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DEMOGRAPHIC ROOTS OF SOCIOECONOMIC DEVELOPMENT: A CASE STUDY FOR TURKEY

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This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science of Economics.

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ABSTRACT

DEMOGRAPHIC ROOTS OF SOCIOECONOMIC DEVELOPMENT: A CASE STUDY FOR TURKEY

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Demographic transition is under way in all over the world as well as in Turkey. From 1940s onwards, life expectancy has increased by more than 30 years and total fertility rate has declined from 6-7 children per woman to almost 2 children in Turkey. Those changes in mortality and fertility patterns affected the age distribution of the population such that share of individuals in working age group has increased to almost 70% while share of children aged 15 and below in total population is lower than 30% and share of elderly aged 65 and over has not increased above 10% yet. Such a change in the age structure of the population in favor of working ages opened demographic window of opportunity for Turkey at the beginnings of 2000s which provides a favorable environment for economic development. Demographic window of opportunity is expected to contribute economic growth through behavioral channels of female labor supply, household savings, and child quality (i.e., investment on education of children). For each of them, a separate model is estimated by using 2003 and 2010 Household Budget

Surveys. Logit estimation procedure is used for female labor force participation model, and ordinary least squares for others. The results reveal that female labor force and child quality channels are functioning in Turkey although the impact of child quantity on child quality is very small. However, household savings do not respond to changes in fertility.

Keywords: Demographic window of opportunity, Female labor force participation, Household savings, Child quality, Turkey

ÖZ

SOSYOEKONOMİK KALKINMANIN DEMOGRAFİK KAYNAKLARI:
TÜRKİYE İÇİN BİR VAKA ÇALIŞMASI

Özer, Merve Nezihe

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Tüm dünyada olduğu gibi Türkiye'de de demografik geçiş süreci deneyimlenmektedir. Türkiye'de doğuşta yaşam beklentisi 1940'lı yıllardan günümüze yaklaşık 30 yıl artmış ve aynı dönemde kadın başına toplam doğurganlık oranı 6-7 çocuktan 2 çocuğa kadar gerilemiştir. Ölüm ve doğum örüntüsünde meydana gelen bu değişimler nüfusun yaş yapısı üzerinde de etkisini göstermektedir. Çalışma çağındaki bireylerin toplam nüfus içindeki payı %70'lere kadar çıkarken, çocukların ve yaşlıların toplam nüfus içindeki oranı sırasıyla %30 ve %10'ların altında kalmaktadır. Nüfus yapısının çalışma çağı yaş grupları lehine değişimi, ekonomik kalkınma için uygun bir ortam sunan demografik fırsat penceresinin 2000'li yılların başında Türkiye için açılmasını sağlamıştır. Demografik fırsat penceresinin kadınların işgücüne katılımı, hanehalkı tasarrufları ve çocuk kalitesi gibi davranışsal kanallar yoluyla ekonomik büyümeye katkı sağlaması beklenmektedir. Türkiye İstatistik Kurumu (TÜİK) tarafından yapılan 2003 ve 2010 yılları Hanehalkı Bütçe Anketleri kullanılarak her bir kanal için ayrı birer denklem tahmini yapılmıştır. Kadın işgücü modeli için logit tahmin yöntemi,

hanehalkı tasarrufları ve çocuk kalitesi modelleri için en küçük kareler yöntemi kullanılmıştır. Sonuçlar göstermektedir ki, kadın işgücüne katılımı ve çocuk kalitesi kanalları Türkiye örneğinde işlevseldir fakat çocuk kalitesi tahmininde miktardaki değişimin kalite üzerine etkisi çok küçük çıkmıştır. Diğer taraftan hanehalkı tasarrufları doğum örüntüsündeki değişikliklere cevap vermemektedir. Bu bağlamda hanehalkı tasarrufları kanalı işlevsel değildir.

Anahtar Kelimeler: Demografik geçiş süreci, Kadın işgücüne katılımı, Hanehalkı tasarrufları, Çocuk kalitesi, Türkiye

To My Family

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ABPRS	Address Based Population Registration System
CBR	Crude Birth Rate
CDR	Crude Death Rate
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
HIPS	Hacettepe University Institute of Population Studies
IMR	Infant Mortality Rate
LFPR	Labor Force Participation Rate
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development
SPO	State Planning Organization
TDHS	Turkey Demographic and Health Survey
TFP	Total Factor Productivity
TFR	Total Fertility Rate
TURKSTAT	Turkish Statistical Institute
U5M	Under Five Mortality Rate
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization

CHAPTER 1

INTRODUCTION

1.1. Overview

Demographic transition theory asserts that a society evolves from a population structure with high birth and death rates to a population structure with low birth and death rates while its economic system transforms from a traditional to an industrialized economy. The process which started in Europe after Industrial Revolution gained momentum in developing countries in the second half of the 20^{th} century and is under way in all over world today.

Turkey is also experiencing a similar process. Mortality indicators have been improving from 1940s onwards while fertility rate started to decline in 1960s in Turkey (Shorter & Macura, 1982). These changes in mortality and fertility patterns eventually affected the age structure of Turkish population substantially, especially after 1980s, such that share of children aged below 15 in total population started to decline while share of working and old age populations has been increasing.

In the process of demographic transition, a certain unique and transitory period is experienced in which young age dependency falls to very low levels and old age dependency does not increase much yet. This period which is associated with accumulation of relatively more individuals in working ages is called demographic window of opportunity. Period of opportunity window is important since it provides a demographically favorable environment for socioeconomic development. By implementing certain policies, this period might be turned to a demographic dividend through the impact of changing demographics on labor market, human capital, savings and investment, and innovation channels.

Turkey is now in its demographic window of opportunity period which started at the beginnings of 2000s and is expected to last until 2035-2040 (Koç, et al., 2010). This period provides an opportunity for Turkey to reach high levels of economic growth as well as to improve its human development level. In this respect, such a study focusing on the demographic roots of socioeconomic development is designed considering the demographic trends and their economic implications in Turkey.

1.2. The Aim and Scope of Thesis

The effects of changing age structure during demographic transition on economic development have attracted attention in the literature with the development experience of East Asian countries, which exhibited an extraordinary performance in economic and human development between years 1960-1990 corresponding to their window of opportunity period (Mason, 2001a). Those countries' experiences provided a guideline for how to turn window of opportunity to a demographic dividend through labor market, savings and investment, and human capital channels that are indicated as potential channels of contribution through which changing demographic structure is expected to contribute economic development.

Since change in the age structure of the population is a macro-demographic phenomenon, most of the studies concentrated on East Asia's demographic dividend have a macroeconomic perspective in nature. However, the "accumulation" idea behind this macroeconomic perspective is nothing but an application of life cycle perspective to aggregates at population level. From a microeconomic perspective, labor supply and savings behavior and demand for education changes through life cycle of an individual. When this perspective is basically applied to population as a whole, a population with a young age structure, a population with a higher share of working age population, and a population where aging problem is severe will have different implications for the economy.

In this respect, this study aims to be more micro-oriented considering the fact that realization of demographic dividend is primarily depends on the functionality of those channels mentioned at micro level. If the behavioral channels – i.e., female labor supply, quality-quantity transition, and household savings – do not respond to changes in demographics at individual or household level, then realization of dividend might not be possible. However, if those channels are functioning, then turning them into aggregates might be possible with sound policies in order to utilize demographic window of opportunity.

Thus, the questions below are tried to be answered in this study.

- Does young and old age dependency at household level have an impact on female labor supply decision and in which direction, if there is any?
- Does young age dependency at household level have an effect on quality of children and in which direction, if there is any?
- Does young and old age dependency at household level have an effect on household savings and in which direction, if there is any?

To answer these questions, three models are estimated to analyze the effect of age dependency at household level on female labor supply decision, child quality, and household savings by using the micro data sets of the Household Budget Surveys conducted by TURKSTAT in 2003 and 2010. The Household Budget Surveys are selected since those surveys provide information on household income and expenditures necessary to perform analyses of especially household savings and child quality models. In addition, considering the availability of the data, those two years are selected since 2003 corresponds to a year near to the opening of opportunity window for Turkey and 2010 corresponds to a more current time. The estimations performed for these years allow making comparison of the change in functionality of those channels mentioned, if there is any. Female labor force participation model is estimated by logit regression, and ordinary least squares is used for child quality and household savings models.

In recent years, several studies have been conducted on Turkey's demographic window of opportunity but those studies mainly employ the macroeconomic perspective mentioned above. In addition, several separate studies have been also conducted for female labor force participation, child quality, and household savings in Turkey but those studies are not holding a demographic perspective as employed in this study. Here, young and old age dependency ratios at household level are considered as the demographic variables representing age structure in the household which are similar to their counterparts at population level. Since demographic window of opportunity is a phenomenon associated with age structure, such a variable is defined for analyses. Those could be considered as the unique features of this study.

1.3. Outline of Dissertation

The thesis consists of four further chapters which are designed as follows.

Chapter 2 provides the literature review. In this section, firstly demographic transition theory is explained based on different experiences of European and developing countries; and in the light of those, Turkey's demographic history is briefly mentioned. After that, economic implications of demographic transition are summarized in the light of East Asian experiences and then, window of opportunity together with the potential channels of contribution is explained. Finally, a brief outline of those channels in Turkish context is provided mostly from a macroeconomic perspective by mentioning other studies conducted on them.

Chapter 3 focuses on data and methodology used. For each model estimated, theoretical framework and model specification together with descriptive statistics for the variables used are explained in this section.

Chapter 4 illustrates the estimation results.

Finally, Chapter 5 concludes the study by providing a brief summary and some policy advices. Discussion and limitations of the study are also provided here.

CHAPTER 2

LITERATURE REVIEW

2.1. Existence of Demographic Opportunity Window

Demographic window of opportunity is basically a period in which age structure of the population provides a favorable environment for a country's economic growth. Opportunity window comes after a time period associated with the change in patterns of two main population dynamics, mortality and fertility, which eventually affect the age structure of the population. This process of change is called demographic transition which constitutes a pre-condition for the formation of demographic opportunity window; thus, it shall be discussed in this chapter by considering different experiences of European countries and developing world before concentrating on the demographic history of Turkey from the establishment of Republic onwards.

2.1.1. European Experience

Most of the history of human beings was characterized by Malthusian conditions such as almost zero economic growth, subsistence level agricultural production and low levels of population growth fluctuating in accordance with natural circumstances (Galor & Weil, 2000; Caldwell, 2004). Before 1800s, demographic structure of Western Europe was characterized by the following facts that total fertility rate was almost 4 to 5 children per woman; life expectancy was 25 to 30 years affected by the high levels of infant and child mortality (Livi Bacci, 2000); and population growth rate was generally under 1% (Lee, 2003). However, this state changed with Industrial Revolution started at the end of 18th century. Income growth and improvements in the standard of living coming with Industrial Revolution caused an initial increase in population growth in Europe in early 19th century confirming Malthusian link between income and population growth; however, this causal channel got shut down soon with the initiation of fertility

decline in most of the European countries observed by the end of 19th century (Galor & Weil, 2000).

Industrial Revolution brought a rapid income growth to the Europe in late 18th and 19th century such that per capita income in Western Europe was tripled by World War I (Caldwell, 2004). As mentioned above, this income growth was associated with a population growth for a limited time period due to rise in fertility but mainly fall in mortality level (Galor & Weil, 2000). Although mortality decline initiated in Northwest Europe in early 1800s (Lee, 2003), large scale mortality decline established in industrialized societies in late 18th century with the improvements in health technology such as invention of smallpox vaccine, application of preventive medicines, better nutrition opportunities due to rising income and reduction of infectious diseases such that mortality rate was estimated to decline by 40% on average between years 1870-1930 (Lee, 2003).

Although it seems that rise of income was associated with rapid population growth in Western Europe at initial stages of Industrial Revolution, Malthusian thesis was broken down especially in the second half of the 19th century (Galor & Weil, 2000). In Western European countries, fertility level started to fall around 1870s (Galor, 2012) since change in the mode of production brought a rational for demographic behavior different than that of agricultural society (Caldwell, 2004). This transition is called as transition from a post-Malthusian to a modern growth regime by Galor and Weil (2000) characterized by fertility decline with rise of income, which mainly triggered by the rising importance of schooling due to mortality decline and increasing returns to human capital after technological change and changing status of women (Galor & Weil, 2000).

This radical change in the rationale of demographic behavior in European history was later formulated in demographic transition theory which is firstly proposed by Warren Thompson in 1929 but became a systematic theory with the studies of Frank W. Notestein in 1940s and 1950s (Kirk, 1996). Demographic transition theory was formulated by considering the regularities observed in the unique

history of European demographic change; thus, a detailed look at the theory might be illuminating to understand the European case.

The main argument of demographic transition theory is that a society evolves from a population structure with high birth and death rates to a population structure with low birth and death rates while its economic system transforms from a traditional to an industrialized economy. Demographic transition theory started mainly as an attempt to classify and identify countries based on their different population dynamics. Notestein's (1950) classification is as follows:

Regions with incipient decline: Those countries have already completed their transition from high death and birth rates to low mortality and fertility. Fertility level is near to the replacement level which eventually produces a stationary population structure. Decline in mortality and fertility has produced a population structure with high average ages. At the time that the article was written, Notestein put most of the European countries, Canada, United States, New Zealand and Australia into this group.

Regions of transitional growth: Those countries are initially experiencing modernization so their fertility and mortality levels just started to decline in the way that would possibly produce a rapid population growth. In 1950s, Notestein classified some Latin American and Eastern European countries, Soviet Union and Japan under this group.

Regions with high growth potential: This group is the most heterogeneous group but mainly mortality and fertility level in those countries were very high. In some of them, mortality transition had begun already so they carry a potential for high population growth. Middle Eastern and African countries with much of the Latin American countries fall into this group in the Notestein's classification.

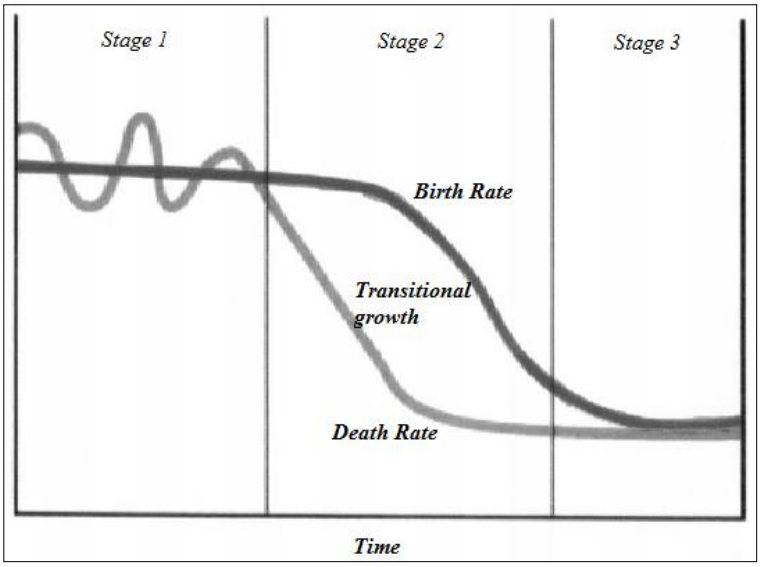


Figure 2.1: Demographic transition with three stages

Those earlier definitions led to a three-stage demographic transition model as in Figure 2.1. As countries modernize, they pass those stages as in European case. According to the model, a country in the first stage is mainly agrarian and has a young population structure with high fertility and mortality levels. As mentioned earlier, mortality levels are generally high and fluctuating at this stage depending on Malthusian reasons such as epidemics, malnutrition and famine (Lee, 2003). On the other hand, agriculture's being main economic activity leads to high fertility levels due to several reasons. In an agricultural society, children can participate to the labor force in earlier ages because schooling for long years is not needed. In a large family system, care for children is not a big burden also. In a traditional society where social security systems in today's terms are not available, children are also seen as an old age security. All of these reasons increase the value and/or decrease the cost of having more children. Caldwell (1976) explains the rationale of having more children in an agrarian society by his wealth flow hypothesis. Resources are flowing from younger to older generations due to the reasons mentioned above so keeping fertility level high is rational in such a societal context where high mortality levels are especially concentrated among infants and children.

With the initiation of development, mortality levels start to decline which corresponds to the beginning of second stage in demographic transition. Improvements in medical technology such as invention of medicines, vaccines and antibiotics and introduction of preventive public health measures together with advancement of sanitation and public order are the key elements contributing to the decline of infectious diseases and epidemics (Kirk, 1996; Lee, 2003). In addition, progress of transportation and communication facilities together with advancements of agricultural technology decrease the fluctuations in food supply which in turn make a significant contribution to decline of famines (Lee, 2003). Cumulative effect of the improvements in nutrition and health measures is eventually reflected by the decline of mortality levels and increase in life expectancy at all ages (Kirk, 1996). In essence of the theory, decline in mortality levels preceding the decline in fertility leads to a transitional stage of rapid population growth. In the following periods of second stage, fertility begins to respond to the decline in mortality due to the following reasons: Mortality decline first shows its effect among infants and children, the groups which are exposed to higher risk of mortality. In addition, in the development process, a gradual dissolution of agriculture is experienced since mechanization of agriculture lowers demand for labor. Modern urban-industrial sectors require skilled labor force so education gains importance. With the increase in importance given to human capital, people start to spend longer times in schooling so cost of childrearing increases. Dissolution of agricultural-traditional system also leads to dissolution of traditional large family system so children are no longer seen as a source of old-age security. In other words, wealth starts to flow from older to younger generations unlike in the first stage so Caldwell (1976) interprets the change in the direction of resource flows as a major factor of fertility decline. On the other hand, increase in educational attainment delays the time of marriage and birth. When educational attainment of women increases, they start to participate into labor force more. This emerging role of women increases the opportunity cost of having more and more children in an urban context. Together with these socioeconomic changes, increase in the availability of modern contraceptive

methods highly contributes to the decline of fertility levels (Notestein, 1944; Lee, 2003).

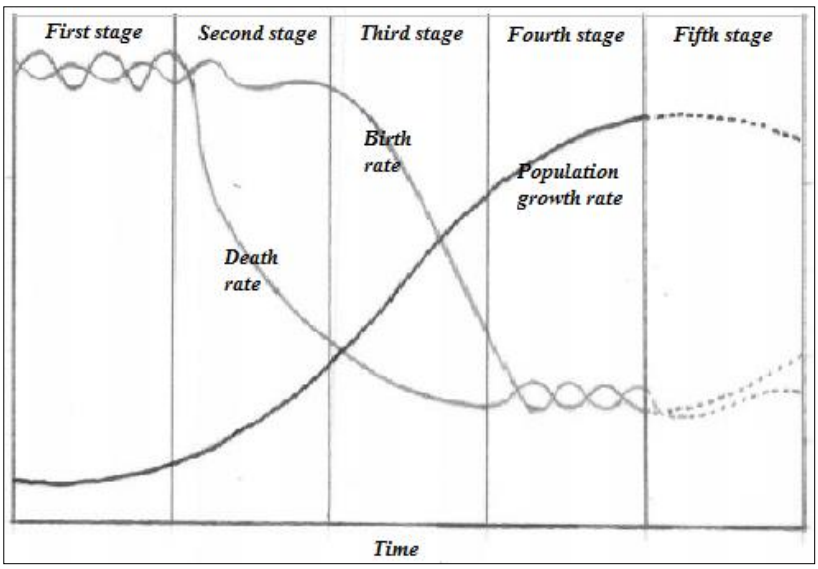


Figure 2.2: Demographic transition with five stages

In the final stage of the demographic transition, both fertility and mortality transitions are completed by converging to each other at low levels. After a transitional rapid growth period, population reaches to a stable structure. Development process is also already completed and a society at this stage has a middle-old aged population structure. However, demographic transition process does not come to an end with the completion of third stage. Blacker's (1947) five-stage model presented in Figure 2.2 corresponds to this further demographic change. Five stages are named as follows: *high stationary, early expanding, late expanding, low stationary and diminishing* (Blacker, 1947). As could be seen from Figure 2.2, high stationary stage corresponds to the first stage and low stationary stage corresponds to the third stage explained above. Second stage is divided into two as early and late expanding stages. Differently, in the fifth stage, population is expected to decline due to falling trend of fertility and increase in the mortality rate which is a result of the increase in the share of old-age population in total population. This phenomenon is called "*second demographic*

transition" by Van de Kaa (1987). The most important feature of second demographic transition is fertility rate declining below the replacement level (Van de Kaa, 1987). Fertility possibly declines under replacement level due to increase in the level of individualism and change in social norms. Individualistic aspirations and change in social norms cause changes in the meanings of family union, marriage and parenthood so further delay of marriage and parenthood, social acceptability of cohabitation and out-of-wedlock births and increasing number of partners without any children are the reasons of further fertility decline (Van de Kaa, 1987). Considered together with the increase in the share of old-age population so as mortality rate, population is expected to diminish in size in this last stage unless immigration does not occur, which is also mentioned earlier by Notestein (1950).

Table 2.1: Some demographic indicators for developed countries, 1950-2010

	1950-1955	**1960-1965**	**1970-1975**	**1980-1985**	**1990-1995**	**2000-2005**	**2005-2010**
Population growth rate (%)	1.204	1.080	0.776	0.600	0.434	0.336	0.420
Rate of natural increase (‰)	11.8	10.3	6.5	4.8	2.4	0.8	1.4
Life expectancy at birth (both sexes)	64.67	69.45	71.08	72.82	74.09	75.56	76.90
Male	62.06	66.32	67.46	68.99	70.17	71.85	73.37
Female	67.16	72.42	74.54	76.51	77.95	79.27	80.41
TFR	2.83	2.68	2.15	1.84	1.67	1.58	1.66

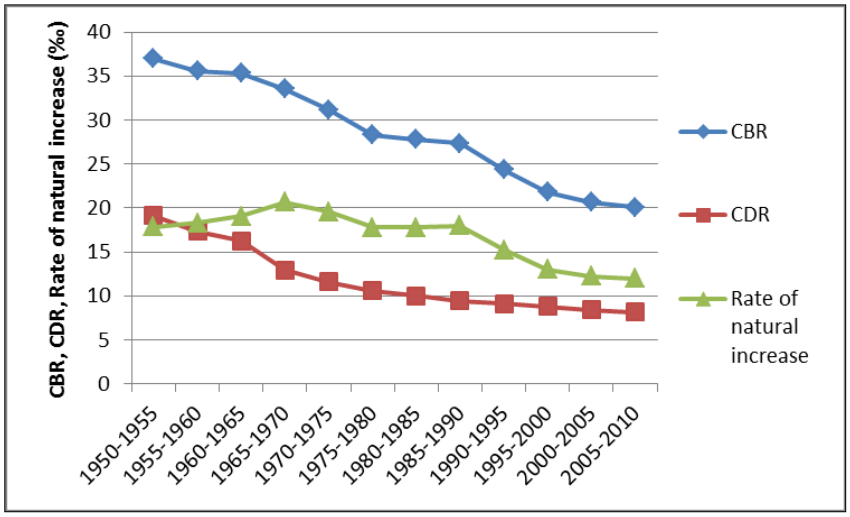
Source: UN World Population Prospects: The 2012 Revision, 2013

First stage of Blacker's demographic transition model corresponds to Europe before Industrial Revolution while second and third stages reflect the era of 19th and early 20th century. Some demographic indicators presented in Table 2.1 show that today's developed countries including not only Europe but also Northern American countries, Australia, New Zealand and Japan are at the fourth stage of demographic transition today. Population growth is very low due to fertility rate under replacement level and life expectancy has already reached very high levels.

According to UN World Population Prospects: The 2012 Revision (2013), share of children aged 0-14 was almost 28% in total population in 1950 but this ratio declined to 16% in 2010. While share of children under 15 has been declining share of elderly people aged 65 and over has increased from 8% to 16% at the same period which reflects aging of the population in developed countries. Most of those countries already completed their first demographic transition and started to experience second demographic transition characterized by fertility under replacement level; therefore, especially Europe is expected to experience depopulation in near future unless there will be an increase in fertility level. Most of the Eastern European countries, Northeastern European countries such as Latvia, Estonia and Lithuania with Italy, Germany and Japan are the countries in the fifth stage of the transition such that they are already experiencing negative natural rate of population increase.

Although demographic transition theory fits well to the historical and current demographic experience of Europe overall, it has been criticized from several aspects. First of all, Notestein has been criticized due to his overemphasis on socioeconomic factors as determinants of fertility change but his ignorance of cultural aspects (Kirk, 1996). Cultural background of societies might independently determine the level of fertility. In his study, Lesthaeghe (1977) showed that different cultural-linguistic groups in Belgium had differential fertility rates although the socioeconomic development level was the same. Another criticism directed to the theory is that demographic transition theory does not mention anything about the differences in pre-modern fertility levels in different societies (Kirk, 1996). Laslett (1972) also argued that fertility was not very high in pre-industrial Europe. Laslett's hypothesis was confirmed by Hajnal (1982) who stated that marriage age in pre-industrial Northwestern Europe was relatively high, putting a pressure on fertility level when compared to other parts of the less developed world such as China in 1920s and 1930s and India in 1950s. In addition, mortality transition, for instance, took longer time in Northern Europe than in Eastern Europe but it is argued that the theory does not explain those differences between timing and duration of the transition among different regions

(Kirk, 1996). Beside those critics, the assumption that mortality decline precedes fertility decline does not applicable for some parts of Europe such as France since use of some contraception was general in late 18th century in France so it was argued that mortality and fertility decline went hand by hand in France (Kirk, 1996).



Source: UN World Population Prospects: The 2012 Revision, 2013

Figure 2.3: World's average of CBR, CDR, and rate of natural increase, 1950-2010

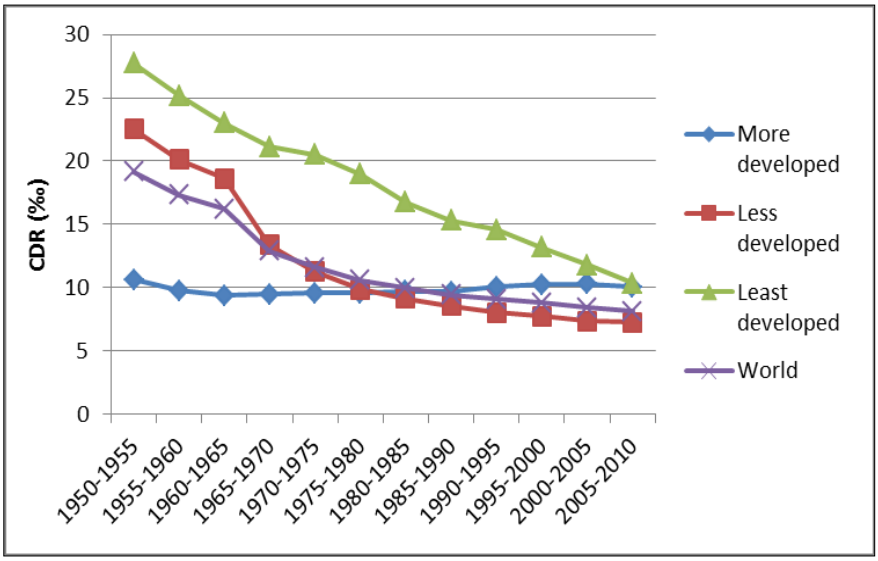
Although all of those critics are justified to some extent, none of them could replace demographic transition theory so the theory preserves its explanatory power in the area despite of its shortcomings. Although the theory has been still criticized that it is only a generalization specific to a particular time period (Hauser & Duncan, 1959) so such a formulation based on European experience in 18th and 19th centuries does not well fit to the experience of developing countries (Kirk, 1996), the implications of demographic transition theory were even extended to developing world due to the trends observed in mortality and fertility after World War II.

As could be seen from Figure 2.3, there has been a dramatic decline in both fertility and mortality levels in the world overall. Rapid decline in mortality level

associated with relatively high level of fertility produced a rapid population growth in 1950s and 1960s but after 1970s, rate of natural increase started to decline together with fall in fertility rates. Many developed countries experienced mortality and fertility transitions in late 18th and early 19th century so from 1950s onwards, the majority of fertility and mortality decline has come from developing countries which experienced demographic transition in a different way than developed ones.

2.1.2. Developing Countries' Experience

As mentioned in Section 2.1.1, demographic patterns started to change in developing countries after World War II. Declining mortality level together with high fertility rate sustained for a time period caused rapid population growth in less developed world that enlivened the discussions on demographic transition theory but with deviations from its conventional basis.

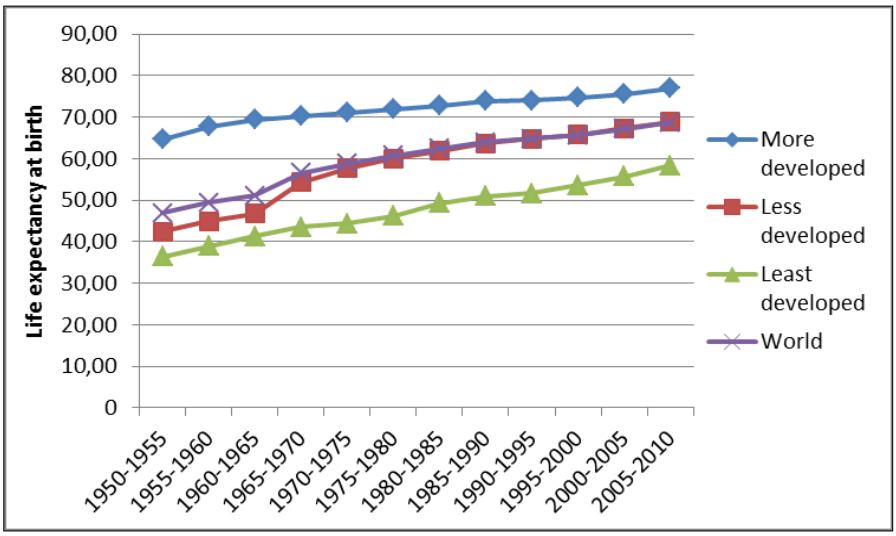


Source: UN World Population Prospects: The 2012 Revision, 2013

Figure 2.4: Crude death rate by level of development, 1950-2010

Mortality transition in the developed world is always linked with increase in agricultural productivity and technological advancement coming with Industrial

Revolution that brought diseases under control (Hodgson, 1983). However, in non-industrialized world, "colonial interpretation of demographic transition" might be applicable in the sense that developed world caused some socioeconomic changes in their colonial countries to ensure resource flows such as initiation of rationalization and commercialization of agriculture, sustaining internal order, advancements of transportation and communication opportunities and implementation of public health measures (Hodgson, 1983). From 1940s onwards, improvements in public health measures including access to safe water, increasing availability of medicines and health care and large scale immunization programs implemented with the active involvement of governments and international agencies contributed to the decline of mortality rates in developing countries (Reher, 2004; Bloom, et al., 2003). This process called as "one-sided modernization" by Hodgson (1983) resulted in rapid decline in mortality and increase in life expectancy especially in developing and least developed countries from 1950s onwards.

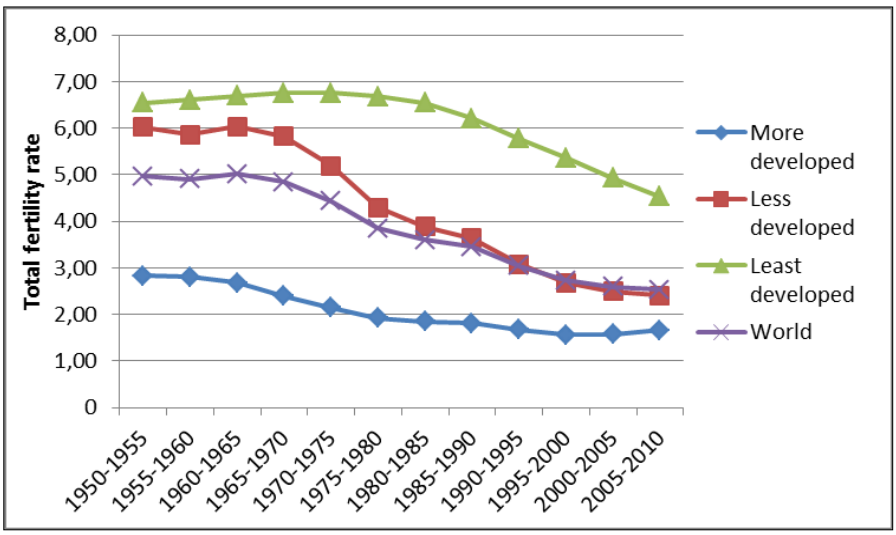


Source: UN World Population Prospects: The 2012 Revision, 2013

Figure 2.5: Life expectancy at birth by level of development, 1950-2010

While mortality level started to decline rapidly, fertility level remained relatively high in those countries until 1970s-1980s. According to UN World Population

Prospects: The 2012 Revision, the average number of children per woman was about 6 at the beginning of 1950s and it showed only a slight decline until the end of 1960s in less developed countries. According to Hodgson (1983), industrialization was not initiated in those less developed countries so they started to experience mortality transition without initiation of socioeconomic context which motivates fertility decline (Hodgson, 1983) so the time gap between mortality and fertility decline was longer in developing countries than developed ones (Reher, 2004).



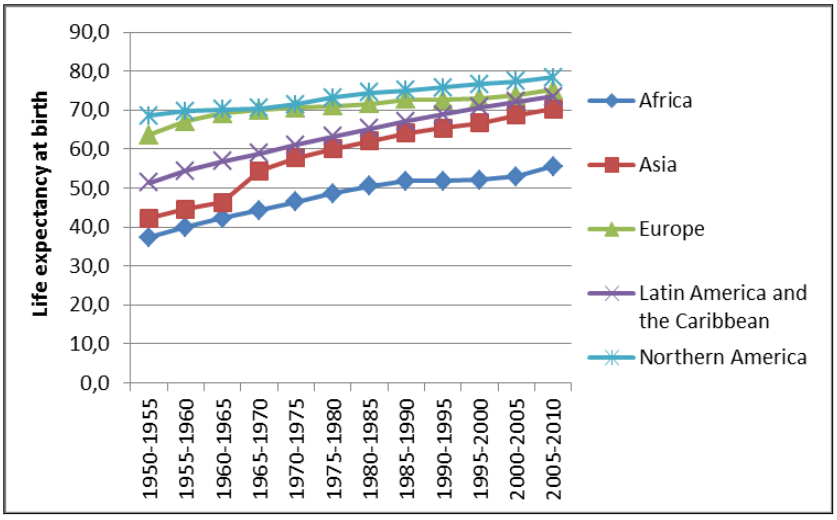
Source: UN World Population Prospects: The 2012 Revision, 2013

Figure 2.6: Total fertility rate by level of development, 1950-2010

Together with rapidly declining mortality rates, these high levels of fertility sustained for a relatively long time produced rapid population growth rates in developing countries, leading to concerns about the adverse effects of rapid population increase on economic development, natural resources, living standards and welfare at both national and international level (Seltzer, 2002). For instance, governments of several East Asian countries, which were previously supporting population growth, started to implement antinatalist population policies due to the rising concerns about how to feed their growing populations (Mason, 2001c). These concerns were also gradually reflected in international conferences on

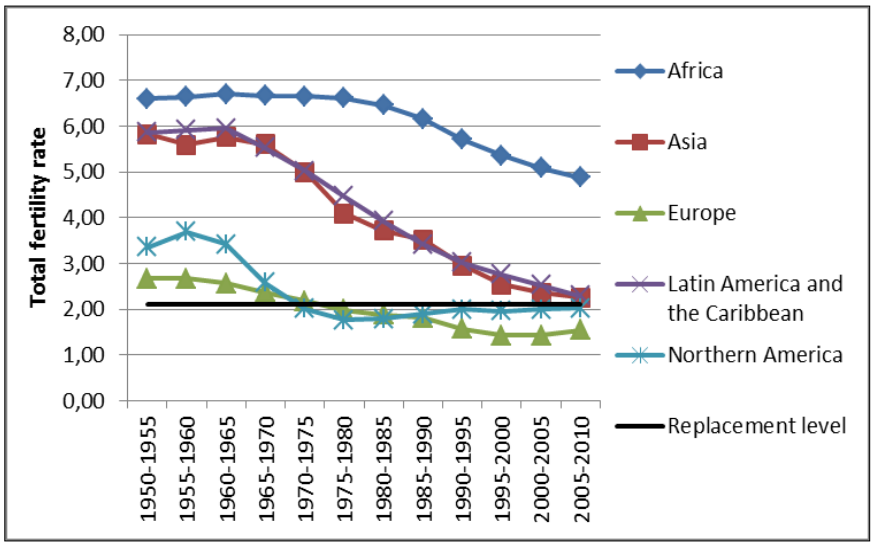
population issues held by United Nations in 1950s and 1960s but Bucharest Conference in 1974 was the one in which governmental intervention was strongly favored to lower population growth in developing countries (Finkle & McIntosh, 2002). All of those concerns constituted the basis of implementation of large-scale family planning programs with the involvement of international agencies all over the world such that by 1998, 179 countries comprising 99% of world population implemented at least one of the forms of family planning programs (Seltzer, 2002). Besides other factors which are expected to lower fertility rate such as economic development, increasing female education and female labor force participation, family planning programs played a critical role in fertility transition of developing countries such that from 1970s to 1980s, TFR dropped by approximately one child just in ten years while it dropped at a rate less than that from 1950s to 1970s.

As second demographic transition is under way in developed countries today, almost all of the developing countries are now experiencing first demographic transition. Mortality transition is nearly completed and fertility declined substantially towards replacement level in many less developed countries except the least developed countries in Africa where fertility transition started after 1980s. According to UN World Population Prospects: The 2012 Revision, Africa is the only continent where life expectancy is under 60 years and total fertility rate is above 4 children per woman so Africa is still experiencing a rapid population growth unlike most of the European countries which experience depopulation.



Source: UN World Population Prospects: The 2012 Revision, 2013

Figure 2.7: Life expectancy at birth by continents, 1950-2010



Source: UN World Population Prospects: The 2012 Revision, 2013

Figure 2.8: Total fertility rate by continents, 1950-2010

Besides these two extremes, Asia and Latin America which constitute the majority of developing countries are experiencing population growth at a relatively more moderate level. Although total fertility rate in those continents have been

declining towards replacement level, they are still experiencing population growth mainly due to population momentum. Nevertheless, according to UN World Population Prospects: The 2012 Revision, those continents are expected to experience depopulation as in Europe after 2050s when their population momentum loses its effect.

Change in mortality and fertility patterns in developing countries affected age distribution of population. In most East Asian countries from 1960s onwards and in Southeastern and Latin American countries from 1970s onwards, share of children in total population declined to 30-40% while those regions have not been experiencing a rapid increase in share of elderly people unlike Europe so age structure of their populations already started to provide a favorable conditions for their economic development.

According to Kirk (1996), the main strength of demographic transition theory is that it predicts the change in demographic structure in every population which starts to experience modernization. However, the experience of developing countries might show that demographic transition could be initiated without modernization but the side effect of this process was rapid population growth triggered due to health driven mortality transition with absence of required economic forces underlying fertility transition. After rapid population growth, the strongest side of the theory turned to a policy instrument as the justification of implementation of family planning programs in developing world. Although at initial stages fertility decline reflected the diffusion of ideas in the form of "Westernization without modernization" (Caldwell, 2004), fertility transition was later well established with the change in economic structure in developing countries, as it might already happen in a similar manner in Turkey.

2.1.3. Turkey's Demographic Transition

Turkey's demographic history has been analyzed in three periods in several studies (Shorter, 1995; Koç, et al., 2010; Tansel, 2012) which are the periods between years 1923-1955, 1955-1985, and 1985 onwards.

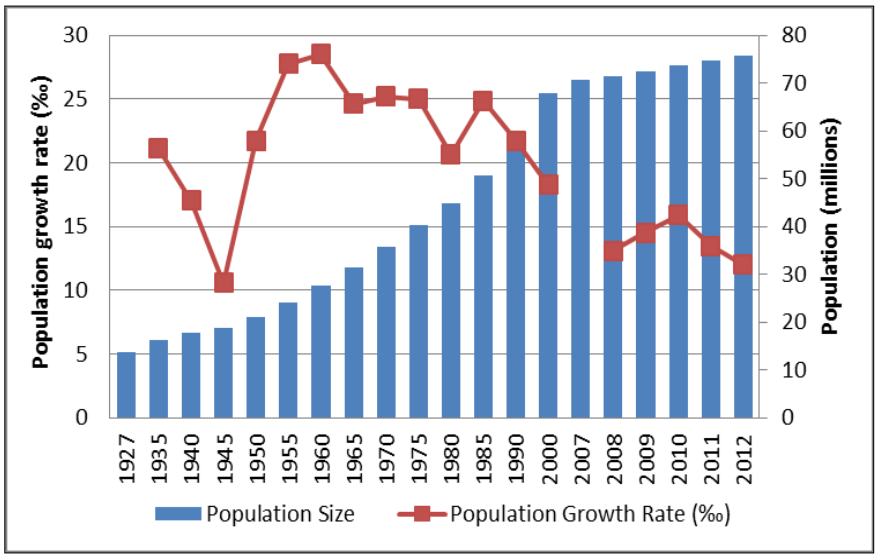
The first stage of demographic history of Turkey from 1923 to 1955 is marked with implementation of pronatalist policies. Population size was approximately 13.6 million in 1927 and male population was found less than female population about 500,000 in 1927 Population Census, which is the result of long years of wars. With the aim of building a nation, increase in population was seen as a source of economic development so policies such as tax exemptions for families with large number of children, decrease in minimum legal marriage age, prohibition of abortion and distribution of contraceptives, and implementation of health policies aiming to decrease child mortality was implemented in this period in order to foster population growth (Koç, et al., 2010).

In the second half of 1950s, the way of approaching to population issue changed. In The First Five-Year Development Plan 1963-1967, rapid population increase from the establishment of Republic onwards was signaled as the primary obstacle for achieving development target if population growth would continue in the same pattern so the need for an immediate policy change was mentioned (SPO, 1963). In the direction of policy advices in The First Five-Year Development Plan, a new law on family planning, *Law on Family Planning No.557,* was enacted by Turkish Grand National Assembly in 1965 which allowed to import and distribution of contraceptive and to authorize health personnel to inform people on family planning. Turkey made a transition from pronatalist to antinatalist population policy with this law (Koç, et al., 2010).

However, it seems that enactment of the *Law on Family Planning No.557* in 1965 did not meet the need as expected. In the proposal given by members of Advisory Council in 1982, *Draft on amendment to the Law on Family Planning No.557 with Turkish Penal Code No.765,* to negotiate the provisions of law enacted in 1965 on abortion, it was stated that population growth rate did not slow down despite of the law implemented, and half of the pregnancies in Turkey were unwanted, and prohibition of abortion results in health risks both in mothers and babies. Thus, after emphasis on the duties of state on family planning taken place in 1982 Constitution, a new law on family planning, *Law on Family Planning*

No.2827, was enacted by Turkish Grand National Assembly in 1983 which allowed implementation of sterilization to both sexes depending on their demand, and induced abortion until the end of 10 weeks of pregnancy. After the enactment of this law, a new era started in Turkish demographic history from 1985 onwards.

Parallel with those changes in policy dimensions, Turkey's demographic structure has been changed throughout these decades. Despite of the implementation of antinatalist policies, population growth rates continued to decline due to the political climate caused by World War II until 1945; however, those policies seem to show their results from 1945 to 1960. From 1960s to 1980s, population growth rate remained at high levels except a relative decline in 1980. However, population growth rates continuously slowed down after 1985 and finally reached about 12‰ in 2012 so enactment of law on family planning in 1985 seems to function well.



Source: TURKSTAT, Population Censuses, 1935-2000
TURKSTAT, ABPRS, 2007-2012

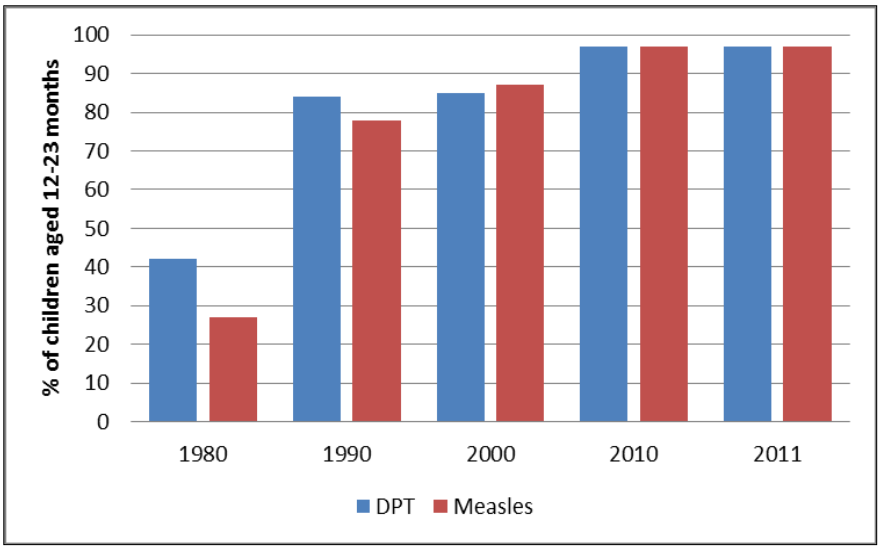
Figure 2.9: Population size and growth rate in Turkey, 1927-2012

However, changes of patterns observed in demographic structure cannot be the result of only population policies implemented so far; therefore, sustained rapid

population growth in 1960s or decline in population growth achieved after 1980s could not be totally attributed to the failure or success of the laws enacted. Changes in the patterns observed were also driven by the changes in socioeconomic environment (TÜSİAD, 1999). However, contribution of policies, even slight or large, to changes in overall health status and reproductive health which affected mortality and fertility patterns should not be ignored in this discussion[1].

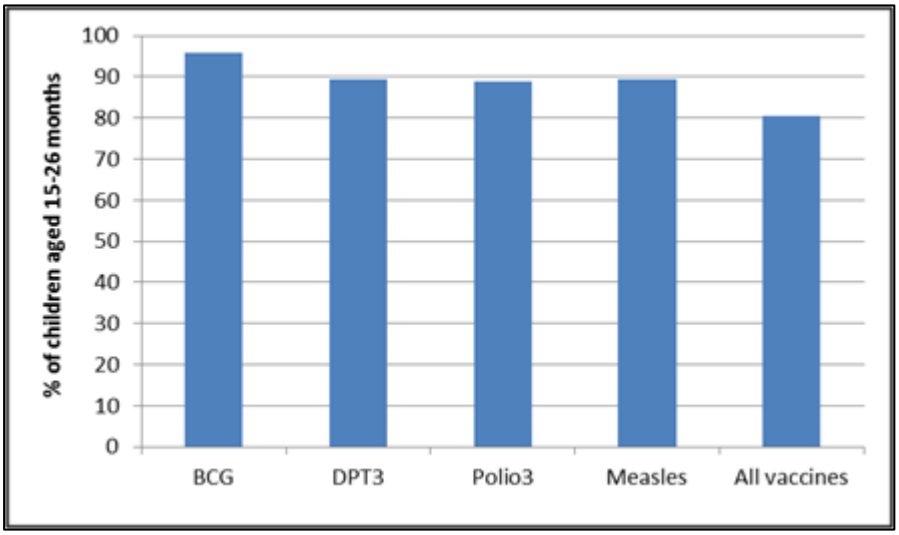
As mentioned earlier, measures were initiated to decline high mortality level and to increase health status in the pronatalist era with the enactment of Public Health Law in 1930. First of all, fight with epidemics was aimed at those times, and production of vaccines was given a special importance (Buzgan, 2011). After 1960s, aim of delivering protective health measures to large masses of people came to the fore with the law on socializing public health services enacted in 1961 under the guarantee of 1961 Constitution (Akın & Ersoy, 2012). With the implementation of the law started in 1963, widespread vaccination practices started to be implemented (Buzgan, 2011). Socialization process was almost completed in 1983 (Akın & Ersoy, 2012), and as could be seen from Figure 2.10, ratios of immunized children aged 12-23 months increased dramatically from 1980 to 1990, reached eventually almost universal levels in 2011. As reflected in Figure 2.11, Turkish Demographic and Health Survey conducted in 2008 also show similar results.

[1] As mentioned above, Turkey's demographic history is divided into three broad historical phases in studies of Koç, et al. (2010) and Tansel (2012) based on the timing of population policies implemented. When this historical order is followed, it seems that population policies preceded demographic shifts in Turkey's demographic history. However, a detailed discussion on whether policies or economic shocks are more important in the initiation of demographic transition in Turkey is not subject to interest considering that this thesis focuses on the economic implications of demographic transition process rather than the reasons of initiation of the transition process.



Source: World Bank, World Development Indicators, 2013

Figure 2.10: Immunization ratios for several diseases in Turkey, 1980-2011



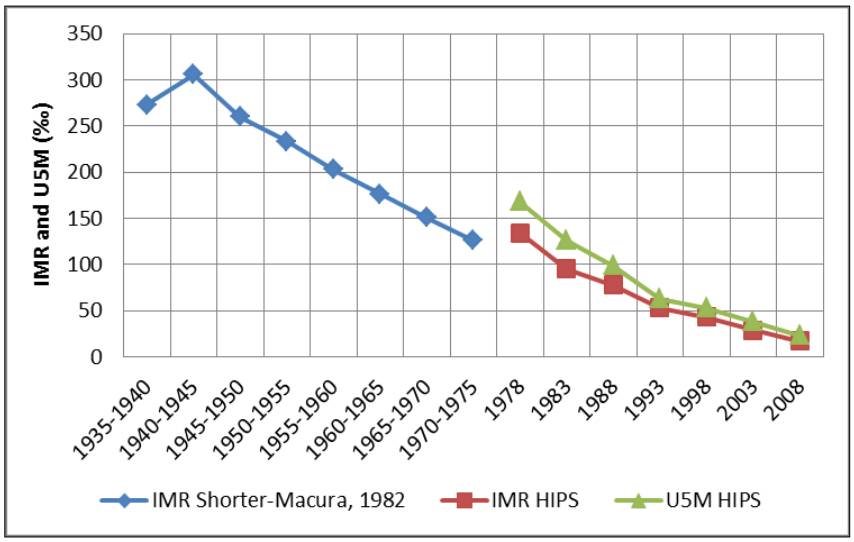
Source: TDHS 2008, 2009

Figure 2.11: Proportion of children immunized in Turkey, 2008

Improvements in extensity of and access to health services are reflected by improved health status in all segments of population. After World War II, crude death rates exhibit a continuous decline. Protective health services mentioned

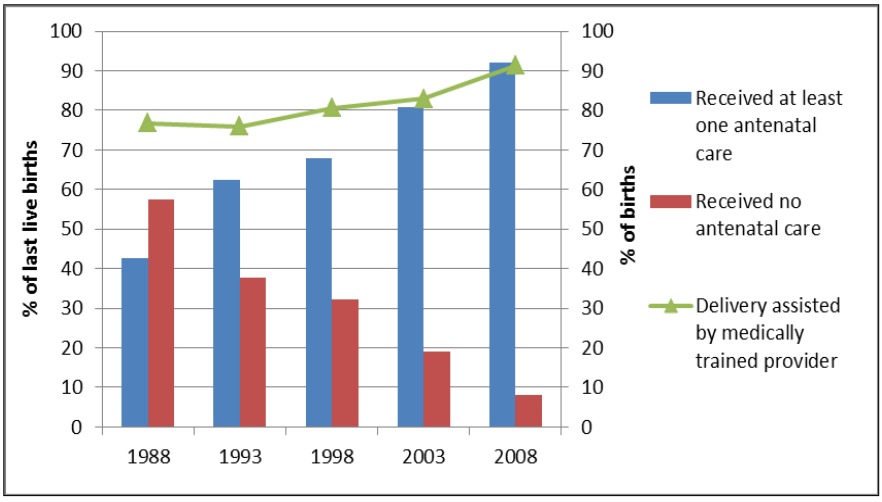
above contributed significantly to decline in infant and child mortality rates which are the major forces that have driven crude death rate down. Improvements in maternal health and nutrition status of children should also be mentioned as important factors for declining infant and child mortality rates.

Surveys conducted by Hacettepe University Institute of Population Studies reflected that proportion of mothers who do not receive at least one health control in the prenatal period declined from 57.4% to 8% between 1988 and 2008 and proportion of births delivered by medically trained personnel increased from 76.8% to 91.3% in the same period. Results of the same surveys also showed that there are improvements in nutrition status of children from 1993 to 2008 as indicated by indices such as weight-for-age, weight-for-height, and height-for-age which are accepted as the indicators of chronic malnutrition. Percentage of children under age 5 in all of the indices exhibited a declining pattern in last 15 years.



Source: Shorter and Macura, 1982
HIPS, 1978-2008

Figure 2.12: Infant and under five mortality rates in Turkey, 1935-2008

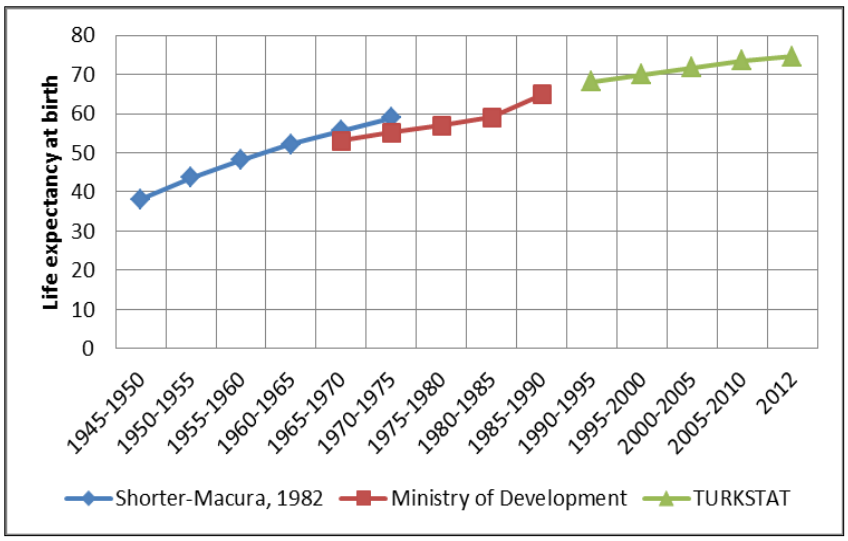


Source: HIPS, 1988-2008

Figure 2.13: Antenatal care and delivery assisted by medically trained personnel in Turkey, 1988-2008

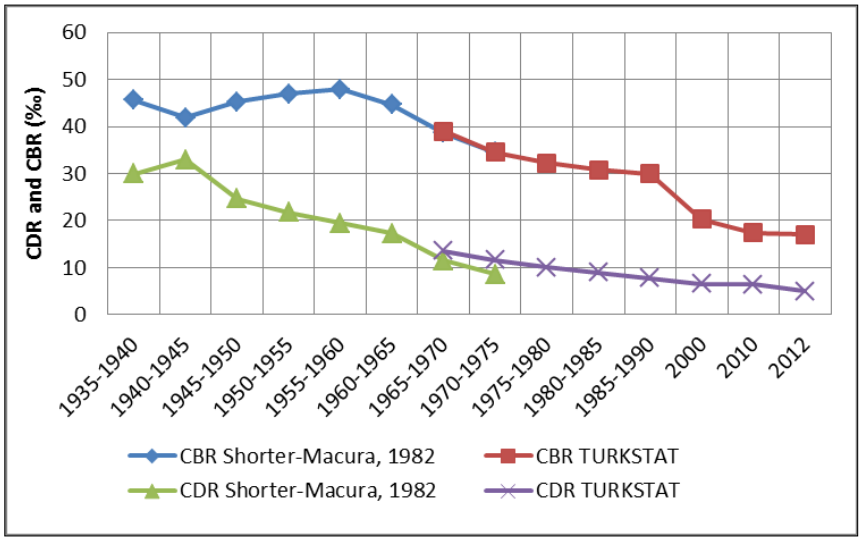
Although it is difficult to state any specific time about the initiation of mortality transition due to inadequacy of data for the period before the establishment of Republic, improvements in overall health status started with the measures of Public Health Law enacted in 1930 formed the basis of mortality transition which is the first step of Turkish demographic transition. Improvement in overall health status is reflected by continuous rise in life expectancy at birth presented in Figure 2.14. According to the TURKSTAT projections, life expectancy at birth has reached 72 years for males and 77.2 years for females in 2012.

When mortality indicators have exhibited a continuous improvement, crude birth rate increased until the end of 1950s as a result of pronatalist policies implemented between years 1923-1965, leading to high levels of natural rate of increase in population. Social and economic conditions in the era together with the ban on family planning activities resulted in high fertility rates which started to decline in a faster way especially after 1970s.



Source: Shorter and Macura, 1982
Ministry of Development, 2013
TURKSTAT, Population Projections, 2013

Figure 2.14: Life expectancy at birth in Turkey, 1945-2012

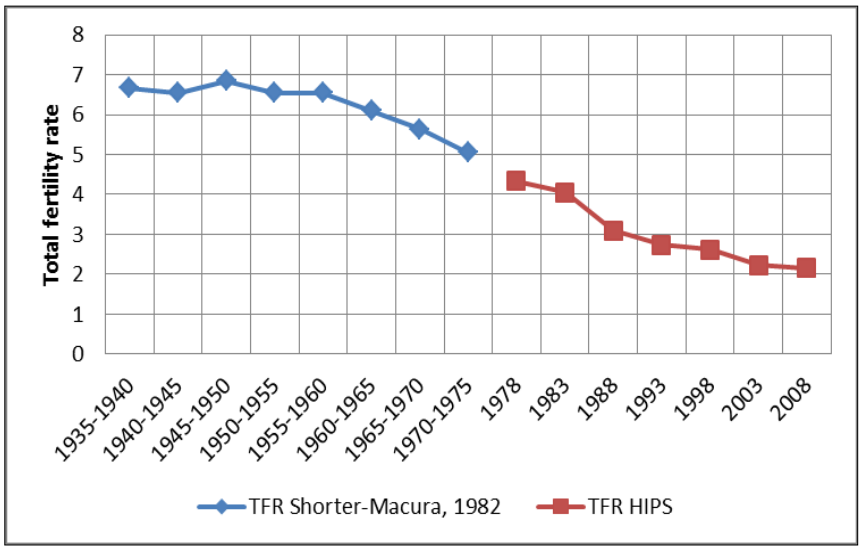


Source: Shorter and Macura, 1982
TURKSTAT, 1965-2012

Figure 2.15: Crude birth and death rate in Turkey, 1935-2012

Estimates of Shorter and Macura (1982) showed that TFR was 6.66 between years 1935-1940, which declined to 6.55 in the following five-year period, and

increased to 6.85 in 1945-1950. However, those increases and decreases were due to the extraordinary nature of time so it could not be interpreted as a trend in fertility dynamics. In addition, there were significant differences in fertility levels between provinces such as TFR in Istanbul was estimated around 3 while it was almost 10 in some eastern provinces (Shorter & Macura, 1982). Fertility transition most probably started earlier in big metropolitan cities such as Istanbul or Izmir than other parts of the country. For example, age at marriage for women in Istanbul was 19.1 in 1885 and 20.5 in 1907, higher than the age at marriage in any other rural areas (Duben & Behar, 1991). Additionally, Duben and Behar (1991) calculated that TFR was 3.5 and 3.88 in Istanbul in 1885 and in 1907, respectively. By comparing historical record with the estimates of Shorter and Macura (1982), Duben and Behar (1991) concluded that almost half of the fertility decline in Istanbul between 1907 and 1945 could be attributed to decline in marital fertility while the other half was attributed to change in marriage patterns (Duben & Behar, 1991). However, making a generalization including other parts of Turkey seems very difficult.

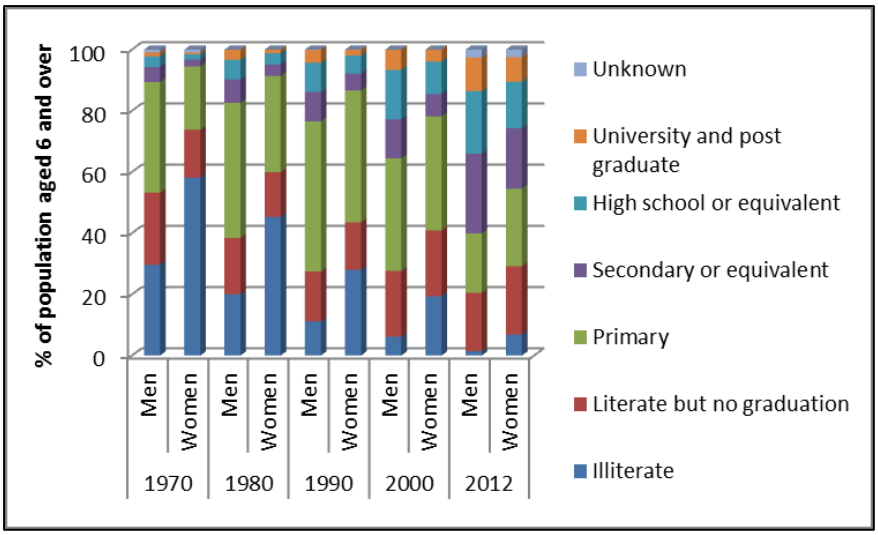


Source: Shorter and Macura, 1982
HIPS, 1978-2008

Figure 2.16: Total fertility rate in Turkey, 1935-2008

Information on general trend in Turkish fertility comes from indirect estimations from censuses and sample surveys conducted. Shorter and Macura (1982) estimated that a declining trend in fertility settled after 1960s. Turkish Fertility Survey conducted in 1978 showed that desired TFR was about 3 while actual TFR was calculated as 4.33. The difference between desired TFR and actual TFR could be an indicator of unwantedness of birth and unmet need for contraception while such a desire to have less number of children could be accepted as the root of fertility transition in Turkey so fertility rate reached almost replacement level according to the results of TDHS 2008. According to results of Turkish Fertility Survey in 1978, TFR in urban areas was 3.67 while it was 5.06 in rural but results of TDHS 2008 showed that TFR in urban and rural areas has reached 2.00 and 2.68, respectively which also indicates that rural and urban fertility levels converged to each other through time.

Change in fertility patterns could be explained by indirect factors such as urbanization, educational attainment, and labor force participation of women and by direct factors such as age at marriage and usage of contraception (Koç, et al., 2010). As mentioned above, fertility levels differentiate between urban and rural areas. According to results of 1927 Population Census, only 24% of Turkey's population was living in urban areas while this ratio has increased to 77.3% as the results of ABPRS 2012 showed. As mentioned above, TDHS 2008 results show that urban and rural difference in fertility declined substantially so this convergence might be attributed to the increase in urbanization since change in economic structure and way of living coming with urbanization might be the factors driving fertility rate down.



Source: TURKSTAT, Population Censuses, 1970-2000
TURKSTAT, ABPRS, 2012

Figure 2.17: Population by educational attainment in Turkey, 1970-2012

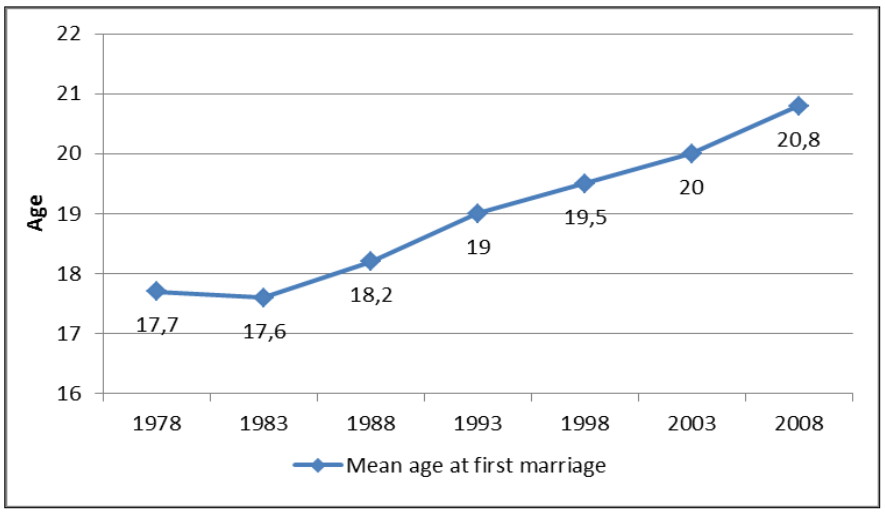
Increase in educational attainment is one of the most important factors that affect the fertility behavior since educational status, especially of women, determines the age at first marriage, knowledge and usage of contraception, and eventually the number of children. TDHS 2008 results showed that women who have not any educational attainment have one more children on average than the women who have at least high school education. Difference in marriage age between those groups was also calculated approximately 5 years. In 1935, almost 92% of women aged 15 and over was illiterate while this ratio has declined to about 7% in 2012. In 1970, only 25% of women graduated from any school while this ratio increased to 68% in 2012. It is found that 1% decrease in illiteracy rate of women contributes 44% decrease in fertility while 1% rise in high school graduation rate decreases fertility 15% (Yaşıt, 2007) so increase in educational attainment of women is one of the underlying factors triggering fertility transition in Turkey.

As educational attainment increases, women are expected to participate into labor force more. Since high level of fertility bears more opportunity cost for women who are working in the market, increase in female labor force participation is

expected to contribute fertility decline. Actually, there is a bidirectional relationship between female labor force participation and fertility level since as fertility declines, women are expected to participate into labor force more. Although several studies showed that employed married women have less children than the unemployed ones (Doğan, 1987) and working status of women in urban areas are especially inversely related with fertility level (Karadayı, 1971; Doğan, 1987), some other studies could not confirm this relationship (Yaşıt, 2007). Turkish case seems puzzling in the sense that female labor force participation has followed a declining trend until recent years in spite of declining fertility. Female labor force participation started to increase in recent years but those ratios are significantly low when compared to other OECD and European and Central Asian countries (World Bank & SPO, 2009). Change in economic structure in developing countries might result such a declining trend in female labor force participation due to some reasons such as dissolution of agriculture and low education and experience of women for urban sectors. In addition to those possible effects, traditional role of women as a care provider and home maker seems to be slowly changing in Turkey since TDHS 2008 results revealed that 31% of women who are not currently working stated childcare as the reason of not working, while 22% of women showed being housewife as a reason of not to work. Therefore, relationship between female labor force participation and fertility in Turkey seems ambiguous.

The indirect factors explained above, urbanization, improvements in educational attainment and labor force participation affect fertility level through their effects on direct factors affecting fertility such as age at marriage and contraception usage (Koç, et al., 2010). In the development process, industrialization going hand by hand with urbanization requires new skills for labor and this leads to an extension of years of schooling. Longer years of schooling causes a delay in age at first marriage which is an important determinant of timing of exposure to fertility since out-of-wedlock birth is not a common practice in Turkey. According to TURKSTAT statistics, mean age at first marriage has been continuously increasing in last ten years. From 2001 to 2012, mean age at first marriage has

increased approximately by one year for both men and women and reached to 26.7 and 23.5 for men and women, respectively. According to demographic surveys conducted by Hacettepe University Institute of Population Studies, mean age at first marriage has increased by 3 years for women in the last 30 years. This increase is one of the factors contributing fertility transition in Turkey.

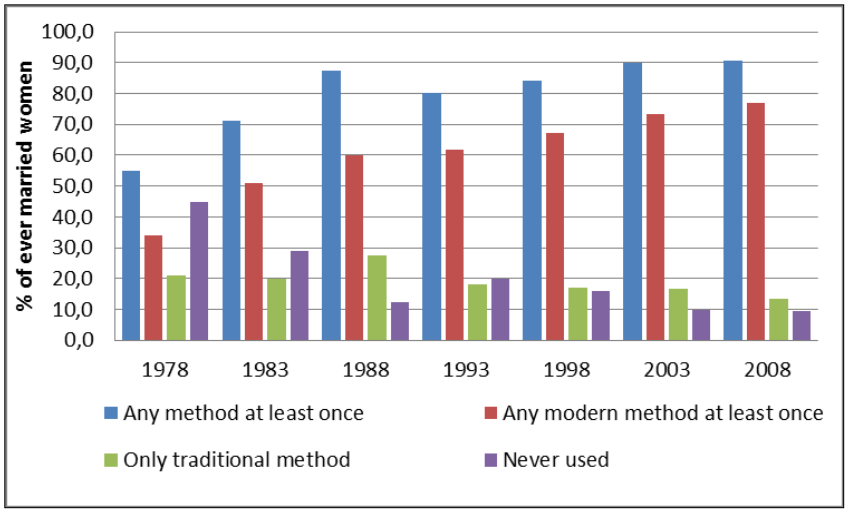


Source: HIPS, 1978-2008

Figure 2.18: Mean age at first marriage of ever married women aged 25-49 in Turkey, 1978-2008

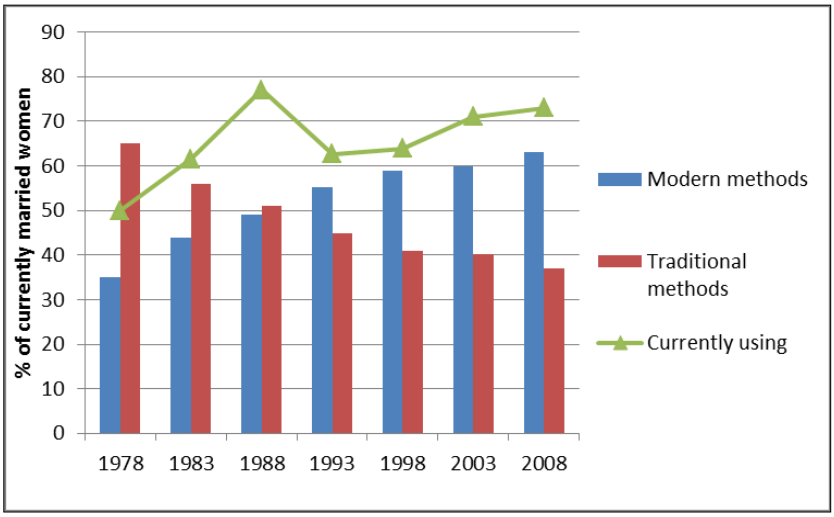
In addition to increase in mean age at first marriage, rise of prevalence of usage of contraception could be mentioned as the other direct factor affecting fertility level. As mentioned earlier, out-of-wedlock birth is not prevalent in Turkey. Almost all women in Turkey marry until the end of their reproductive period and little of them divorce so marriage is a universal phenomenon for women in Turkey. In addition, women give their first birth approximately after 1.6 years of marriage which is a characteristic demographic behavior in Turkey (Koç, et al., 2010). In this respect, contraception usage among married women comes to the fore as a more important factor limiting the number of higher order births in Turkey. According to the findings of 1963 Turkish Population Survey, only 22% of women are using any contraception method at those times (Özbay, 1978 cited in Koç, et al., 2010). This ratio is important in the sense that it shows the prevalence

of usage of contraception before legal regulations in 1965. After abolishment of restrictions on supply of contraceptives, prevalence of usage of contraception increased through time.



Source: HIPS, 1978-2008

Figure 2.19: Ever usage of contraception by ever married women aged 15-49 in Turkey, 1978-2008

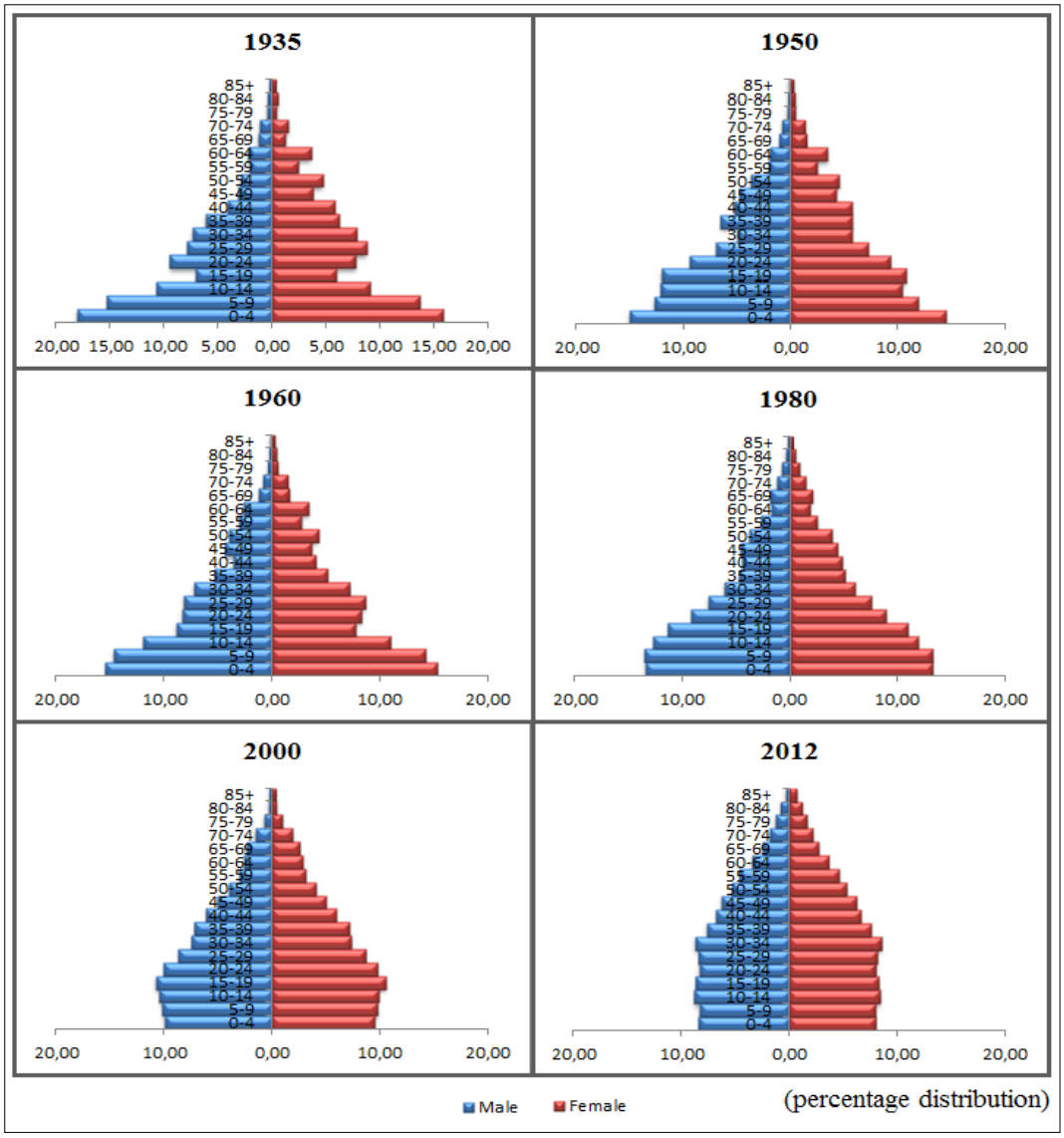


Source: HIPS, 1978-2008

Figure 2.20: Current usage of contraception by currently married women aged 15-49 in Turkey, 1978-2008

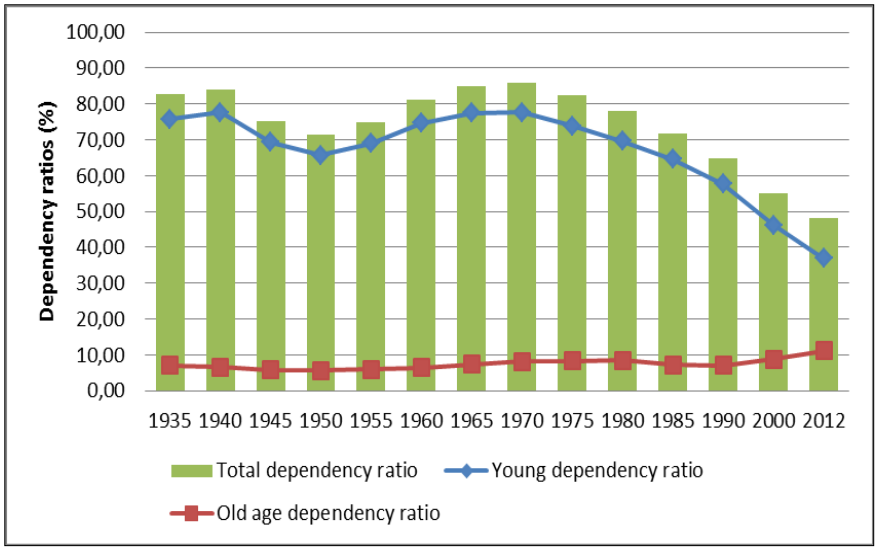
According to the findings of demographic surveys conducted by HIPS, ratio of ever married women used any type of contraceptive at least once increased from 55% to 90.5% from 1978 to 2008. As could be seen from Figure 2.19, dominance of modern methods also scaled up at the same period. Figure 2.20 reflects that ratio of currently married women using contraceptive also exhibits an increasing trend and usage of ineffective traditional methods among those women declined from 1978s onwards indicating that usage of contraception is one of the most important factors restricting fertility level after marriage.

Those changes in fertility and mortality patterns experienced in Turkey eventually had an effect on age structure of the population. Those effects could be seen from population pyramids provided in Figure 2.21. High fertility rates experienced until 1980s are reflected by large basis of population pyramids. However, it is seen that share of 0-4 age group was almost similar to the share of 5-9 age group in 1980, reflecting a decline in fertility level. The effect of this decline is much more obvious in the population pyramid of 2000 such that share of 15-19 age group is higher than those lower age groups.



Source: TURKSTAT, Population Censuses, 1935-2000
TURKSTAT, ABPRS, 2012

Figure 2.21: Population pyramids of Turkey, 1935-2012

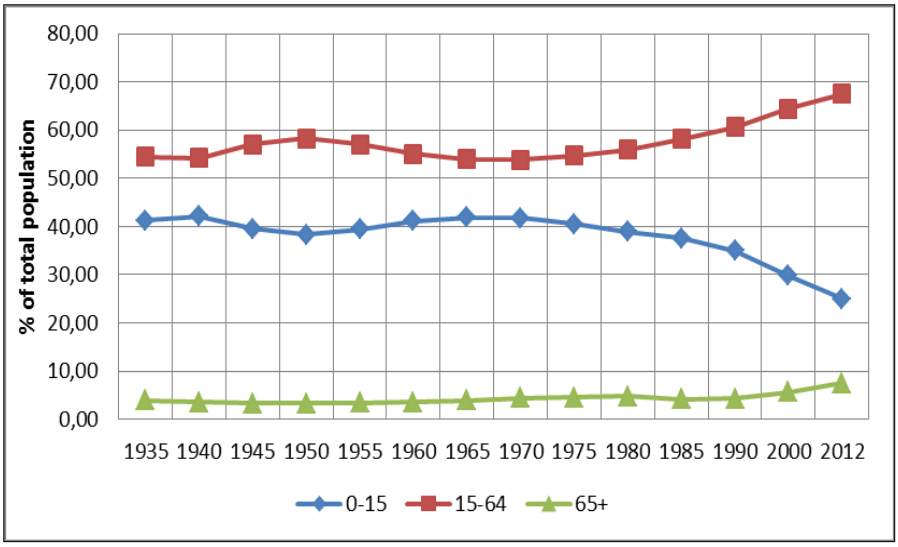


Source: TURKSTAT, Population Censuses, 1935-2000
TURKSTAT, ABPRS, 2012

Figure 2.22: Dependency ratios in Turkey, 1935-2012

The changing pattern of mortality is also reflected in the age structure of population. Until 1980s, a faster upward contraction is observed in age pyramids reflecting low life expectancy; in other words, higher mortality risk in early ages. However, it is observed that population pyramids gain a much smoother shape through time as a result of declining mortality risk and share of population aged 65 and over increases with rise of life expectancy.

As a result of those changes in age structure of population in Turkey, total dependency ratio which reflects the ratio of economically dependent young and old population to population in working age group declined from 1970s onwards. This decline was dominated by the substantial decrease in young dependency ratio which indicates the decline of fertility level in the country. On the other hand, old age dependency ratio remained at very low levels until recent years but share of population aged 65 and over started to slightly increase in recent years, which indicates the first sign of aging population in Turkey.



Source: TURKSTAT, Population Censuses, 1935-2000
TURKSTAT, ABPRS, 2012

Figure 2.23: Share of broad age groups in total population in Turkey, 1935-2012

As mentioned in Section 2.1.2, health driven mortality transition resulted in a rapid population growth due to lack of economic forces required to trigger fertility transition in developing countries so government-induced family planning programs with involvement of international organizations played their role to pull down fertility. Turkish experience is very similar to the experience of developing countries in the sense that health driven mortality transition caused a rapid population increase in 1950s and 1960s; thus, government started to encourage family planning activities by changing law prohibiting family planning activities and creating needed infrastructure for dissemination of family planning knowledge and implementation (Akın, 2007). In addition, technical help to monitor the population survey conducted in 1963 was received from Population Council and financial assistance was given by Ford Foundation for the establishment of Hacettepe University Institute of Population Studies in 1966 (Akın, 2007) so international assistance was also received to some extent in order to form the basis of population programs implemented. Nevertheless, family planning program which started to be implemented in 1965 could not retard rate

of population growth until 1980s. The failure of the law enacted in 1965 in retarding population growth rate was generally attributed to insufficiency of the law; however, the expected decline in fertility could only take place under appropriate economic conditions which began to materialize after 1980s in Turkey.

As of today, Turkey is at the third stage of Notestein's model. As could be seen from Figure 2.22 and Figure 2.23, total dependency ratio is declining and share of working age population in total population is increasing in Turkey so changes in demographic patterns which altered age structure of the population brought demographic window of opportunity to Turkey.

2.2. Economic Impacts of Demographic Opportunity Window

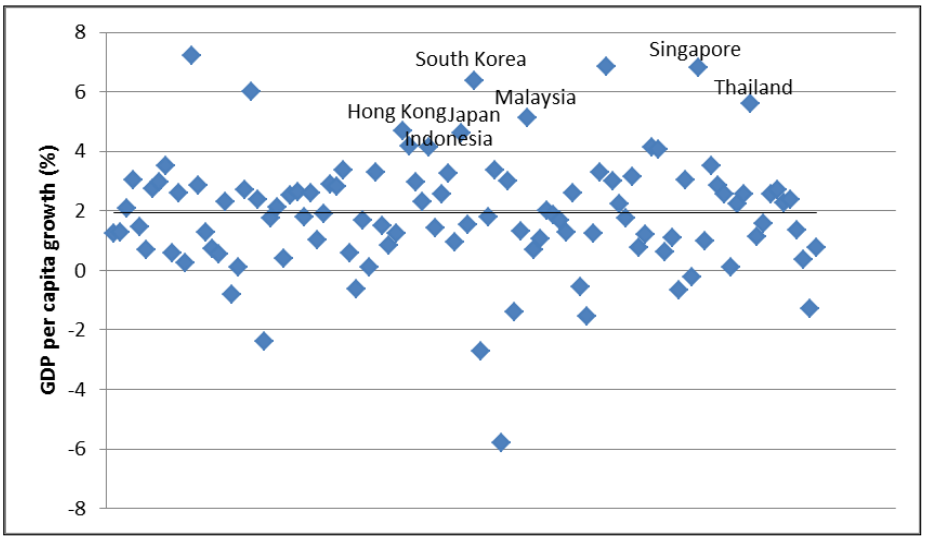
As explained in Section 2.1, change in mortality and fertility patterns during demographic transition eventually affects the age structure of the population such that share of children in total population declines while share of working age group and elderly is increasing. There is a unique transitory period in this process in which share of elderly does not yet reach to high levels while share of children is declining so in this period, share of working age group in total population reaches its maximum levels. As mentioned earlier, this period is called demographic window of opportunity which provides a favorable environment for economic development if the opportunity could be seized through right policy environment. Implications of demographic opportunity window for an economy and channels of potential contribution to economic growth shall be discussed in following sections in the light of experience of East Asian miracles and finally, the state of channels in Turkey shall be examined.

2.2.1. Demographic Dividend of East Asian Miracles

In period of 1960-1990, East Asian economies had a substantial performance in economic growth. From 1960s onwards, first wave countries called Asian Tigers and from 1970s onwards, newly industrialized Tiger Cub economies which took

Asian Tigers as a role model experienced not only significant economic growth but also dramatic improvements in human development (World Bank, 1993).

The performance of East Asian economies was attracted attention in the literature since before 1960s, those countries except Japan had largely agrarian and poor economies; many of them were under foreign domination which inhibited the development of their own political culture and economic institutions; and saving and investment levels were very low such that it could not trigger economic growth (Mason, 2001a).



Source: World Bank, World Development Indicators, 2013

Figure 2.24: GDP per capita growth rate, average of 1960-1995 period

At the same time, these countries were under severe population pressure due to declining mortality together with a high level of fertility which was 5 to 6 children per woman on average. Under those circumstances, governments of East Asian countries which previously held a pronatalist perspective by considering a large population as a source of military and economic power faced two major challenges: feeding a rapidly growing population and productively employing such a growing labor force (Mason, 2001a). The former was solved by Green Revolution (Hayami, 2001) and the latter was met with success through rapid economic growth. In addition, concerns about the adverse effects of rapid

population growth led East Asian governments to implement antinatalist policies so they experienced the fastest fertility transition in world history which took about 30 years (Mason, 2001a).

Table 2.2: Fertility and mortality indicators of East Asian countries

	Total Fertility Rate		Life expectancy at birth	
	1950-1955	**1990-1995**	**1950-1955**	**1990-1995**
Japan	3.00	1.48	62.17	79.45
Hong Kong	4.44	1.24	63.18	78.16
South Korea	5.05	1.70	47.92	72.88
Singapore	6.61	1.70	60.23	76.97
Malaysia	6.23	3.42	54.79	71.30
Thailand	6.14	1.99	51.58	70.44
Indonesia	5.49	2.90	38.25	64.50

Source: UN World Population Prospects: The 2012 Revision, 2013

Besides the miraculous economic performance of East Asian countries, rapid demographic transition associated with this economic growth was also attracted interest so the question which was asked is whether rapid demographic change contributed to East Asian economic growth or not. In her study, Barlow (1994) found that highest rates of GDP per capita growth are achieved by countries which experience high fertility rates in the past but low current fertility which eventually result in growth of labor force at a rate more than total population. Thus, a population with high share of people in working ages provides a suitable environment for economic growth in terms of demographics. Barlow (1994) firstly named this period *"demographic window of opportunity"* which is used interchangeably with the terms demographic dividend or demographic bonus and she also stated that several East and Southeast Asian countries enjoyed the benefits of this demographic structure in period of 1968-1983.

Based on the results of Barlow's path breaking study, emphasis on the importance of age structure for economic growth became much stronger and attempts to estimate the contribution of age structure to economic development proliferated. Bloom and Williamson (1998) and Bloom, et al. (2000) estimated that one-third to

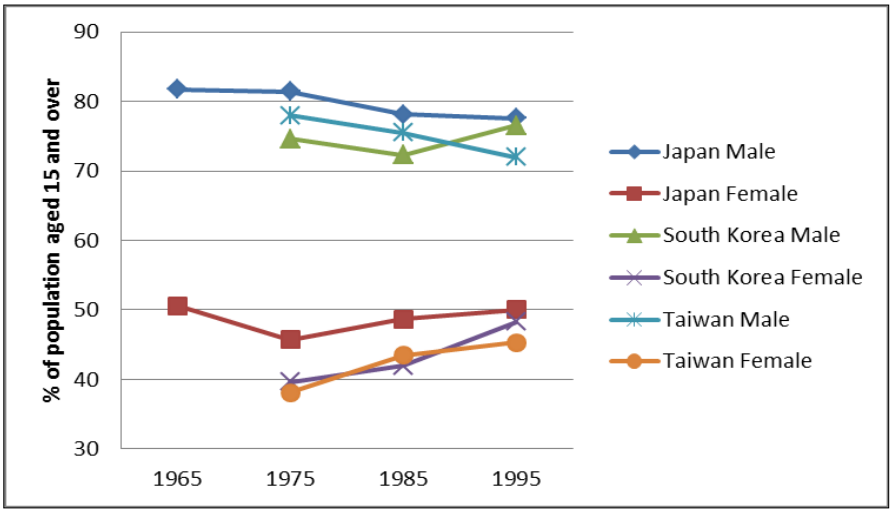
half of the growth experienced by East Asian countries in the period of 1965-1990 could be attributed to the favorable age structure. Results of Bloom and Canning (2008), Bloom, et al. (1998) and Mason (2001b) further confirm the importance of age structure for East Asian economic growth in that period.

Although those studies showed that changing demographic environment functioned in favor of economic growth, it is mentioned in all of those studies that realization of demographic dividend is not an automatic process. As could be understood from its name, demographic window of opportunity is just an opportunity period; it just provides a favorable demographic environment but does not ensure high economic growth rates (Bloom, et al., 2000; Bloom, et al., 2003; Mason, 2001a). As shall be discussed in further sections, changing demographic structure is expected to affect individuals' and households' decisions in several spheres of economic life but to turn those micro-level impacts into aggregates for creation of demographic dividend, right policy environment is also important which addresses labor market, education system, financial system, and macroeconomic stability in the country (Bloom, et al., 2003). Thus, a series of studies concentrated on the policies implemented in East Asia, which is the focal point of the "miracles" that connect the demographic structure to economic outcomes.

In growth literature, mainly two sources of growth are mentioned: factor accumulation and increase in productivity. Most of the East Asian economic growth is generally attributed to rapid factor accumulation (World Bank, 1993; Young, 1994; Krugman, 1994).

Demographic transition which eventually creates a large working age population as a share of total population causes an increase in potential labor force, in other words accumulation of labor. Besides this effect, labor force participation of women is also expected to increase mainly due to declining fertility. This is actually what had happened in East Asian countries as well (Bauer, 2001a; Bloom, et al., 2009). As could be seen from Figure 2.25, male labor force

participation rates did not exhibit an increase but even a decline in some East Asian countries. While male labor force participation might be depressed due to declining participation of males at younger ages who continued their education for longer years, it was still above 90% in those years for males aged 25-54 (Okunishi, 2001). Okunishi (2001) stated that most of the nominal increase in labor supply in East Asian countries could be attributed to change in age structure rather than change in labor force participation rates overall but Okunishi (2001) did not ignore the substantial increase in labor force participation rates of females at reproductive ages. The decline in labor force participation rates at younger ages was also observed among women but this decline seems to be compensated by the increase in labor supply of women especially after marriage and birth (Okunishi, 2001).



Source: Okunishi, 2001

Figure 2.25: LFPR by sex in several East Asian countries, 1965-1995

As mentioned earlier, increase in labor supply constitutes one of the important channels through which demographic change contributes to economic growth since it means a decline in dependency rate; however, neoclassical approach perceives that increase in labor supply might result in capital dilution (Coale & Hoover, 1958). It seems that East Asian countries did not experience capital

dilution due to increasing savings and investment. As presented in Table 2.3, gross domestic savings as share of GDP rose dramatically in many East Asian countries from 1960s onwards. In parallel with the rise of savings, private domestic investment also substantially rose (Bauer, 2001b). For instance, South Korea experienced an increase in investment rate by 15% just in ten years from 1950s to 1960s and investments made a peak around 30% of GDP around 1970s (Bauer, 2001b). Singapore also experienced an increase in investment rate from 10% to 40% of GDP between years 1960-1970 (Bauer, 2001b). When the limited reliance on foreign savings in some of those East Asian countries is considered (Bauer, 2001b), high levels of domestic savings were the main source of financing investment (World Bank, 1993).

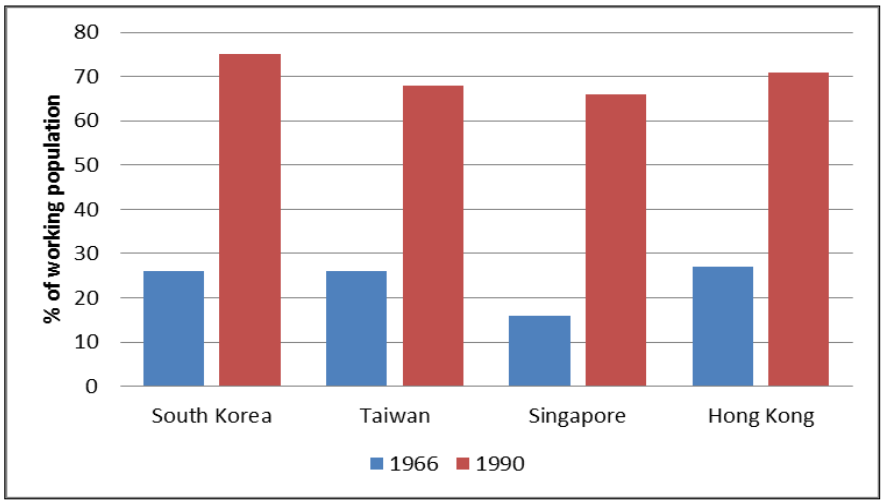
Table 2.3: Gross domestic savings as share of GDP (%), 1960-1993

	1960	**1965**	**1970**	**1980**	**1993**
Japan	34	28	40	31	33
South Korea	1	8	15	23	35
Taiwan	18	21	26	32	28
Singapore	-3	10	18	30	47
Hong Kong	6	29	25	24	31
Thailand	14	19	21	22	36
Indonesia	8	8	14	30	31
Malaysia	27	24	27	32	38

Source: Bauer, 2001b

However, factor accumulation is not limited only with physical capital accumulation. Human capital accumulation also played a vital role in creation of East Asian miracle. Especially Tiger economies except Singapore had already high levels of literacy in 1950s when compared to other less developed countries at that time (Barro & Lee, forthcoming). Average years of schooling of population aged 15 and over was above 4 years in Hong Kong, South Korea and Taiwan in 1950s and it reached to 9 years on average in 1990s (Barro & Lee, forthcoming). Accumulation of human capital in East Asian countries was achieved through the provision of universal primary education and increasing availability of secondary

education (World Bank, 1993). Between years 1966-1990, share of working population with secondary and higher education increased substantially in Tiger economies as could be seen from Figure 2.26. In addition to provision of universal primary and improved secondary education, post-secondary education was concentrated on vocational and technical disciplines which resulted in technically improved human capital (World Bank, 1993). All of those improvements in educational attainment eventually contributed to economic growth such that Kim and Lau (1995) estimated 11% to 14% of growth in East Asian newly industrialized economies could be attributed to improvements in educational attainment.



Source: Bauer, 2001b

Figure 2.26: Share of working population with secondary or higher education in Tiger economies, 1966 and 1990

In the light of those facts, the question to be answered is whether demographic change contributed to the factor accumulation in East Asia and if yes, how it contributed. Rapid demographic transition in East Asia which caused increase in the share of working age population is often linked with factor accumulation. Bauer (2001b) asserted that change in demographics affected economic performance mainly through factor accumulation. Several studies concentrated on East Asian countries showed that declining young dependency due to rapid

fertility transition positively affected the level and growth rate of national savings (Mason, 1981; Mason, 1987; Fry & Mason, 1982). Higgins and Williamson (1997) stated that East Asian savings were actually depressed by higher young dependency burden until the end of 1970s but after 1980s, declining fertility and changing age structure triggered increase in national savings such that savings were 8.38% higher than the average of 1950-1992 period between years 1990-1992. Overall, demographic factors resulted in an increase in gross national savings by 13.6% in Northeast Asia and 11.5% in Southeast Asia (Higgins & Williamson, 1997).

As mentioned earlier, labor supply increased due to changing demographic structure and at the same time educational composition of the labor force in East Asian countries changed. Okunishi (2001) stated that employed persons who graduated from a college or higher level educational institution constituted 20% or more of the total employment in countries such as South Korea, Taiwan, Singapore, and Japan by 1995. Some portion of this shift is also attributed to changing demographic patterns such that decline in East Asian secondary school age cohort due to falling fertility was estimated to result in 3-4% increase in enrollment rate and 10-13% increase in education expenditure per child between years 1970 and 1990 (Williamson, 1993).

East Asian miracle is generally attributed to rapid factor accumulation as explained above and role of growth of total factor productivity in East Asia is seen minor (Young, 1994; Krugman, 1994; Kim & Lau, 1994; Young, 1995). Although estimates of World Bank (1993) also showed that a major portion of growth was due to factor accumulation, one third of the growth was attributed to the productivity change. One factor leading to TFP growth was asserted as the efficient allocation of resources and investment to high productivity areas (World Bank, 1993). Structural transformation managed successfully in East Asian countries between years 1960-1990 altered sectoral share of output such that countries such as South Korea, Singapore and Thailand experienced an increase from almost 20% to approximately 40% or above in industrial share of GDP

(Bauer, 2001b). Mason (2001a) stated that share of employment in agriculture declined while share of employment in nonagricultural sectors was increasing in all East Asian countries except Thailand and Indonesia; thus, output per worker increased overall due to increase in both agricultural productivity and productivity in nonagricultural sectors. However, besides the increase in TFP due to improvements in technical efficiency gained from structural transformation, technological catch-up was limited to certain countries. According to estimates of Page (1994), Hong Kong, Japan, Taiwan and Thailand managed catching up to international best practice while South Korea, Indonesia, Malaysia and Singapore could not.

On the other hand, Liang (2009) rejected the Krugman-Kim-Lau-Young hypothesis by asserting that industrial restructuring should be considered under TFP growth and asserted that TFP growth in Taiwan gained momentum after 1980s. Similar evidence was also provided by Rao and Lee (1995) for the acceleration of TFP growth in Singapore after 1987. In the light of those studies, it might be stated that TFP growth followed factor accumulation and contributed to growth of some East Asian countries at least in the last decade of their demographic window of opportunity period.

As mentioned above, contribution of high share of prime age population to economic growth in demographic window of opportunity period is usually linked with its positive effects on factor accumulation but such a direct link between demographics and TFP growth is not as visible as the former in the literature. Bauer (2001b) stated that declining fertility might positively affect TFP growth in the following way: Continuous decline in fertility will eventually cause a decline in growth rate of labor force so labor scarcity might create an incentive to adopt labor-saving technologies which causes TFP growth since Cutler, et al. (1990) and Romer (1990) implied that labor scarcity due to slower labor force growth creates a necessity for innovation which improves technical efficiency through spillover effects. Indeed, demographic window of opportunity is characterized by a large working age population and in East Asian case, labor force participation rates of

women increased and that of men especially aged 25 and over remained stable at very high levels so inexistence of such a labor scarcity is indisputable. In this respect, the channel proposed by Cutler, et al. (1990) and Romer (1990) might be applicable only for the later years of demographic window of opportunity when growth of labor force is expected to slow down but is not relevant for the whole period of demographic dividend. At this point, Lau's argument (1996 cited in Bauer, 2001b) might be more relevant for East Asian TFP growth if there was any. Lau (1996 cited in Bauer, 2001b) stated that as accumulation of capital continues for fixed amount of labor, capital is subject to diminishing returns after a certain highest ratio of capital to labor is reached so needs for intangible capital such as research and development activities, human capital, and technological change reveal to prevent diminishing returns and eventually this intangible capital accumulation leads to TFP growth.

So far, the sources of East Asian economic growth and their interactions with demographics are explained and in the light of those points, the lesson which could be derived from the East Asian experience is that there are mainly four channels through which demographic factors indirectly affect economic development which are labor supply, savings and investment, human capital and productivity. Change in population dynamics in demographic transition process activates those channels but sound government policies helping to increase the functionality of those channels are also important as well. In this respect, a set of policies are briefly discussed below in the light of East Asian experience which provides a broad range of policy lessons to fully capture the gains of demographic window of opportunity.

First of all, East Asian economies ensured the stability of macroeconomic environment (Bauer, 2001b; Page, 1994; World Bank, 1993) which is important to increase the efficiency of savings and investment channels in demographic opportunity window. Between years 1960-1990, East Asian countries managed to control fiscal balance in reasonable boundaries which helped to keep inflation rate at stable lower levels compared to other low and middle income countries at that

period (World Bank, 1993). Due to stability of inflation rate at low levels, stability of real interest rates could be sustained which encouraged private investment by allowing long term planning (World Bank, 1993). In addition to favorable environment for investment created through macroeconomic policies, East Asian countries promoted private entrepreneurship through several policies such as provision of infrastructure, tax exemptions, usage of instruments to control prices of capital goods at low levels, provision of credits, and creation of development banks.

Ensured macroeconomic stability played a vital role to sustain high levels of investment in East Asian countries in the period of 1960-1990 but another important issue is the source of finance of these high levels of investment. Although some East Asian countries attracted foreign direct investment, their reliance on foreign borrowings were limited (Page, 2004) and declined through time (Bauer, 2001b). Under those circumstances, domestic savings come to the fore as a major source of investment finance. As mentioned earlier, national savings substantially rose in East Asian countries during demographic window of opportunity period. Besides macroeconomic stability which helped to encourage savings by ensuring the stability of returns on it (Stiglitz & Uy, 1996), East Asian governments implemented policies to inject those savings into the system through enhancing their financial institutions. Regulations with the aim of increasing security of banking system to prevent a potential bank failure are among those policies (World Bank, 1993; Stiglitz & Uy, 1996) but Stiglitz and Uy (1996) stated that the most important institution created by some East Asian governments to encourage savings is the postal saving systems which provided the access of small savers especially in rural areas to financial system. It seems that those policies mentioned above did not only encourage savings but also attracted them into financial system to be used in investment finance. This channel seems to have a substantial role in realization of demographic dividend in East Asia when its interaction with labor market is considered as mentioned later in this section.

Secondly, role of education policies in accumulation of human capital in East Asia should be emphasized. As mentioned earlier, working age populations in most of the East Asian countries had already higher educational attainment in 1950s compared to other developing countries at that time (Barro & Lee, forthcoming) so this might provide an advantage to East Asian countries over other developing countries at the beginning of development process. However, it is asserted that policies implemented by East Asian countries further contributed to increase the gap in human capital accumulation between East Asian countries and other developing countries at that time (World Bank, 1993; Page, 1994). Share of educational spending in GDP rose from 2.5% to 3.7% in East Asian countries from 1960 to 1989 but at the same period, a similar increase was also realized in other developing regions (Page, 1994; World Bank, 1993). Despite of this similarity in education spending, Page (1994) and World Bank (1993) stated that the critical policy underlying the East Asian success in human capital accumulation was allocation of educational budget in favor of basic education rather than higher education unlike in other developing regions. By increasing share of spending on primary and secondary education, East Asian countries succeeded to improve overall skills of the whole population which then increased the possibility of further education at post-secondary level that concentrated on generation of technical skills of labor force (Page, 1994).

Besides the policies favoring primary and secondary education, World Bank (1993) asserted that rapid economic growth which created a demand for skilled workers resulted in an increasing incentive for school enrollment. As educational attainment leads to economic growth, economic growth also leads to improvement in human capital by allowing increase in resources to be devoted to education. Thus, increase in both economic growth and human capital together might create a virtuous cycle for East Asian countries. However, the role of rapid demographic transition in this discussion should not be ignored since declining fertility affected educational attainment by allowing increase in resources available per child. World Bank (1993) stated that share of education budget for basic education remained relatively same in 1960-1990 in East Asian countries but decline in the

share of school age cohort at the same time set free the resources available per pupil at school ages.

As mentioned earlier, demographic window of opportunity is characterized by increase in share of working age population, so potential increase in labor supply. However, neither increase in labor force nor improvements in educational attainment of labor force could trigger economic growth unless labor is productively employed so succeeding to produce productive employment opportunities for a growing labor force constituted the basis of utilizing demographic window of opportunity in East Asian countries. High rates of savings encouraged by policies mentioned above seem to have critical importance to finance new investment so producing new employment opportunities but savings channel was not alone in the process of employment creation in East Asian case. In this respect, the role of trade policies based on export-push strategy should be highlighted in the context of East Asia's demographic dividend.

Export orientation is seen as one of the major factors promoting growth through productivity change by improving efficiency in production, increasing specialization, allowing adaptation of new technologies, and generation of foreign exchange which could be used to import raw materials and capital goods needed in production (Bauer, 2001b). Except Hong Kong, all of those East Asian economies followed import substitution policies but they liberalized their trade regimes to different extents to encourage exports by late 1960s, earlier than other developing economies (Page, 2004; World Bank, 1993). As a result, East Asian exports increased by 9.5% in 1970s and 10.5% in 1980-1992 annually while exports of other low and middle income countries were increasing by 3.9% and 4.4% per year in the same periods, respectively (Bauer, 2001b).

While East Asian exports were increasing, composition of exported goods also shifted in favor of manufactured exports as presented in Table 2.4. Besides exchange rate management to prevent the overvaluation of national currencies which triggered export growth, other policies such as export credits, duty free

imports for export producers, subsidized infrastructure, tax incentives, and export targets together with protection of domestic markets and promotion of specific industries altered sectoral structure in East Asian economies in favor of manufacturing (Page, 1994; World Bank, 1993). Almost all of the studies concentrated on factors which brought economic development to East Asia highlighted the vital importance of export push strategy (World Bank, 1993; Bauer, 2001b; Page, 1994; Stiglitz, 1996). Stiglitz (1996) stated that active encouragement of exports by East Asian governments provided a performance criterion to allocate credits which might eventually promoted efficient allocation of resources. Although some countries did not rely on foreign investment (Bauer, 2001b), they were generally open to foreign knowledge and technology (World Bank, 1993). Foreign exchange generated by exports might help to import needed foreign technology but most importantly, growth in manufactured exports provided a basis for adoption of international best practices which generated spillovers for the rest of the economy (World Bank, 1993).

Table 2.4: Percentage share of total and manufactured exports of East Asian countries, 1965-1990

	1965	**1980**	**1990**
Total exports			
Share in world exports	7.9	13.1	18.2
Share in developing countries' exports	12.2	21.1	56.3
Manufactured exports			
Share in world exports	9.4	17.3	21.3
Share in developing countries' exports	14.2	48.6	73.5

Source: Page, 1994

At initial stages of East Asia's demographic window of opportunity period, labor force growth was higher but labor demand grew faster than labor supply such that wage employment in manufacturing, construction, and services increased substantially more than in Latin American and Sub-Saharan African countries (World Bank, 1993). Share of agriculture in total employment declined in East

Asian countries from 1960s onwards (Mason, 2003) but it seems that rural to urban migration and dissolution of agriculture which caused unemployment problems in most of developing countries after 1980s due to skill-biased technological change did not result in such problems in East Asian countries due to increasing employment opportunities in nonagricultural sectors. The success of structural transformation could be attributed to increasing employment opportunities mainly due to increase in labor intensive production triggered by export push strategy. At initial periods of opportunity window, East Asian countries pursued a development strategy by heavily relying on labor intensive manufactured exports in sectors such as textiles and apparel, leather, wood (World Bank, 1993). It seems that this strategy allowed absorption of growing labor force due to demographic shift and labor force moving out of agriculture. Labor intensive manufacturing also provided substantial employment opportunities for women entering into labor market (Bauer, 2001a). When the structure of global international trade from 1960s onwards was considered, East Asian countries benefited from the new international division of labor and liberalization of trade in developed economies after 1970s. Although labor abundance disappeared due to declining fertility in later periods of opportunity window, educational composition of labor force changed and supply of skilled workers increased in East Asian countries reflected by the increase in share of white collar workers in 1970s and 1980s (World Bank, 1993). This increase in supply of skilled workers was again met by increasing demand for skilled labor as reflected by persistence of high returns on skills in those countries except South Korea and Taiwan (Montgomery, et al., 2000). Montgomery, et al. (2000) speculated on the possible reasons of consistent high rates of returns on skills despite of increasing skilled labor supply and stated that capital accumulation, technological change, and export orientation might be the reasons of sustained increasing demand for skilled labor. In this respect, it could be concluded that trade policies based on export oriented manufacturing indirectly served as labor market policies to sustain labor demand at high levels. In this way, most of the labor force could be employed in

production which positively affected savings and incentives to invest on education more and created demographic dividend.

In brief, East Asian countries succeeded to achieve high levels of economic development in the period of 1960-1990. As explained by the brief outline in this section, rapid demographic transition supported with proper financial institutions, education policies and labor market strategies seem to have contributed to the "East Asian miracle" through activation of labor supply, human capital, and savings-investment and productivity channels triggered by demographic shift.

High levels of economic growth in East Asian countries associated with rapid demographic transition in 1960-1990 attracted interest to the effect of demographic change on economic development in the literature. By underlying the positive effects of demographic transition on East Asian economic success, Barlow (1994) brought a new term *"demographic window of opportunity"* into the literature. East Asian experience is instructive such that this experience allowed academics to identify demographic window of opportunity in macroeconomic sense. In addition, growth of East Asian economies in 1960-1990 provides an enlightening case study on how demographic shifts affect overall performance of the economy and through which channels as well as how governments can manipulate their policies in several spheres of economic life to seize opportunities coming with demographic shift. In this respect, East Asian experience provides a guideline on how to utilize demographic dividend for countries experiencing similar stages of demographic shift.

Demographic transition is also under way in Turkey and Turkey's demographic opportunity window is estimated to have started at the beginnings of 2000s (Koç, et al., 2010); hence, East Asian case provides a guide on through which channels demographic opportunity window is expected to contribute Turkey's economic development and what Turkey should do to seize opportunities coming with demographic shift which constitutes the motivation of this thesis. In this context, the next section is devoted to the explanation of demographic window of

opportunity and possible contribution channels for development derived mainly from East Asian experience.

2.2.2. Demographic Window of Opportunity: Macro Identification

As explained in Section 2.1, change in mortality and fertility patterns during demographic transition eventually affects the age structure of population. Until the path breaking study of Barlow (1994), importance of age structure of population for economic development has been often neglected in the population-development nexus (Bloom, et al., 2003); however, East Asian case made the importance of age structure visible from a macroeconomic perspective.

High fertility rates experienced before demographic transition creates large cohorts in the base of population pyramids but when fertility transition initiates, growth rate of population starts to increase in a declining manner or even to decline. In the following 15-20 years after their birth, those large cohorts belonging to past high fertility period start to form working age cohorts. Those dynamics create a higher growth rate for working age population when compared to growth rate of total population. In other words, age structure of population changes in favor of working age group. As Barlow (1994) suggested, this period which provides a demographically suitable environment for economic growth is called demographic window of opportunity. Opportunity window is opened when those large cohorts hit their working ages and closed when those large cohorts move to the age groups of 65 and over. This transitory period is technically expected to last 50 years.

According to the definition of UN Population Division, window of opportunity period starts when share of children aged below 15 in total population decline below 30% and the proportion of elderly aged 65 and over is still under 15%

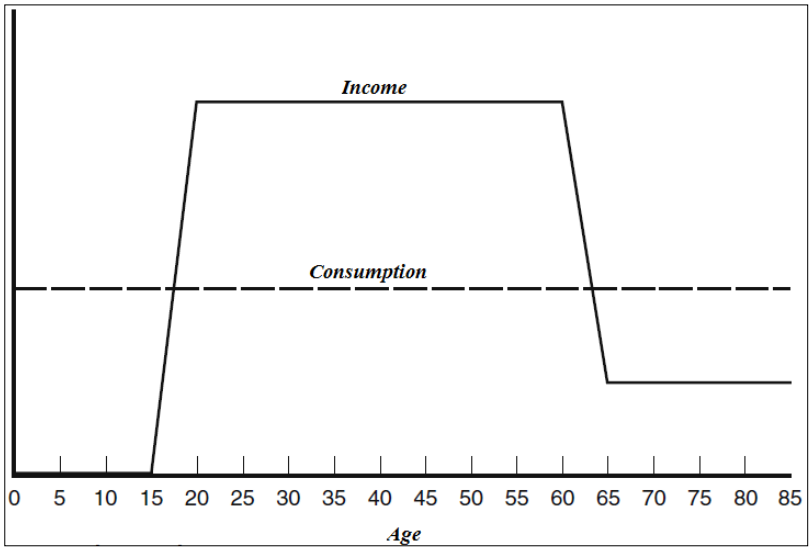
(Hakkert, 2007) [2] . Although, window of opportunity may last 50 years theoretically, the timing and duration of fertility transition determines duration of window so window of opportunity may last two or three decades. In this respect, demographic window of opportunity lasted from 1950 to 2000 for Europe but for instance, China is expected to experience window of opportunity from 1990 to 2015 (Hakkert, 2007).

Change in age structure of population is actually a macro-demographic concept; in this line, demographic window of opportunity is tended to be evaluated in macroeconomic terms since it basically means accumulation of majority of population in a country into a certain age group. Despite of this fact, economic implications of change in age structure is actually based on life cycle hypothesis which is actually a microeconomic approach.

According to the life cycle hypothesis by Modigliani (1966), people tend to smooth their consumption over their life cycle to maintain their standard of living so saving decisions are based on this tendency (Modigliani, 1966). Therefore, economic behaviors and needs of agents are expected to change over their life cycle (Bloom & Canning, 2008). In earlier stages of life, in other words in childhood, people tend to consume more than they earn. Expenditures for education, health and other needs of children are generally financed by parental resources since children are not economically active. The behavior is similar in elderly period since old aged people do not usually have a tendency to work due to retirement, ill-health or disability so they spend from their earlier savings. On the other hand, people in working age groups tend to work and earn income more than they consume so savings are expected to be positive in this period. In brief, life cycle approach which is derived from Modigliani's hypothesis provides an

[2] Such a definition of demographic window of opportunity implicitly assumes that accumulation of individuals in all working ages creates the same impact on the economy. In this study, the assumption of existence of such a linear relationship is preserved at this stage but accumulation of individuals in ages of 20s or in ages of 60s does not surely affect the economy in the same direction so the assumption of a linear effect of whole working ages might be considered as a limitation. Investigation of separate impacts of accumulation in narrower age groups might be an extension of this study.

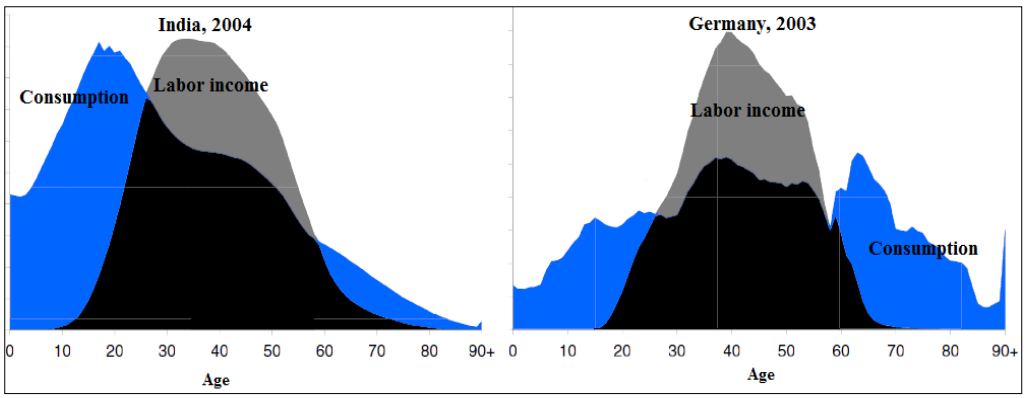
explanation for the change in economic behavior over the life course such that young need intensive investment for their education and health and elderly require retirement income and health care while people in prime ages supply labor and savings (Bloom, et al., 2003). In this respect, people in their earlier and later stages of life are considered as "resources users" from an economic perspective while people in working ages are "resource creators" (Kelley & Schmidt, 1995).



Source: Bloom, et al., 2003

Figure 2.27: Life cycle of an individual

As a matter of fact, demographic window of opportunity is nothing but an application of agent-based life cycle approach to a society at aggregate level. As explained above, an individual requires human capital investment in his/her earlier ages, supplies labor and savings in his/her working ages, and finally, requires pension income and health expenditures in later stages of his/her life. When this individual life cycle behavior is applied to a society considering the share of young-aged, middle-aged, and old-aged individuals in total population, a population-level life cycle might be developed as follows.



Source: Lee, et al., 2011

Figure 2.28: Life cycle pattern of populations with high share of children and elderly

As mentioned above, parental resources are flowing to children to finance their education, health expenditures and other needs. When it is thought at aggregate level, if share of young people in a society is high, then a large portion of national resources should be devoted to finance investment in education and health. On the other hand, if share of elderly people in a society is high, then resource flows will reverse to cover social security expenditures such as retirement benefits or health expenditures. Figure 2.28 by Lee, et al. (2011) represents the direction of resource flows for India which has a population with young age structure and for Germany where proportion of elderly in total population is relatively high. On the other hand, a population structure which has a high share of people in prime ages experiences large influx of labor supply; thus, labor market policies become a requirement to integrate those people into active economic life by providing productive employment opportunities and a well-functioning financial system should be established to encourage savings and to turn those savings into investment. Thus, age structure of a population is crucial to determine the priority areas in policy implementation at national level and governmental authorities play a key role at that point to determine the direction and magnitude of intergenerational wealth flows (Lee, et al., 2011).

In this context, impact of demographic structure on the economy basically depends on the idea of individual life cycle; in other words, the direction and magnitude of the impacts are determined mainly by accumulation of individuals in a population in different stages of life cycle. Thus, the phenomenon of demographic window of opportunity basically reflects the accumulation of individuals in working ages; in other words, a population's being situated in its middle ages throughout its life cycle. Since working ages are associated with labor supply, income generation, and supply of earnings while young and old ages are associated with economic dependency, demographic window of opportunity period provides a favorable demographic environment for economic development. Although the magnitude of demographic dividend is a macroeconomic concept, realization of dividend depends on responses of individuals to changes in demographics in several channels at micro level since dividend is mainly created by the accumulation of those micro-level responses. The economic channels in which those micro level responses are expected and turn to aggregates are presented in the following section.

2.2.3. Channels of Contribution

2.2.3.1. Channel I: Labor Supply

Before the initiation of demographic transition, high fertility rates create large cohorts. Through time, those large cohorts age and constitute working age groups within 15-20 years. Together with the start of fertility transition, new cohorts born will be proportionately smaller when compared to past cohorts created by high fertility levels. Thus, demographic transition process alters the age structure of population in favor of working age groups as could be seen from Figure 2.29.

15-64 age group is known as the working age population and growth of working age population faster than the whole population in demographic transition process create a favorable environment for increase in labor supply. It is expected that the larger the working age population is, the larger will be the labor force. Through such an accounting effect, labor force participation is expected to increase in

demographic window of opportunity period (Bloom & Williamson, 1998; Bloom, et al., 2003).

However, increase in labor force participation in demographic dividend period could not be attributed only the accounting effect. Increase in female labor force participation could produce a behavioral effect on overall labor force participation (Bloom & Williamson, 1998; Bloom, et al., 2003). Increase in female education and female labor force participation are both starts and ends in the demographic transition process such that increase in education and employment of women in development process is one of the triggering factors for the initiation of fertility transition. When fertility transition is under way, decline in childrearing burden of women is expected to contribute further to the increase of female labor force participation. In addition to the behavioral change in women's labor supply decision, change in life cycle events during demographic transition might also have positive or negative effects on labor supply decisions. Together with the increase in educational attainment, longer years of schooling might cause young adults' to participate into labor force later. On the other hand, increase in longevity and health status might lead to longer duration in employment which compensates the late entry into labor force due to longer years of schooling.

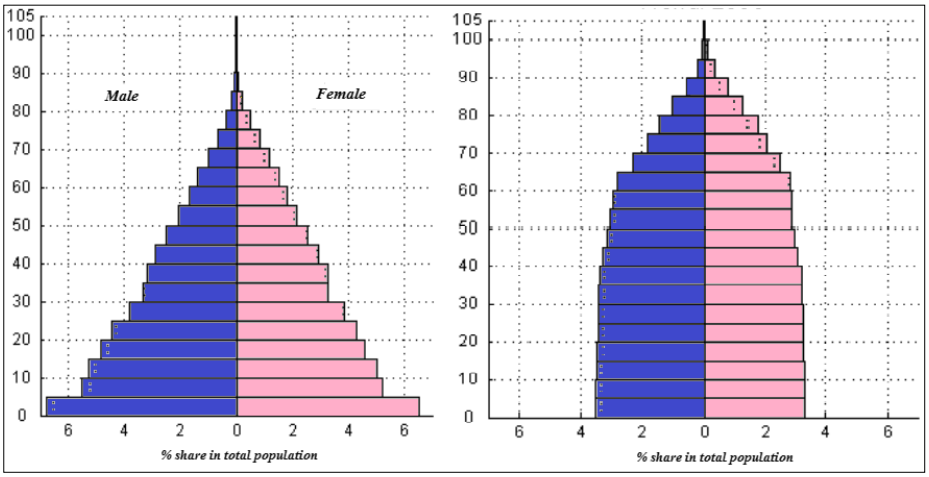


Figure 2.29: Change in age structure of population through demographic transition

As mentioned earlier, main increase in male labor force in East Asian countries from 1960s onwards was due to changing age structure in favor of working age group rather than increase in male labor force participation rate (Okunishi, 2001). However, all of the increase could not be attributed only to this accounting effect since female labor force participation rates increased much more rapidly in some of East Asian economies due to more entrance of women to labor force after completing school, postponement of marriage and childbearing, and stay in labor force after marriage and childrearing (Okunishi, 2001). Ireland had also a similar experience. In 1990s, Ireland experienced rapid economic growth which is partly attributed to favorable demographic shifts due to legalization of contraceptive usage in 1980 (Bloom & Canning, 2003). Due to rapid decline of fertility, labor force participation significantly increased among women aged 25-40 years in the period 1980-2000 (Bloom & Canning, 2003). Combining those accounting and behavioral effects explained above, increase in labor supply might be contribution channel for economic growth in demographic window of opportunity when those people in working ages are provided with productive employment opportunities.

2.2.3.2. Channel II: Human Capital

Importance of human capital accumulation comes to the fore in the growth literature with the studies of Romer (1989) and Mankiw, et al. (1992). Productivity of physical capital and labor is expected to rise with accumulation of human capital which eventually contributes to economic growth. Changes in demographic variables during demographic transition process are also expected to contribute economic growth through their effects on human capital accumulation.

Increase in educational attainment has a central role in demographic transition theory. Galor & Weil (1999) argued that demand for human capital increased due to accelerating technological advancement in the second phase of Industrial Revolution which created an incentive for parents to invest in their children's education. With the rapid development of technology, returns to human capital increased significantly which eventually shifted preferences of parents from child quantity to child quality so fertility transition started (Galor & Weil, 1999). As

could be seen, rising rate of returns on human capital is an important factor determining the level of investment on human capital such that societies prefer to invest human capital more when rate of returns are higher (Becker, et al., 1990). With the rising importance of education due to transformation of economic system, cost of raising a child also increased so change in the direction of resource flows in favor of children contributed to the initiation of fertility transition (Caldwell, 1976). Increase in returns to education also encouraged women to enroll in schools and to participate into labor force at progressively high rates which further contributed to fertility decline due to the rising opportunity cost of having more children (Schultz, 2001).

Education is one of the most important elements which trigger the start of fertility transition. However, education and level of fertility are in a bidirectional relationship since level of fertility is also a determinant of educational investment per child. With the resources in a household held constant, decline in number of children intensifies per capita expenditure for each child, ceteris paribus. There are several studies showing that small family size has a positive impact on educational attainment and success of children (Hanushek, 1992; Knodel & Wongsith, 1991) so decline in fertility might result in faster accumulation of human capital. On the other hand, demographic transition leads to smaller younger cohorts at school ages so those smaller cohorts might have access to better schooling opportunities since per capita expenditure increases even if total public spending on education remains same at aggregate level (Bloom & Canning, 2008; The World Bank, 1993).

Another aspect of human capital is health. Good health measured mostly by life expectancy has been found significantly positive in many cross country growth regressions (Bloom & Williamson, 1998; Bloom, et al., 2000; Bloom, et al., 2003; Bloom, et al., 2004). The reason might be that more healthy labor force is expected to be more productive and illness and disability cause reduction in working hours which have an effect on overall production (Bloom, et al., 2004). In addition, health status might affect quality of labor force through its effect on

educational attainment. With demographic transition, less number of children in a household have access to higher health expenditure per child even the resources of the household remains same and this leads to higher educational success of children (Bloom, et al., 2003). Life expectancy has been also found positively related with average years of schooling (Bloom, et al., 2004; Kalemli-Ozcan, et al., 2000). Kalemli-Ozcan, et al. (2000) stated that decline in mortality represented by increase in life expectancy increases the optimal level of schooling since rise in life expectancy allows more longer time to collect the returns on educational investment.

As mentioned above, human capital accumulation is important for a country to utilize the gains coming with demographic window of opportunity but implementation of education policies should start much earlier than demographic dividend period to guarantee increase in the educational level of future labor force. For example, in Ireland which experienced a successful demographic dividend period in 1990s, initiation of free secondary education occurred in 1960s and as a result, enrollment rates increased (Bloom & Williamson, 1998; Bloom & Canning, 2008). East Asian case is also similar such that in 1950s, many high performing East Asian countries had already higher primary and secondary enrollment rates when compared with other countries at the same income level (Barro & Lee, forthcoming) but increase in educational expenditure per student (World Bank, 1993) and rise in enrollment rates at all education levels (Mingat, 1998) also continued during dividend period as already mentioned in Section 2.2.1. Contribution of declining fertility to human capital accumulation in East Asia should not be ignored as the evidence suggested by Huang (1997) although some household level studies provide little support to this proposition (Ahlburg & Jensen, 1997).

2.2.3.3. Channel III: Savings

The third channel which is expected to contribute economic growth during demographic window of opportunity is savings. The effect of change in

demographic structure on savings could be examined in two parts, accounting and behavioral effects.

As mentioned before, children and elderly people are considered as resource users (Kelley & Schmidt, 1995) in the sense that they are not economically active so they tend to consume more than they earn. At early ages, children are dependent on parental resources while at old ages, elderly people move out of labor force due to retirement or health problems so they are expected to use their earlier savings or some form of income transfer for their consumption expenditures. On the other hand, people in working age groups are expected to be economically active. Therefore, people in working ages earn more than they consume and have enough resources to save as depicted in Figure 2.30. When this individual life cycle behavior is applied to population, aggregate savings are expected to change similarly in accordance with the age structure of population. In the process of demographic transition, share of working age population in total population increases so relatively larger number of working people are expected to create more savings when compared to a population with a high young and old age dependency burden. This accounting effect is supported with a behavioral effect since increase in savings is expected to be especially stronger between ages 40-65 due to the fact that those people tend to save more due to preparation for retirement and declining resource transfer to children at those ages (Bloom, et al., 2003).

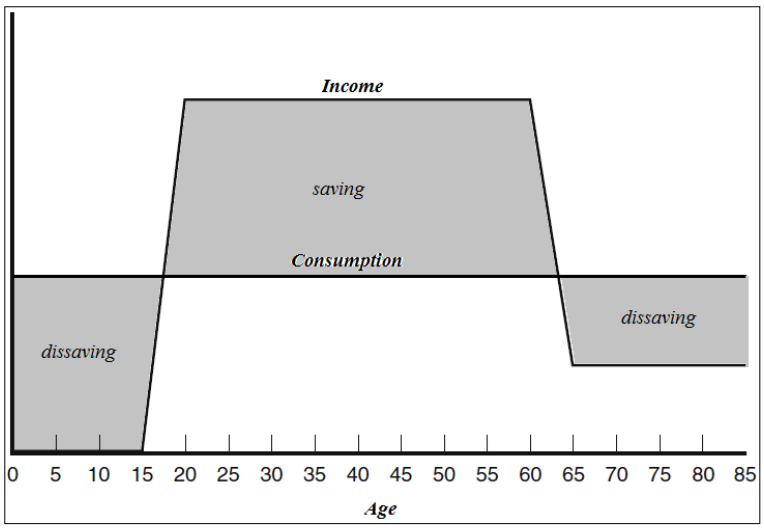


Figure 2.30: Saving profile by age

According to Coale-Hoover hypothesis (1958), high fertility is detrimental for economic growth due to age dependency effect that is high number of children causes an increase in consumption and in turn decline in savings. With the initiation of demographic transition, fertility starts to decline which eventually results in relatively more household income becoming available to be devoted for savings. In addition, increasing female labor force participation due to declining childrearing might also contribute to household income to rise so it might result in an increase in household savings as another behavioral effect. On the other hand, increasing life expectancy might also contribute to rise in savings since people expect to maintain a certain standard of living for longer years (Tsai, et al., 2000; Lee, et al., 2000). However, this behavior might depend on several conditions. Improvements in health and longevity might lead people to work longer years which creates a labor supply effect while depresses the need for savings (Bloom & Williamson, 1998). Availability of pension systems and their features might also have an impact on the magnitude of savings (Bloom, et al., 2003). It seems that increase in life expectancy does not create an incentive to work for longer years when it is considered that historical records of retirement age in industrialized countries have been following a downward pattern (Lee, et al., 2000). Mandatory or conventional retirement ages together with financial

incentives to retire implemented in many social security systems might result in a gap between retirement age and expected life duration so increasing life expectancy might create a higher need for savings (Bloom & Williamson, 1998).

East Asian experience showed that change in demographic structure contributed to increase in savings at aggregate level as already mentioned in Section 2.2.1. However, household level estimates give ambiguous results on the impact of demographic change on savings. Tsai, et al. (2000) and Lee, et al. (2000) asserted that change in demographics, specifically increase in life expectancy explains much of the increase in household savings in Taiwan. On the other hand, Deaton and Paxson (2000) argued that only 4% of 20% increase in household savings between years 1970-1990 in Taiwan could be attributed to life cycle changes. It is argued that increase in life time resources due to rapid economic growth, in other words cohort effect, mostly contributed to rise in savings in Taiwan (Deaton & Paxson, 2000). Although results of household level estimates put a question mark, during demographic window opportunity in which young dependency declines at very low levels and old age dependency does not increase so much yet, savings are expected to reach high levels due to combined accounting and behavioral effects and contribute to economic growth if sufficient mechanisms such as low inflation, macroeconomic stability and financial systems which canalize savings into investment are available.

2.2.3.4. Channel IV: Entrepreneurship and Innovation

As mentioned several times, a high share of working age population might cause a "demographic disaster" unless labor force is productively employed. Savings which are expected to increase due to changing demographics contribute to economic growth only if they can be transformed into investment and provide new employment opportunities. Besides sound macroeconomic policies to encourage saving and investment, entrepreneurship and innovation channel plays a key role in utilizing demographic dividend by creating new productive employment opportunities.

Start-ups are important for an economy in terms of employment creation and innovation. According to the estimates of Haltiwanger, et al. (2008) every year approximately one-third of new employment opportunities are created by newly established firms in the U.S. In addition to employment creation, increase in start-ups contributes to the increase in the volume of innovation and efficiency in production causing an improvement in total factor productivity. For instance, in a study conducted for the U.S. software industry between years 1982-1987, Prusa and Schmitz (1991) found that old firms in the sector develops existing technologies while newly established ones have a comparative advantage over those in developing new technologies.

Entrepreneurial activity or self-employment as an indicator of entrepreneurship is expected to be affected by change in demographic structure. So far, it is stated in several studies that there is a positive relationship between population growth and entrepreneurial activity (Van Wissen, 2002; Reynolds, et al., 1999; Verheul, et al., 2002). This might be due to the push effect of negative impact of population growth on available job opportunities and wages (Verheul, et al., 2002) or increasing market opportunity and easiness of entry into market in case of rise of demand due to population growth (Reynolds, et al., 1999; Van Wissen, 2002). Despite of the consensus about the effect of population growth, effect of population density on entrepreneurship is ambiguous (Wennekers, 2006). On the one hand, it is argued that thinly populated areas cannot enjoy the benefits of economies of scale; therefore, self-employment rate is higher in those regions (Van Wissen, 2002). On the other hand, it is stated that high volume of entrepreneurial activity is more possible in densely populated urban areas since urban areas are geographically proximate to business networks and other supply side factors such as research centers, universities offering educated workforce and innovational processes/products (Wennekers, 2006; Verheul, et al., 2002). Another demographic variable affecting entrepreneurial activity is gender. Unlike population density, it is generally observed that there is a lower rate of self-employment among working women than men in Western countries (Wennekers, 2006). This might be due to women's financial constraints and difficulties to

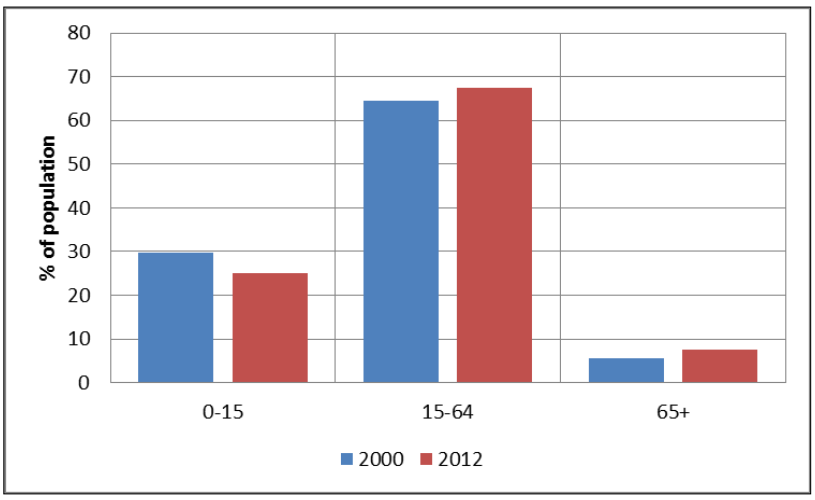
access credits due to their discontinuous labor market histories (Riding & Swift, 1990) or due to time constraint created by household/family responsibilities (Loscocco, et al., 1991).

One of the most important demographic factors affecting the probability of being an entrepreneur is age of the person. Since psychological state, abilities, educational attainment, social and business networks, and life experience of a person are changing in accordance with age (Bönte, et al., 2007), age is used as an explanatory variable for entrepreneurial activity in many micro-empirical studies. Empirical evidence suggests that probability of being an entrepreneur follows an inverse U-shaped pattern with respect to age; in other words, prevalence of being a self-employed is found higher at later ages (Evans & Leighton, 1989; Blanchflower & Meyer, 1994). Generally, middle ages of 30s and 40s are stated as the ages at which prevalence of being self-employed is higher (Evans & Leighton, 1989); nonetheless, some recent studies showed that there is a tendency towards earlier ages in becoming entrepreneur (Delmar & Davidsson, 2000). In this respect, increase in the share of working age population is expected to associate with higher entrepreneurial activity at aggregate level. Analysis of Bönte, et al. (2007) for regions of Germany showed that expected number of start-ups in regions is positively affected by the share of people at 20-64 ages while share of individuals aged 20-30 and aged 40-50 is found to have positive influence on high-tech start-ups.

In demographic dividend period, share of working age population is higher than the share of dependents in total population so as more and more people hits to those ages at which prevalence of entrepreneurial activity is higher, innovation capacity and growth of total factor productivity are expected to be higher due to large number of start-ups. In this regard, entrepreneurship and innovation channel is expected to contribute economic growth in demographic dividend period through its contribution to the creation of productive employment opportunities for a higher share of working age population and through improvements in total factor productivity by technological advancement.

2.2.4. Turkey's Opportunity Window

As explained in Section 2.1, demographic transition eventually leads to a change in the age structure of population and brings a unique transitory period called demographic window of opportunity. As reflected in Figure 2.31, share of working age group in total population in Turkey has been continuously increasing since 1970s. Decline in fertility has depressed share of children under age of 15 in total population and increasing life expectancy resulted in an increase in the share of elderly population aged 65 and over. According to UN World Population Prospects: The 2012 Revision (2013), share of population aged 65 and over is 16% in more developed countries so when compared to those countries, share of elderly population in Turkey (7.5% according to results of ABPRS in 2012) is still at low levels.



Source: TURKSTAT, Population Census, 2000
TURKSTAT, ABPRS, 2012

Figure 2.31: Share of broad age groups in total population in Turkey, 2000 and 2012

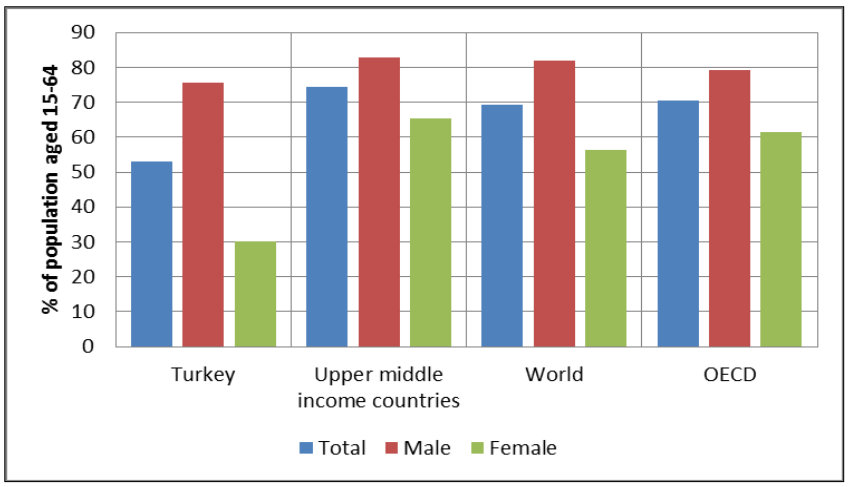
As mentioned earlier, UN Population Division defines window of opportunity period as the period when share of children aged below 15 in total population decline below 30% and the proportion of elderly aged 65 and over is still under 15% (Hakkert, 2007). As reflected in Figure 2.31, share of children aged 15 and

below in Turkey declined under 30% in 2000 for the first time and share of elderly population is still below 15% despite of the increase from 2000 to 2012 so by definition, Turkey's demographic window of opportunity started in the beginning of 2000s and is projected to continue until 2040s (Koç, et al., 2010; Tansel, 2012). In this respect, Turkey is in an advantageous position for development in terms of its demographic structure. However, as explained in Section 2.2.3, utilizing possible gains coming with this opportunity period depends on the performance of Turkey in channels of labor market, savings, education, and entrepreneurship so this section is devoted to analyze the major trends in those channels in Turkey.

2.2.4.1. Labor Market in Turkey

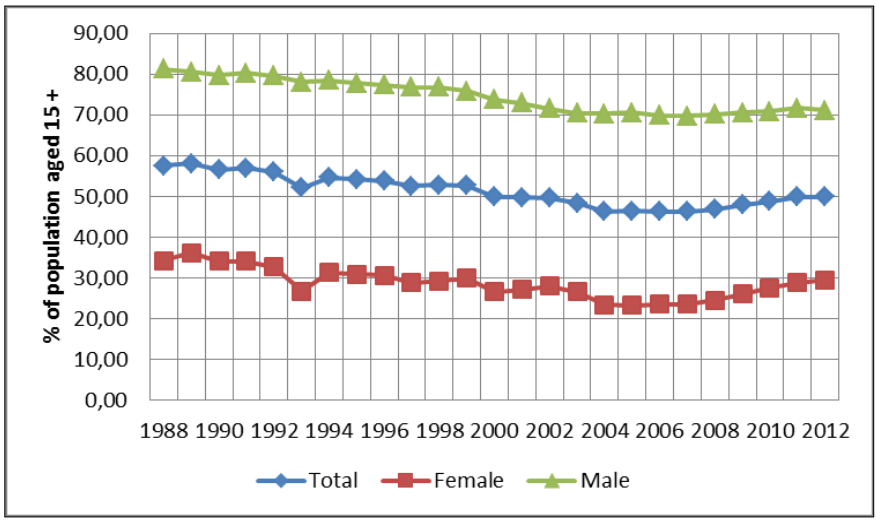
As explained in Section 2.2.3.1, change in population dynamics is expected to affect labor supply through accounting and behavioral effects in the demographic transition process (Bloom & Williamson, 1998; Bloom, et al., 2003). Accounting effect reflects the additional labor supply due to increase in the share of population in working age group while behavioral effect mainly means increasing female labor force participation due to declining fertility.

Nevertheless, change in the age structure of population in favor of working age group does not automatically results in an increase in labor force participation as observed in Turkey. International comparisons reveal that labor force participation rates are very low in Turkey. According to World Bank classification, Turkey is among upper-middle income countries and labor force participation rate in Turkey is well below than the average of those countries as well as OECD and world averages as presented in Figure 2.32.



Source: World Bank, World Development Indicators, 2013

Figure 2.32: Labor force participation rates, 2011



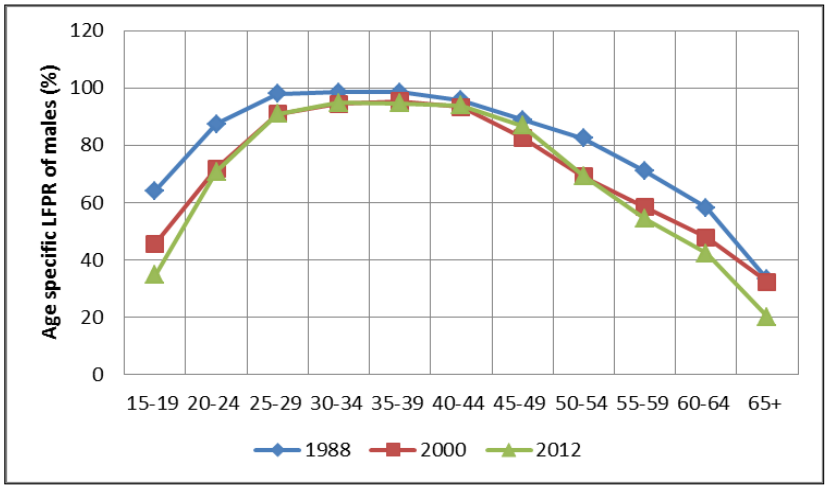
Source: TURKSTAT, Household Labor Force Surveys, 1988-2012

Figure 2.33: Labor force participation rates by sex in Turkey, 1988-2012

Figure 2.33 shows that labor force participation rates of both males and females have been declining in Turkey from 1988 onwards except the increases in recent years. Despite of the slight increase from 2007 onwards, almost 10 percentage

points decline in male labor force participation rate has been accounted from 1988 to 2012.

When age specific labor force participation rates of males are investigated, the major sources of decline become apparent. Although participation rates in all of the age groups has declined in period of 1988-2012, Figure 2.34 reveals that the significant portion of the overall decline comes from the fall in participation rates of males in age groups of 15-24 and 50 and over. From 1988 onwards, educational attainment has increased in Turkey; thus, the decline in participation rate in 15-24 age group reflects the longer duration in education while the significant fall in participation rates at ages 50 and over is attributed to the early retirement policies implemented in 1990s (Tansel, 2012).



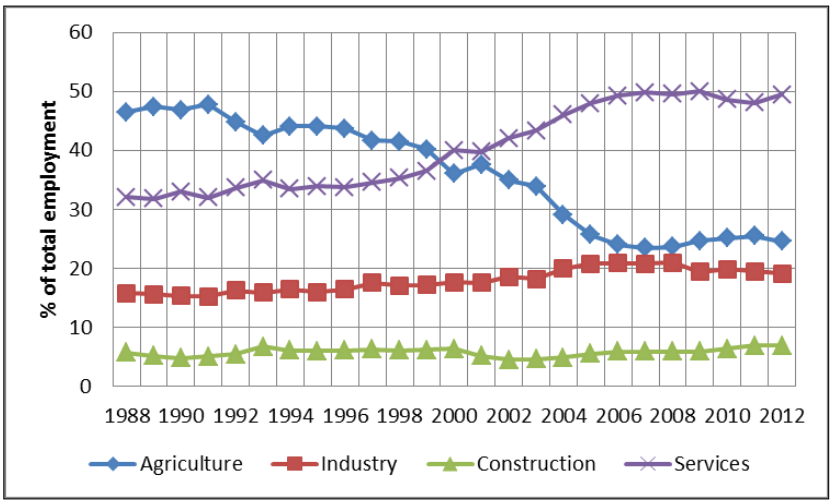
Source: TURKSTAT, Household Labor Force Surveys, 1988-2012

Figure 2.34: Male labor force participation rate by age in Turkey, 1988-2012

Employment in agricultural sector usually comprises the edges of age distribution more than urban modern sectors so shift in sectoral allocation in the economy in favor of urban modern sectors might be responsible of decline in labor force participation especially in older ages. In Turkey, participation rate of males aged 55 and over in rural areas was 49.3% in 2012 while this rate was 27.3% in urban. As those figures reflect, the decline of participation rates in older males could also

be attributed to the structural transformation experienced in Turkey, which gained momentum especially after 1990.

As explained in Section 2.2.1, East Asian countries followed export orientation based on labor intensive manufacturing as a development strategy and surplus labor coming from agriculture constituted the major ingredient of this process. Historical experience of developed countries also exhibits a similar pattern such that first the share of industry, then the share of services sectors increase during structural transformation while agriculture loses its dominance in employment. However, experience of today's developing countries does not match with the experience of those since developing countries are experiencing structural transformation in a much faster way due to skill-biased technological change (Pandit & Casetti, 1989). Due to this fact, industrial sectors in developing countries are not expected to absorb much of the surplus labor leaving agriculture.



Source: TURKSTAT, Household Labor Force Surveys, 1988-2012

Figure 2.35: Employment by sector in Turkey, 1988-2012

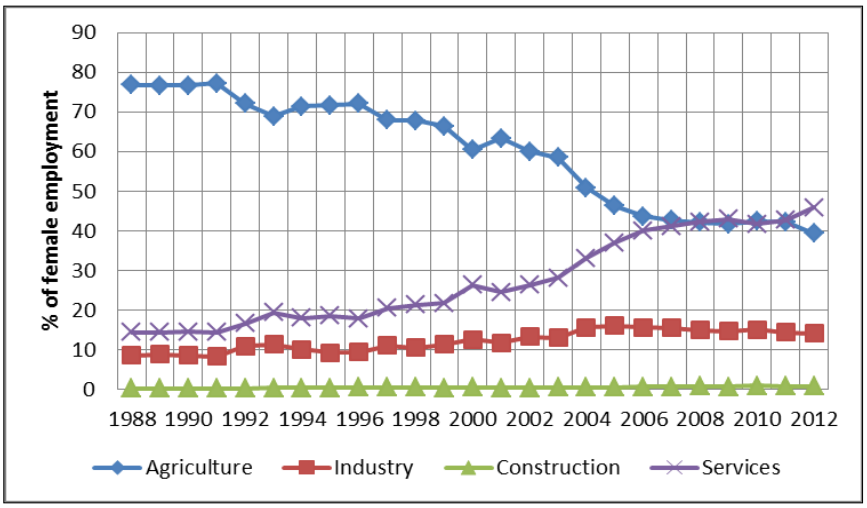
As reflected in Figure 2.35, Turkey's experience is also similar to developing countries' case. Much of the surplus labor has been absorbed by services sectors while share of industry in total employment has been almost stable through time. Earlier, Ercan (1999) predicted that Turkish manufacturing has been affected by

skill-biased technological change so it is not possible share of industry in Turkey to rise up to 35-40% which is the level reached by developed countries during structural transformation. In this respect, it could be thought that structural transformation does not only affect the participation rate at older ages but also level of participation in whole age groups. In Figure 2.34, a slight decline in the age group of 25-49 is also visible between years 1988 and 2012. This might be due to the fact that as dissolution of agriculture continues, nonagricultural sectors might not create enough employment opportunities to absorb all labor leaving agriculture as well as new entrants. In the last decade, labor supply increased by 1.4% on average and agricultural employment contracted by almost 3%. At the same time, nonagricultural employment increased only by 3% while Turkish economy experienced 5.2% GDP growth on average. As Taymaz (2010) stated Turkey is experiencing growth without creating employment opportunities so this fact might eventually create a discouraged worker effect besides its push effect on unemployment rate. The limited capacity of Turkey in creation of new employment opportunities is best indicated by relatively high rate of unemployment among young people aged 20-29 which is another point that should be addressed for Turkey to utilize its demographic window of opportunity.

Besides the decline of male labor force participation, the striking feature of Turkish labor market is the very low female labor force participation rate. International comparisons reflected in Figure 2.32 reveal that the major reason of the gap between overall labor force participation in Turkey and those group of countries is the lower rate of female labor force participation in Turkey. Although it started to follow an increasing pattern after 2005, female labor force participation rate in Turkey was approximately 30% in 2012 which is substantially low when compared to the average participation rates of upper-middle income countries and OECD, which is higher than 60%. This rate was also lower than the female labor force participation rates in some East Asian countries which were near to 40% at the beginning of their demographic window of opportunity period (Okunishi, 2001).

From 1988 onwards, total fertility rate declined almost one child but at the same period female labor force participation rates also declined for a long period of time. When fertility is falling, female labor force participation is actually expected to increase by showing the behavioral effect; however, those two matters of fact might not follow the same timeline in the development process.

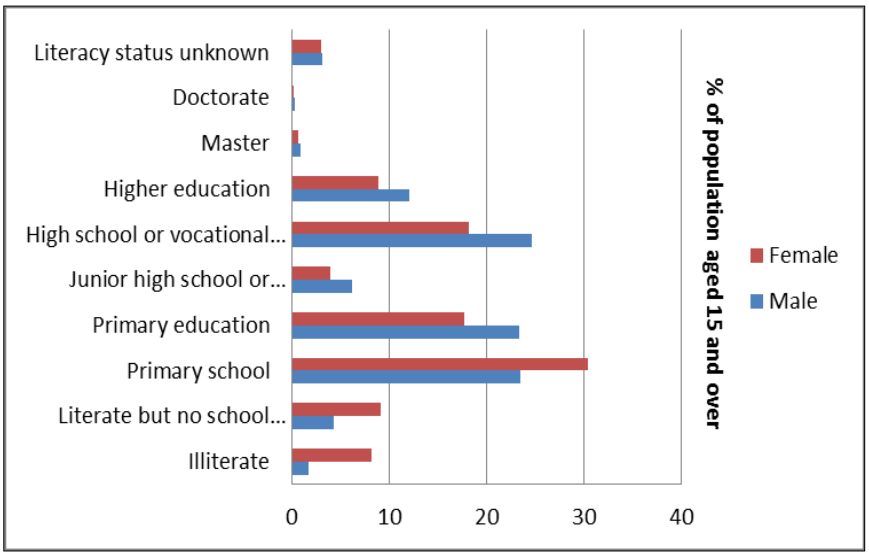
One of the important factors that affect female labor force participation in Turkey is asserted as the dissolution of agriculture and migration from rural to urban areas (Dayıoğlu & Kırdar, 2010; Uraz, et al., 2010; Taymaz, 2010; Tansel, 2012). As seen from Figure 2.35 and Figure 2.36, sectoral allocation of employment rapidly shifted from agriculture to non-agricultural sectors especially after 2000s and this shift especially affected the labor force participation and employment status of women. In 1988, 77% of women are working in agricultural sector which protected its dominance in female employment until 2012 despite of its declining share. In 1988, 70% of women working were employed as unpaid family workers while this ratio declined to 34% in 2012. Those values reflect the declining importance of agricultural sector in female employment.



Source: TURKSTAT, Household Labor Force Surveys, 1988-2012

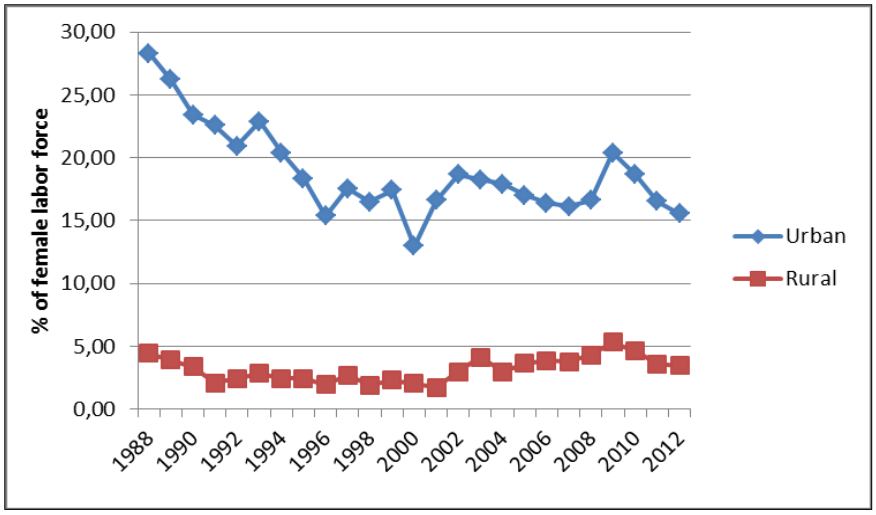
Figure 2.36: Sectoral allocation of female employment in Turkey, 1988-2012

Such a rapid dissolution of agriculture together with urbanization and migration from rural to urban areas led women to move out of labor force while moving out of agricultural sector mainly due to low educational attainment of them. Education is one of the most important factors determining female labor force participation. Dayıoğlu and Kırdar (2010) and Uraz, et al. (2010) showed that probability of woman to participate into labor force in Turkey increases with educational attainment. In this respect, low educational attainment of women moving out of agricultural sector hinders the possibility of those women finding job in urban non-agricultural sectors. As shown in Figure 2.37, educational attainment of women is generally lower than the educational attainment of men. Share of women aged 15 and over are higher than men in low education groups. With such low educational attainment, women experience difficulties in finding job in industry and services sectors which require more skills (Taymaz, 2010). Those factors might cause discouragement of women so they prefer to move out of labor force.



Source: TURKSTAT, ABPRS, 2012

Figure 2.37: Population aged 15 and over by education status, 2012



Source: TURKSTAT, Household Labor Force Surveys, 1988-2012

Figure 2.38: Female unemployment rates in Turkey, 1988-2012

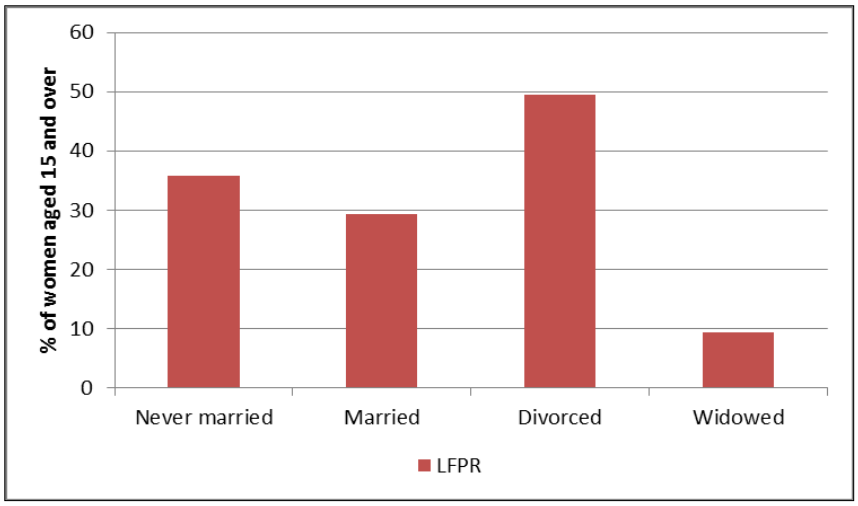
Another factor that leads to the discouragement of women from participating into labor force might be the relatively high unemployment in urban areas (Tansel, 2012). As shown in Figure 2.38, although it has exhibited a declining trend, urban unemployment rates among women have been substantially higher compared to women in rural areas so women who have already low educational attainment remain at home by thinking the difficulty of finding a job in the market. Even those women find a job in the market; they are exposed to work in insecure conditions more than male workers. As revealed by TURKSTAT statistics, from 2001 onwards, share of labor working in informal sector has exhibited a declining trend for both male and female workers. However, share of women working in informal sector has always been higher than men. In 2012, 54% of women employed were not registered to any social security institution while this ratio was 33% for men. Approximately 78% of those women working in informal sector had education at primary school level or below in 2012. In this respect, especially women with lower educational attainment are under the risk of being an informal worker when they enter to the labor market.

Extensity of informality in labor market for women triggers earning inequalities between men and women (Taymaz, 2010). Dayıoğlu and Kırdar (2010) asserted that labor earnings being very low for women with lower education is one of the factors which cause slowdown of the participation of urban low skilled women. Insecure working conditions together with low earnings cause women to remain at home since their production at home become relatively more valuable, which is also supported by gendered nature of division of labor based on traditional values (Tansel, 2012). Dayıoğlu and Kırdar (2010) stated that production of women at home is especially valuable for households with low income. In this respect, sustaining production at home might be an economically rational choice especially for low skilled urban women since it seems that earnings from a job outside might not compensate the loss due to not working at home. Even women work outside home, household chores and care for children and elderly are seen as the main duties of women due to traditional gender based division of labor (Ercan, et al., 2010). Ercan, et al. (2010) stated that in rural areas, working at home and in the field at the same time does not challenge to the traditional roles of women but those traditional roles cause conflicts for urban working women. This statement was also confirmed by the studies of Dayıoğlu and Kırdar (2010) and Uraz, et al. (2010) which showed that probability of women to participate into labor force is higher in rural areas.

According to the results of the Household Labor Force Survey in 2012, being busy with household chores was ranked as the first reason of women not being in the labor force. TDHS 2008 gives more detailed information about the reasons of not working and quitting job for ever married women aged 15-49. According to results of this survey, 31% of ever married women aged 15-49 who did not work in the last 12 months stated care for children as the main reason of not working while 22% of them stated household chores as a reason of not being in labor force. Approximately 50% of those women aged 20-34 do not work due to child care so it could be inferred that child care constitutes a major barrier for women's participating into labor force especially in the first half of their reproductive period. Interestingly, percentage of women stating child care as the main reason of

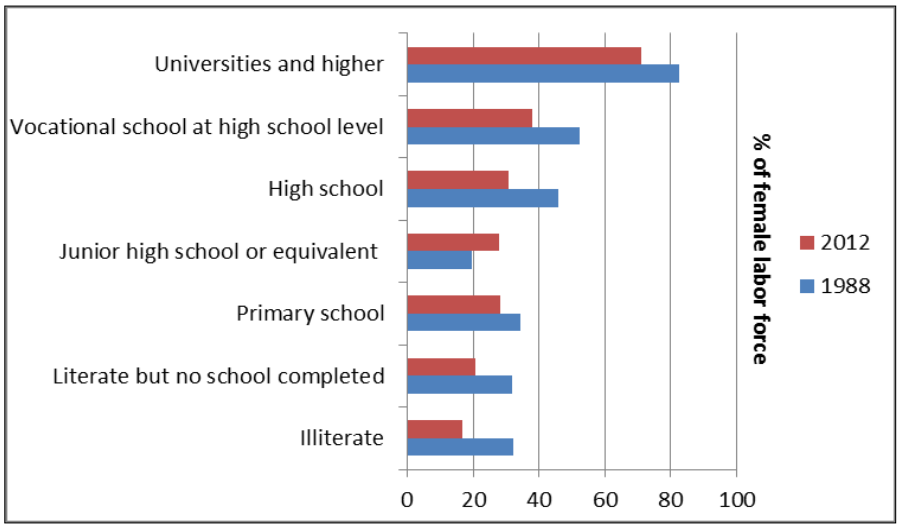
not working is highest in the western region of Turkey. This result also confirms the statement of Ercan, et al. (2010) that traditional roles of women and working in paid jobs are conflicting especially in urban regions. Therefore, child care's being not institutionalized might result in women to move out of labor force (Tansel, 2012). The findings of Dayıoğlu and Kırdar (2010) also showed that presence of children aged 0-14 in household lowers probability of women to participate into labor force but this effect is more visible in urban areas.

Another feature of female labor force participation is that it changes in accordance with marital status of women. As shown in Figure 2.39, participation rate is higher among never married and divorced women when compared to married woman. As TDHS 2008 result reveal, marriage is the main factor of quitting job. 27% of women quitted their job after marriage in 2008. This ratio is higher among women at early ages, with lower educational attainment living in households with lower welfare status. Pregnancy is the second ranked factor such that 11% of women quitted their job after they became pregnant. Those figures are actually expected in the sense that household chores and child care becomes main responsibilities of women after marriage. Marriage also affects the decision of women to participate into labor force through household income. Dayıoğlu and Kırdar (2010) showed that probability of women with lower educational status to participate into labor force declines as household income rises but such an effect is not visible among women with higher educational attainment. Uraz, et al. (2010) also confirmed this result by using TDHS 2003 data by showing that increase in wealth is associated with a declining probability of labor force participation for women. Another result of the study conducted by Uraz, et al. (2010) is that probability of women to participate into labor force also falls as educational attainment of husband increases. This effect is again more visible among urban low skilled women compared to high skilled women (Uraz, et al., 2010). As husband's educational status increases, household income is expected to increase so combination of those effects seems to adversely affect women's labor force participation.



Source: TURKSTAT, Household Labor Force Survey, 2012

Figure 2.39: Female labor force participation rate by marital status in Turkey, 2012



Source: TURKSTAT, Household Labor Force Surveys, 1988 and 2012

Figure 2.40: Female labor force participation by education status in Turkey, 1988 and 2012

Although labor force participation of low skilled women is examined so far, a decline of labor force participation among women with university or higher education is also visible when labor force participation rate of this group of

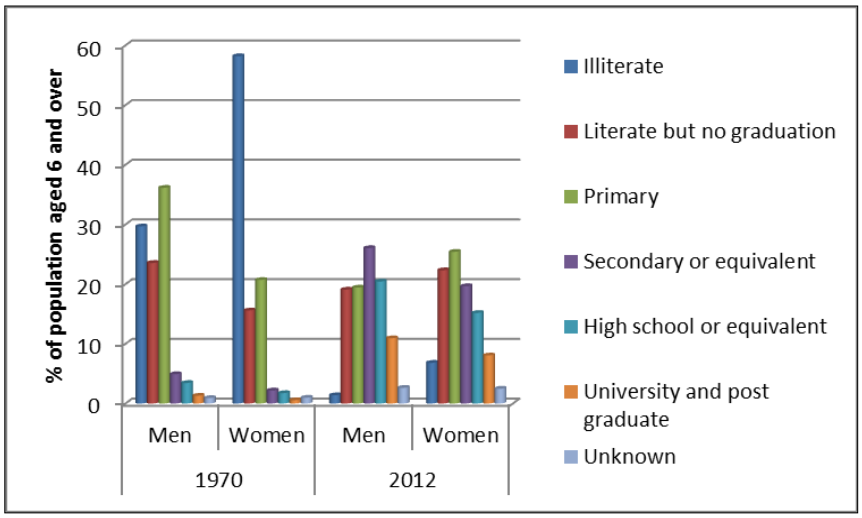
women in years 1988 and 2012 is compared. Between years 1988 and 2000, labor force participation of high skilled women exhibited a declining trend (Dayıoğlu & Kırdar, 2010) and after 2000, it has been following almost stable trend. Dayıoğlu and Kırdar (2010) argued that relatively stable trend in wages of high skilled women after 2000 and longer duration of education might be the reasons of such a stable trend observed in 2000s. On the other hand, as mentioned earlier, Taymaz (2010) pointed out the nature of economic growth in Turkey in recent years such that high economic growth rates in Turkey observed in recent years could not produce employment opportunities at the same pace and services sector produced limited formal employment opportunities for high skilled women in the first half of 2000s. As TURKSTAT statistics reveal, unemployment rate among women with university degree or above was 14% on average in 2000-2012 period so producing productive employment opportunities for high skilled women should be also addressed in policy discussions, especially in order to seize the opportunities coming with demographic dividend period.

2.2.4.2. Human Capital in Turkey

As in labor supply and savings channels, accounting and behavioral effects of change in demographics are expected to provide a potential to raise human capital. As stated in Section 2.2.1, even the share of educational budgets in total public expenditure or in GDP remains same, fall in fertility level leads to an increase in expenditure per child due to the contraction of school age cohort (World Bank, 1993). Besides this accounting effect, expenditure per child in household is also expected to rise since economic conditions favoring human capital encourage parents to invest their children's education more; thus, behavioral effect works through quality-quantity transition.

In the last 40 years, Turkey achieved significant attainments in educational status of population. According to 1970 Population Census, almost 44% of population aged 6 and over was illiterate while proportion of illiterates fell to 4% in 2012. In addition, share of graduates in all levels of education has increased as presented in

Figure 2.41. Although women have also benefited from increasing education opportunities, some of the gap between educational attainment of men and women remained such that illiteracy is still more common among women than men and share of primary school graduates are higher among women but completion of other education levels is lower compared to men. Although most of gender inequalities at least in basic education have been eliminated, inequalities in other education levels should also be addressed to fully utilize demographic window of opportunity since as mentioned in Section 2.2.4.1, increase in educational attainment of women is important for their labor force participation prospects (Dayıoğlu & Kırdar, 2010; Uraz, et al., 2010; Tansel, 2012) as well as the quality of children raised by them (Montgomery, et al., 2000).



Source: TURKSTAT, Population Census, 1970
TURKSTAT, ABPRS, 2012

Figure 2.41: Population aged 6 and over by education status in Turkey, 1970 and 2012

When average years of schooling of Turkish population aged 15 and over in 2000 (the year estimated as the starting point of demographic window of opportunity for Turkey) is compared with education level of East Asian countries in 1960s (start of East Asian demographic dividend period), it seems that Turkey is more advantageous in term of human capital compared to East Asian countries except

Japan. Nevertheless, such a comparison would be misleading in the sense that skills required to catch up international best practices in 21st century are not the same as that of in 1960s. As mentioned earlier, skill biased technological change and current rise of information technologies force countries to adopt their labor force to changing skill demands. In this respect, Turkey is in a disadvantageous position in terms of average education level of the population (estimated as 7.18 years in 2010) when compared to developed countries (more than 9 years in 2010) classified in Barro and Lee's dataset (forthcoming). On the other hand, a more accurate indicator for the educational attainment of current school age cohort might be expected years of schooling which also provides a perspective about the future of the human capital in the country. According to this indicator provided by UNESCO (2012), a child who is at the beginning of his/her education in 2012 in Turkey might expect 12.9 years of schooling on average. Turkey is ranked 90th, after all of the developed countries, with 12.9 expected years of schooling in 186 countries (UNESCO, 2012). Hence, it could be concluded that Turkey should immediately revise the education policies since expected years of schooling indicates that catching up developed countries in human capital level in the near future does not seem possible.

According to TURKSTAT statistics published in 2013, Turkey reached almost universal provision of primary education as reflected by almost 99% net enrollment rates and gender differences were almost eliminated at primary level. On the other hand, enrollment ratios at secondary level falls to almost 70% but most importantly, transition from secondary to tertiary level is a big problem for Turkey such that approximately only one out of three students who apply for university education could continue his/her education at tertiary level (Kavak, 2010). In addition, educational spending as a share of GDP in Turkey is lower than almost all of the OECD countries (OECD, 2013).

Nonetheless, considering the change in fertility level in Turkey, it is reasonable to expect that current and future demographic structure might have positive impacts on education sector. Kavak (2010) stated that the period of 2010-2050 will be

demographic opportunity window for Turkey in terms of education. Based on population projections conducted by Hoşgör and Tansel (2010 cited in Kavak, 2010), Kavak (2010) stated that share of school age cohort (3-22 age group) in total population will decline from 35% to 25% in Turkey in the period of 2010-2050 so Turkey will be free of the pressure of demand for schooling. This period can be utilized to increase enrollment ratios at all education levels as well as the quality of education (Kavak, 2010).

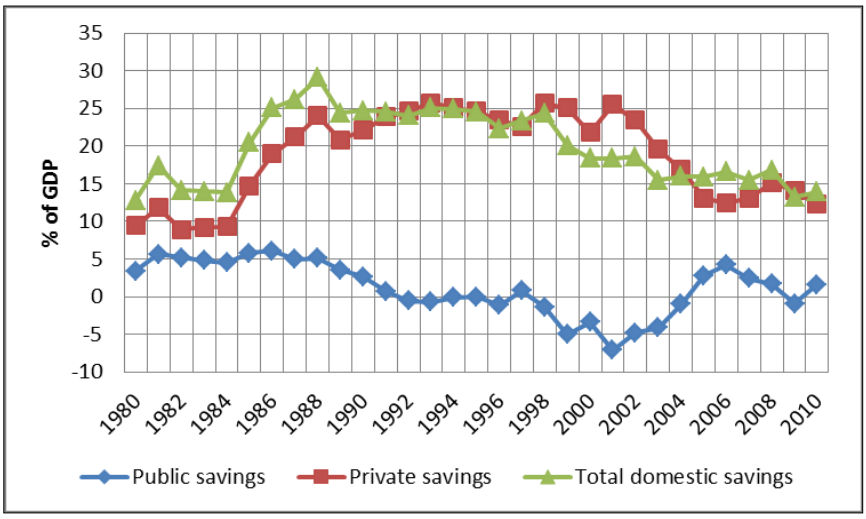
Expecting that future decline in fertility and fall in the share of school age cohort in total population will have a positive impact on human capital accumulation in Turkey is very reasonable by considering micro evidence provided by Dayıoğlu, et al. (2009) and Selim and Üçdoğruk (2005). Although the result is ambiguous depending on the estimation method, Dayıoğlu, et al. (2009) showed that increase in number of siblings has a negative impact on probability of enrollment. By estimating a child quality model using Household Labor Force Survey conducted in September 1999, Selim and Üçdoğruk (2005) provided evidence that number of children and educational attainment measured by completed years of education of children aged 16 and over have a negative relationship. Those findings confirm quality-quantity transition for Turkey and provide a bright picture about future increase in educational attainment of Turkish population if structural problems of education system are solved.

2.2.4.3. Domestic Savings in Turkey

As explained in Section 2.2.3.3, change in age structure of population is expected to affect domestic savings through accounting and behavioral effects as in labor supply channel. Accounting effect reflects the potential to increase savings that arises from accumulation of more and more people in working ages relative to economically dependent age groups while behavioral effect means the change in saving pattern of households as dependency burden in the household declines due to falling fertility level.

Domestic savings are the major source of financing investments in a country. If investments could not be financed through domestic savings, then dependence on foreign savings increases which might eventually harm the macroeconomic stability (World Bank, 2011). In this respect, the level of savings is important to sustain growth in an economy. Creation of new employment opportunities for labor force depends on investment level so savings; thus, the level of savings is also vital to fully utilize the demographic window of opportunity.

Domestic savings in Turkey has been following a declining trend especially since 1998. From 1980s onwards, total domestic savings reached its highest value in 1988 with almost 30% as a share of GDP but a declining trend was established afterwards and domestic savings reached its lowest value in 2009 with 13.2% of GDP.



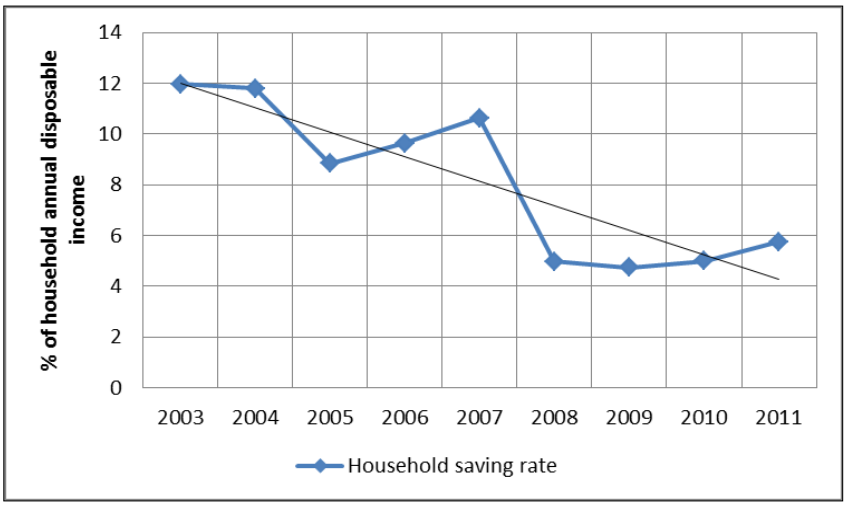
Source: Ministry of Development, 2013

Figure 2.42: Domestic savings in Turkey, 1980-2012

Between years 1980-1988, domestic savings increased mainly due to uncertainties in the economy formed by high inflation rates (World Bank, 2011). After that, an increasing pattern in private domestic savings was observed in the period of 1988-2001 but total domestic savings was depressed by the decline in public savings whose effect is more apparent between years 1998-2001 (World Bank, 2011).

After 2001 crisis, Turkey started to implement recovery policies shaped by fiscal tightening so public savings increased; however, credit expansion in the same period revived private consumption which was postponed for longer years due to macroeconomic instabilities and crisis (World Bank, 2011). In this respect, most of the decline in total domestic savings after 2001 could be attributed to the decline in private domestic savings as could be seen from Figure 2.42.

Private savings comprise of company and household savings. By providing data on household savings and retained earning separately for the period 2004-2008, Van Rijckeghem and Üçer (2009) put forward that the main source of decline in private savings was the decline in household savings in that period. A further analysis of World Bank (2011) also confirms this argument by revealing that after 2001, savings of firms followed an increasing trend except the decline in 2005 and 2008.



Source: TURKSTAT, Household Budget Surveys, 2003-2011
Author's calculations

Figure 2.43: Household saving rate in Turkey, 2003-2011

A long time series data only for household savings is not available for Turkey; therefore, macroeconomic analyses mostly use private domestic savings to make inferences about the determinants of household savings. In this respect, Van Rijckeghem and Üçer (2009) speculated on the reasons of this decline in private

savings and argued that reduction in real interest rate and credit expansion caused decline in private savings in 2000s. In an earlier study conducted for 1968-1994 period, Özcan, et al. (2003) found that real interest rate does not have a significant impact on private domestic savings in Turkey but income level and inflation rate have positive effects. In this analysis, Özcan, et al. (2003) used young age and old age dependency together with life expectancy to see the effects of demographic variables on Turkish private savings. The authors could not find any significant impact of young and old age dependency on private savings but found a negative significant impact of life expectancy. Although it is expected that increase in life expectancy creates an incentive to save more (Bloom & Williamson, 1998; Lee, et al., 2000), Özcan, et al. (2003) estimated that 1% increase life expectancy causes a 2% reduction in Turkish private savings and interpreted this result as the negative effect of aging on savings. Although, Özcan, et al. (2003) could not find a significant relationship between young age dependency and private savings for 1968-1994 period, analysis of World Bank (2011) based on Loayza, Schmidt-Hebbel, and Servén model (2000 cited in World Bank, 2011) showed that decline in young age dependency between years 1998-2008 absorbed some of the decline in private savings such that if young age dependency ratio had remained at its level in 1998, average private savings between years 2005-2008 would be lower than its actual average by 1.5 percentage points.

Besides the impact of fall in real interest rate and improved credit availability, World Bank (2011) indicated that increased macroeconomic stability and improved income prospects might be the reasons of declining household savings in Turkey in 2000s. Deaton (1990) argued that household savings in developing countries are mainly due to precautionary motive rather than consumption smoothing over life cycle since household income is more unstable in developing countries. Ceritoğlu (2009) confirmed precautionary saving hypothesis for Turkey by providing evidence that especially labor income risk causes households to save more. In this respect, economic growth experienced after 2001 might posivitely affect the expectations of households about their future income and cause a decline in precautionary savings.

Especially low levels of female labor force participation in Turkey creates a dependency effect in working age group; thus, restricts income and saving prospects of a household. In this respect, low and declining female labor force participation and employment especially in the first half of the 2000s might have a depressing effect on savings. By providing micro evidence from Household Budget Surveys 2003-2008, Aktaş, et al. (2012) confirmed that households with higher ratio of working females save more. However, not only female but also male employment has declined until recent years. Aktaş, et al. (2012) also provided evidence that households with unemployed male heads tend to save less. In this respect, declining employment rates until the second half of 2000s might be another reason of declining household savings (World Bank, 2011).

Micro analysis conducted to analyze the determinants of Turkish household savings provide evidence that income (Cilasun & Kırdar, 2009; Aktaş, et al., 2012; Van Rijckeghem & Üçer, 2009), wealth (Aktaş, et al., 2012; Van Rijckeghem & Üçer, 2009), and education (Cilasun & Kırdar, 2009; Aktaş, et al., 2012) have positively affect the level of household savings. Despite of the concensus on the importance of those variables, there is ambiguity about the life cycle pattern of Turkish household savings. Van Rijckeghem and Üçer (2009) could not find a significant relationship between age of household head and household savings. Aktaş, et al. (2012) also found that Turkish household savings do not follow life cycle pattern. However, Cilasun and Kırdar (2009), through their descriptive analysis, showed that household savings in Turkey follow life cycle pattern but in a different way than developed countries. Household savings increase with age of household head up to 55-59 age group and follow a more smooth hump-shaped pattern so Cilasun and Kırdar (2009) argued that such extraordinary levels of savings at older ages could not only be explained by life cycle hypothesis and they pointed out informal working among old-aged people, intergenerational family reunification, and bequest motive as potential reasons. In the light of this finding, it seems that old age dependency does not show its negative impact on savings in Turkey. Although Van Rijckeghem and Üçer (2009) could not find any significant impact of share of elderly in household,

Aktaş, et al. (2012) provided evidence on the significant and positive impact of presence of elderly on household savings. As mentioned earlier, World Bank (2011) estimated that some portion of decline in Turkish private savings between years 1998-2008 was absorbed by the decline in young age dependency at that period. The positive effect of declining young age dependency burden on savings is also visible at household level such that Aktaş, et al. (2012) estimated that share of children aged 0-14 in household has a significant negative impact on household savings.

In 2010, share of total domestic savings in GDP was approximately 14% in Turkey. When compared with domestic savings of East Asian countries at the beginnings of their demographic opportunity window presented in Table 2.3, Turkey's current saving rate seems comparable with the saving rates in South Korea and Singapore in 1965 but substantially lower than the saving rates in Taiwan, Hong Kong, Thailand, Malaysia so only by looking at this comparison, reaching directly a conclusion about the future performance of Turkey in increasing savings is not possible. However, median household saving rate in Turkey declined up to 6% in 2011 which puts Turkey among low-saving countries according to classification of Poterba (1994 cited in Cilasun & Kırdar, 2009). Attanasio and Székely (2000) estimated that median household saving rate continuously increased from 6.0% to 21.4% in Thailand from 1975 to 1996 while it increased from 24.5% to 48.1% at the same period in Taiwan. After 2008, household saving rate started to increase in Turkey but compared to Thailand's and Taiwan's household saving rates, such low saving level in Turkey does not allow to a bright scenario about future utilization of demographic opportunity window.

2.2.4.4. Entrepreneurship and Innovation in Turkey

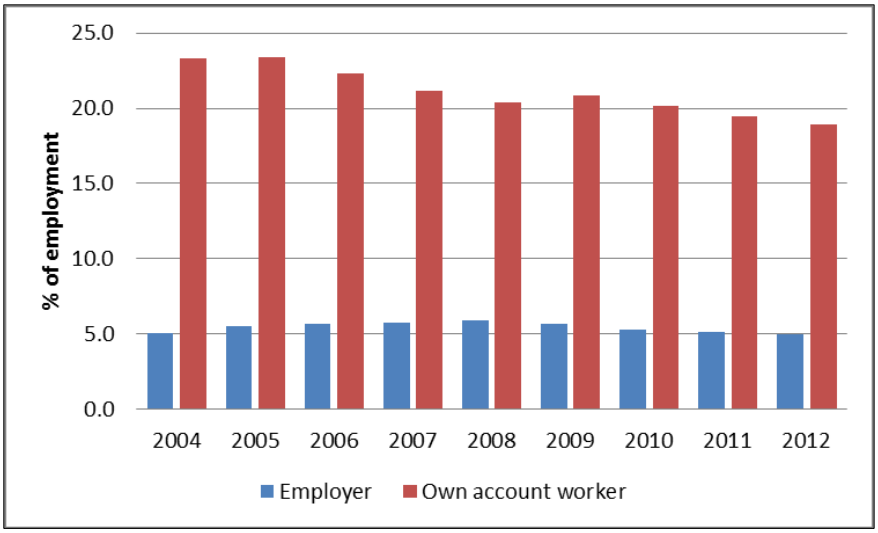
As mentioned in Section 2.2.3.4, entrepreneurship and innovation channel is crucial to realize the potential gains coming through demographic window of opportunity since this is the channel which turns savings into investment. Increase in investment is vital to produce productive employment for larger working age

cohorts entering into labor market in early phases of demographic opportunity window so functionality of this channel is vital to capture demographic dividend. Although it is strongly interrelated, entrepreneurship and innovation form a separate channel in terms of impacts of demographics on the economy since entrepreneurial activity and innovation capacity are affected by changes in demographic structure independent of savings and investments. Some of those effects are already presented in Section 2.2.3.4.

In this part, a brief sketch of entrepreneurship in Turkey is firstly provided which is indicated by the proportion of self-employment in total employment. As TURKSTAT statistics reveal, self-employment rates in Turkey are declining in recent years. As could be seen from Figure 2.44, proportion of employers in total employment has remained almost same from 2004 onwards but ratio of own account workers has declined from 23% to 19%. This decline might be a result of dissolution in agriculture since most of self-employed are working in agricultural sector. This interpretation is confirmed by the data of 2003 and 2010 Household Budget Surveys. According to the data, 59.3% of self-employed are working in agriculture in 2003 while this proportion has declined to 55.3% in 2010.

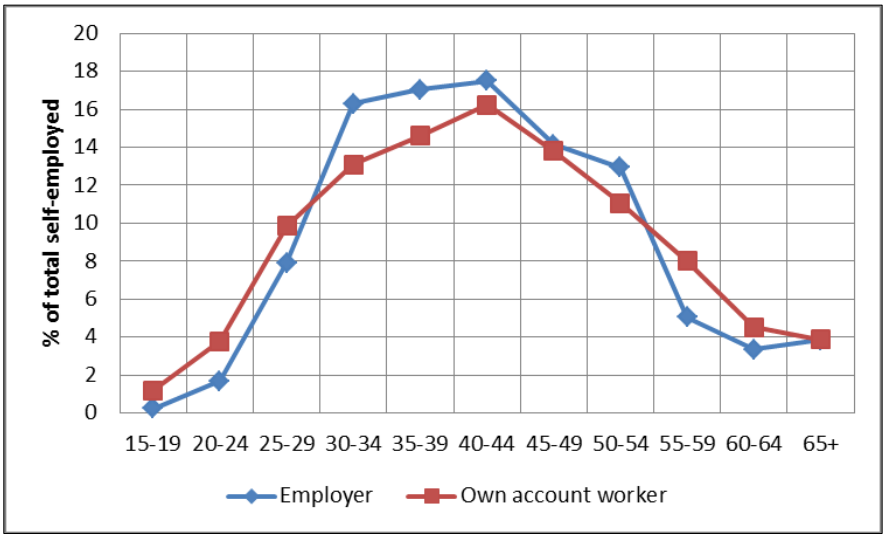
As mentioned in Section 2.2.3.4, entrepreneurship is strongly linked with age of the individual in the literature. Age might affect entrepreneurship positively or negatively. For instance, younger individuals might have knowledge and incentive but might not have enough experience, network, or access to credit market as well as older individuals; thus, a quadratic relationship between age and entrepreneurial activity is possible to observe (Bönte, et al., 2007). Such a relationship is visible when age profile of self-employed individuals is investigated in Turkey. As could be seen from Figure 2.45, distribution of employers and own account workers follows a hump-shaped distribution with a peak at 40-44 age group. In addition, as the data from 2010 Household Budget Survey reveals, a significant portion of employers and own account workers have primary school degree. Compared to own account workers, employers in non-

agricultural sectors have higher educational attainment. Those findings reveal that self-employed individuals in Turkey are middle-aged and low educated generally.



Source: TURKSTAT, Household Labor Force Surveys, 2004-2012

Figure 2.44: Proportion of self-employment in total employment in Turkey 2004-2012



Source: TURKSTAT, Household Budget Survey, 2010

Figure 2.45: Self-employment in non-agricultural sectors by age in Turkey, 2010

Although self-employment is used as a proxy of entrepreneurship in the literature, it does not provide an accurate measure of entrepreneurial activity and innovative capacity at least for Turkey in the sense that self-employment data covers employers and own account workers in all sectors including agriculture. For instance, data set of 2010 Household Budget Survey reveals that more than 50% of own account workers are in agricultural sector who most probably work for the subsistence of their own families. Considering that group of self-employed individuals under the category of entrepreneurial activity might not make sense in terms of the innovation capacity of the economy. Even though, it is possible to drop self-employed individuals from data sets for any micro analysis, self-employment again does not provide a sufficient for measure for innovative entrepreneurship since obtaining information on the founders of newly established firms is not possible from those micro data sets available in Turkey. In this respect, the statistics above do not go beyond to providing just a brief sketch for the current state of self-employment in Turkey. Considering the aim of the thesis which is providing a micro perspective for the demographic roots of socioeconomic development in Turkey, performing a well-suited micro analysis on the determinants of entrepreneurial activity in Turkey by taking age as the demographic variable seems inappropriate where self-employment provides a poor measure of entrepreneurship and innovation channel.

To perform a well-constructed micro analysis to observe the differential demographic characteristics of individuals on their possibility to involve in entrepreneurial activity, self-employment models provided by Knight (1921 cited in Foti & Vivarelli, 1994) and Oxenfeldt (1943 cited in Foti & Vivarelli, 1994) might provide a theoretical framework. The idea of self-employment model is that individual and background characteristics of the founder have a significant impact on the probability of being involved in entrepreneurial activity. In this respect,

- previous work and unemployment experiences (Vivarelli, 1991; Storey & Johnson, 1987),
- expected difference between income under entrepreneurial activity and dependent work (Foti & Vivarelli, 1994),

- education (Evans & Leighton, 1989),
- family's employment background (Evans & Leighton, 1989), and
- psychological factors such as tendency to take risk (Koh, 1996)

come to the fore as the major explanatory variables of a self-employment model in the literature. Besides these variables, age should be included into the model also to observe the impact of demographics on entrepreneurial activity since age is associated with education, work experience, and risk behavior (Bönte, et al., 2007) which are expected to determine the possibility of becoming an entrepreneur. Interactions between age and those variables might provide a clearer picture on the effect of age so hypothesis on the effect of changing demographics on entrepreneurship might be more accurately tested. However, it should be noted that in such an analysis, entrepreneurship definition should be limited to the founders of newly established firms in industry and manufacturing sectors where innovative capacity is expected to be higher compared to agricultural sector. Data from a survey which collects information on those variables listed above from the founders of newly established firms and from a sample of dependent workers as a control group might be analyzed by logit estimation procedure to observe the effects of those variables on probability of being an entrepreneur as well as the impact of age differentials on entrepreneurial activity. As far as the author is aware, such a data set is not available in Turkey; thus, performing such a self-employment model for Turkey is not possible now but there is room for improvement in this area if such a survey is conducted.

Such a procedure as explained above might test whether age differentials between individuals create a behavioral impact on entrepreneurial activity. Although observing this relationship might have important implications, it might not be sufficient to fully observe the functionality of entrepreneurship and innovation channel since important aspects of changing age structure in the population remain missing in such a micro-level analysis. Those aspects are as follows. Firstly, changing age structure in the population is expected to positively affect domestic savings in a country; hence, resources available to be used in investment increase for entrepreneurs as a result of demographic shift if proper financial

institutions are established to make access to credit easier. Secondly, demographic transition is expected to contribute educational attainment of the workforce through quality-quantity transition; thus, availability of educated workforce at relatively young ages at the beginnings of demographic opportunity window makes entrepreneurial activity easier and increases the innovation capacity through adoption or development of new technologies. Finally, changing demographic structure is expected to change consumption patterns in the population. For instance, a relatively larger share of young age population raises the market demand for education and child care; or a relatively larger share of old age population might create a market demand for life-long learning and wellness commodities. Siebert (2002 cited in Weber, 2010) stated that a population with a high share of elderly might not easily accept new technologies as consumers. From this perspective, it might be stated that adoption of new technologies might be easier at early stages of demographic opportunity window since relatively higher share of young adults might trigger market demand for new products which eventually might create an incentive for innovation and entrepreneurship.

In the literature which focuses on the determinants of start-ups in terms of market or industry characteristics, profitability and barriers to entry come the fore as major factors affecting the level of new entries to a certain market. In his empirical analysis for several industrial sectors in the U.S., Mansfield (1962) showed that increase in profitability in a sector positively affects entry while increase in capital requirements for a start-up negatively influence entry. Profitability might increase due to increase in demand or rise of product differentiation while initial capital requirements creates a barrier for entry mainly due to financial constraints (Vivarelli, 1991). At this stage, it is thought that impacts of demographics might be incorporated into this theoretical framework as follows. Changing age structure due to demographic transition has an impact on consumption patterns since accumulation of people in different age groups might trigger market demand for different industries depending on age structure so increasing profitability opportunities in those sectors might encourage innovative ideas and attract entrepreneurs in those sectors. On the other hand, accumulation

of individuals in working ages in demographic window of opportunity period is expected to increase savings as explained in Section 2.2.3.3 so increasing savings supported with proper financial institutions might ease financial constraints of entrepreneurs so attract them to start a new business. In addition, changing demographics is expected to positively affect human capital as mentioned in 2.2.3.3 so accumulation of skilled labor in work force might ease the cost of R&D and adoption of new technologies so starting to a new business for an entrepreneur might be much more easier in such an environment.

These hypotheses might be tested in a model which involves

- private savings as a share of GDP,
- an indicator of functionality of financial institutions in a country,
- share of high-skilled labor in total workforce or share of labor force working in R&D sectors,
- share of monetary value of consumption of a specific commodity in all households budget to see the impact of changing consumption patterns, and
- age structure of total population which might be measured by dependency ratios or share of broad age groups in total population

as explanatory variables where entrepreneurship and innovation is measured by total number of start-ups in a specific industry or volume of patent applications. Similar to the self-employment model suggestion mentioned above, interaction terms between age structure and other explanatory variables might be added to observe the channels through which age structure affects entrepreneurship and innovation in a much more clear way.

To perform such an analysis for Turkey, data on labor working in R&D and age structure of the population could be found from the statistics published by TURKSTAT while data on household savings and consumption patterns could be observed from Household Budget Surveys. In addition, the indicator of functionality of financial institutions should incorporate the injection of savings into the system and flows of financial sources for investment. In this respect, such

an indicator might be developed by using the ratio of household savings deposited to financial institutions and the ratio of bank deposits used for investment credit. The number of patent applications which might be used as the dependent variable of the model is published by Turkish Patent Institute and yearly and city-level data is available from 1995 onwards but the number of observations are limited for a time series analysis. However, performing such an analysis seems applicable for Turkey.

This thesis aims to investigate the impact of demographic differentials on the channels which are expected to contribute economic development in demographic opportunity window as mentioned earlier; in other words, the aim of this study is to look at the functionality of those channels at micro-level. Therefore, the entrepreneurship and innovation channel in this study is limited to a theoretical framework which is tried to be constructed above by incorporating possible impacts of demographics into existing start-ups literature since carrying out such a macro-level or sector-specific analysis for entrepreneurship and innovation channel is out of interest at this stage considering the limited scope of the study. However, the trial of constructing aforementioned theoretical framework provides a promising extension of this study and testing those hypotheses constitutes the basis of future works on this issue.

CHAPTER 3

DATA AND METHODOLOGY

As explained in Chapter 2 in detail, change in mortality and fertility patterns during demographic transition process eventually affects age structure of a population and brings a unique, transitory period called demographic window of opportunity which provides a demographically favorable environment for economic development. This period is attracted attention in the literature with the experience of East Asian countries which achieved high economic growth rates with rapid demographic transition between years 1960-1990. "East Asian miracle" is conventionally explained by factor accumulation and productivity growth (see e.g., World Bank, 1993; Page, 1994) which are the sources of economic growth by economic theory. However, rapid demographic shift associated with economic growth led to the question whether demographic changes also contributed to economic growth or not. In the light of studies referred in Section 2.2.1, it seems that changing demographics indirectly affected economic development in East Asian case through its impact on several spheres of economic life. In this respect, these several spheres of economic life called channels are important to be investigated to capture relationship between demographics and economics. These channels derived from East Asian experience are labor supply, human capital, savings, and innovation and their relations with demographic change are already discussed in Section 2.2.3 in detail.

Location of more and more individuals in working ages in a population is a macro-demographic concept so as implied in previous sections, realization of demographic dividend through the channels mentioned often comes to the fore as a macro-phenomenon in the literature. However, activation of these channels is strongly associated with economic decisions of individuals and households. In other words, activation of those channels in window of opportunity period depends on responses of individuals and households against changing

demographics. This argument is supported by life cycle approach discussed in Section 2.2.2. According to the life cycle approach, economic behavior of an individual changes throughout his/her life cycle. When this framework is applied to population level, demographic window of opportunity analogously corresponds to the location of an individual in his/her working ages when he/she makes critical economic decisions related to labor supply, education investment, and savings. In other words, location of more and more people in working ages in a population means that more and more people make those critical economic decisions which form the basis of demographic window of opportunity.

However, such an "accumulation" idea might not be enough to fully understand window of opportunity period since changing mortality and fertility patterns in this process is expected to create some behavioral effects in the life cycle. For instance, labor supply is not only expected to increase due to location of more and more individuals in working ages but also is expected to increase through increasing female labor force participation due to declining fertility. As a second example, increase in overall human capital depends on realization of quality-quantity transition. Finally, savings are expected to increase not only due to location of more and more individuals in their income-earning ages but also due to declining dependency burden at household level which make additional resources to be devoted for savings free. East Asian case also revealed the existence of such micro-level behavioral channels. Several microeconomic analyses conducted on East Asian window of opportunity show that changing demographics during demographic transition process positively affected female labor supply decisions (Okunishi, 2001; Bauer, 2001a), quality-quantity transition (Montgomery, et al., 2000), and household savings (Lee, et al., 2000). In the light of those studies, this study is based on the argument that changing demographics indirectly affects economic development by activating those micro-level behavioral channels. When those channels are activated, aggregation of those behaviors through some policies creates demographic dividend as revealed in East Asian case. In this respect, investigation of these micro-level behavioral channels is important to test their functionality in terms of demographic window of

opportunity period at first instance since unless changes in demographic structure affect decision making processes of agents in the channels of contribution, cumulative – i.e., accounting – effects could not materialize.

In this respect, by following the studies conducted on East Asian demographic window of opportunity, the aim of this thesis is to investigate behavioral effects of demographic transition on households' and individuals' decisions in those spheres of economic life; in other words, to examine the functionality of those channels at micro level in Turkish context since Turkey is also experiencing a similar demographic transition process as East Asian countries experienced in 1960s. For this purpose, female labor force participation, child quality, and household savings models are estimated by adding age dependency variables into the models which are constructed by following related theoretical frameworks conventionally used in the literature for such analyses. For these analyses, micro data sets of Household Budget Surveys conducted by TURKSTAT in 2003 and 2010 are used. Besides the aim of investigating the functionality of those channels, since Turkey's demographic window of opportunity started at the beginnings of 2000s, the years 2003 and 2010 are also selected considering the availability of the data in order to evaluate the changes in functionality of those channels, if there is any. This chapter is devoted to the explanation of data and methodology used in this study. First, information on Household Budget Surveys conducted by TURKSTAT is presented, and after that models estimated in this study are explained in details in subsequent sections by providing theoretical framework and methodology, explanations of variables used, descriptive statistics related to those variables for each model to be estimated.

3.1. Data

The Household Budget Surveys are annually conducted by TURKSTAT since 2002 which provide information on socioeconomic status and standards of living of individuals and households and their consumption patterns. The surveys are mainly carried out with the aim of providing information on

- main consumer goods and services which shall be used in calculation of consumer price indices,
- changes in household consumption patterns through time,
- distribution of disposable income among households and individuals,
- private consumption expenditures which shed light in calculation of national accounts,
- needed data to determine the level of minimum wage, and
- required sets of data to detect poverty line.

For these purposes, information on three main groups of variables is collected through these surveys which are related with socioeconomic status of households, consumption expenditures, and socioeconomic and demographic characteristics of household members. In this respect, those surveys provide a wide range of variables such as types of household consumption expenditures and variety of commodities purchased, working status of individuals, or household total income and sources of income.

Two-stage stratified cluster sampling is used as sampling design of the Household Budget Surveys. The framework for sample selection covers all population in urban and rural areas, with population size of over 20000 and 20000 and below, respectively, in the Republic of Turkey except institutional and nomadic population. Thus, samples of the surveys are representative for Turkey's residential population, and allow estimations at three domains (urban, rural, and Turkey) by using the weights provided in the micro data sets.

In order to form a basis for harmonized consumer price index started in 2003 and to accord estimation domains to NUTS system in the process of adaptation of European Union standards, the structure of the survey was revised and implemented for the first time in 2003. Therefore, 2003 Household Budget Survey was implemented to a very large sample comprising of 25290 households in the period of January 1- December 31, 2003. After that, the sample size was contracted to above 8000 households. For the 2010 Household Budget Survey

carried out in the period of January 1- December 31, 2010, the sample drawn involved 13248 households.

Household Budget Surveys include information on household income, properties owned by the household, household expenditures together with the monetary value of each item purchased in the survey month, and socioeconomic and demographic characteristics of household members such as education, age, marital status, and working status and so on. All information needed for the analysis performed to investigate female labor force participation, household savings, child quality, and self-employment is available in these surveys; thus, Household Budget Surveys are preferred to be used in this study.

As mentioned earlier, since Turkey's demographic window of opportunity started at the beginnings of 2000s, 2003 and 2010 Household Budget Surveys are selected considering the availability of the data in order to evaluate the changes in functionality of the channels investigated, if there is any. All variables used in the models to be estimated are generated from these data sets and analyses are carried out by using the statistical package program called STATA 11. Those variables which are determined in the light of theoretical framework related to each channel investigated in this study are explained in following sections together with related descriptive statistics.

3.2. Models for Possible Channels of Contribution

3.2.1. Female Labor Force Participation Model

As mentioned in Section 2.2.3.1, in the period of demographic opportunity window, labor supply is expected to increase not only through accumulation of population in working age groups – i.e., accounting effect – but also changes in labor supply decisions of agents. Those behavioral effects are mainly visible among women since fertility behavior has a direct effect on female labor force participation. In this respect, the first behavioral channel examined in Turkish context is labor force participation decisions of women in Turkey.

3.2.1.1. Theoretical Framework and Methodology

Neoclassical framework acknowledges that rational agents in an economy seek to maximize their utility through their decisions in a wide range of spheres of economic life. In the light of neoclassical framework, basic problem in the consumption theory is the consumer's utility maximization problem. Labor supply decision of agents is also considered as a utility maximization problem and uses the same outline as consumption decisions.

Leisure time is considered as a consumer good similar to other goods available for consumption of agents. A rational agent must decide to how much leisure is to be consumed considering forgone earnings which might alternatively be used for consumption of other goods. In this respect, the maximization problem faced by the consumer is as follows.

$$U_i = f(C_i, L_i) \tag{1}$$

subject to

$$L_i + H_i = 24 \tag{2}$$

$$pC_i \leq R + w_i H_i \tag{3}$$

where U_i represents the utility of the agent i from consuming the vector of consumption goods C and leisure time L subject to time and income constraints provided in Equation 2 and Equation 3, respectively. Time constraint represents the maximum hours in a day which could be allocated between leisure time L and working time H. p is the vector of prices of consumption goods so pC_i represents the expenditure of the agent which should be below or equal to the sum of his/her labor income $w_i H_i$ where w_i represents the labor earnings per hour and income from other sources (R).

Since leisure is denoted as a normal good, consumption of leisure time is expected to increase as income increases. On the other hand, consumption of more leisure time results in contraction of consumption of other goods due to forgone earnings

which is the price or opportunity cost of leisure time measured by w_i per hour. Under this framework, hours of labor supplied is determined by the relative dominance of income and substitution effects. As the labor wage increases, cost of leisure time increases so demand for leisure is expected to fall due to substitution effect. On the other hand, higher wages lead to higher income. Since leisure is a normal good, higher income results in an increase in demand for leisure due to income effect. Hence, increase in wages is expected to positively affect labor supply if substitution effect if greater than income effect but to decrease labor supply if income effect is higher than the substitution effect. The implication of this explanation is a backward-bending labor supply curve which implies the increase in labor supply at initially low wage levels due to dominance of substitution effect and then the decline in hours of work for initially high levels of wages due to dominance of income effect.

The neoclassical framework for labor supply based on the demand for leisure time is theoretically applicable also for female labor supply. Nevertheless, Mincer (1962) stated that such an analysis is missing in the sense that leisure time actually includes works that are not paid. According to Mincer (1962), work at home takes substantial time of especially married women so a simple labor-leisure framework is not sufficient to fully explain the dynamics of labor supply decisions of women.

As in consumption where family or household is taken as the unit of analysis, Mincer (1962) and Becker (1965) proposed to look at familial context in decision of labor supply of family/household members. According to Mincer (1962), family income is an important determinant of demand for house work and leisure time demanded by family members as well as family context which determines the demand for home production and leisure time consumed given the production function at home. Nevertheless, the allocation of time between leisure, paid work and house work is not only determined by family income or family structure but also by relative prices of those activities (Mincer, 1962). In other words, differential productivity of household members in those activities is also important. By the theory of allocation of time, Becker (1965) put forward this

argument in a much more clear way. Becker (1965) asserted that similar to the allocative efficiency of other resources, time is also efficiently allocated in the household such that household members who are relatively more productive in market work spend less time to leisure or house work. If there is a change in relative productivity of household members, then this is expected to result in a reallocation of time used by household members in different activities (Becker, 1965). The implication of this theoretical framework proposed by Becker (1965) and Mincer (1962) for female labor force participation is that comparative advantage of women in house works leads them to spend less time on market work which is determined in the family context. However, why women have a comparative advantage in house work compared to men remains as a question in this framework. Gender-based division of labor due to discrimination against women or fertility experience which is a life-cycle event special to women might traditionally form the basis of comparative advantage of women in house work which might cause lower earnings potential for women in the market (Becker, 1985).

In the light of the theoretical framework suggested by Mincer (1962) and Becker (1965), the variables mentioned in Section 3.2.1.2 are selected as potential explanatory variables which determine labor supply decision of females by affecting earnings potential of women in the market and demand for house works. Household-level young and old age dependency ratios that are discussed in the next section are expected to affect labor supply decisions of women through their impacts on the demand for house work so considering the aim of the thesis; household-level age dependency ratios are subject to special attention in order to observe the demographic roots of female labor force participation. The model to be estimated is specified as follows.

$$L_i^F = \alpha_0 + \alpha_1 EDUC_i + \alpha_2 MARRIED_i + \alpha_3 AGE_i + \alpha_4 AGE_i^2 + \alpha_5 URBAN_i + \alpha_6 HHINC_i + \alpha_7 YOUNGDEP_i + \alpha_8 OLDDEP_i + \varepsilon_i \quad (4)$$

where

L_i^F: labor force participation status of the woman i

$EDUC_i$: educational attainment of the woman i

$MARRIED_i$: marital status of the woman i

AGE_i: age of the woman i

AGE_i^2: square of the age of the woman i

$URBAN_i$: place of residence of the woman i

$HHINC_i$: household income of the woman i

$YOUNGDEP_i$: young age dependency in the household of woman i

$OLDDEP_i$: old age dependency in the household of woman i

The estimation method is as follows. L_i^F which denotes to the labor force participation status of woman i is a dummy variable such that

$$L_i^F = \begin{cases} 1, & if\ the\ i^{th} woman\ is\ in\ labor\ force \\ 0, & otherwise \end{cases} \quad (5)$$

It is possible to estimate such a model with ordinary least squares in the form of linear probability models. However, ordinary least squares is not suggested in the estimation of models with a dichotomous dependent variable since it might give predicted values lying outside of the interval of (0,1) with large prediction errors (Maddala, 2002). An alternative approach is available which transforms the dichotomous variable to a continuous one through a probability function P_i. The assumption is that the true value of the variable is not observed but it is realized as a binomial process with a probability varying for each case (Maddala, 2002). Since the occurrence of the event depends on the probabilities varying from case to case, the likelihood function below is subject to the estimation.

$$L = \prod_{event=1} P_i \prod_{event=0} (1 - P_i) \quad (6)$$

The likelihood equation can be estimated by logit or probit procedures. The only difference between them is the assumption on the distribution of the error term (Maddala, 2002). If it is assumed that cumulative distribution of the error term is logistic, then the logit model is estimated as follows.

$$log\frac{P_i}{1-P_i} = \beta_0 + \sum_{j=1}^{k}\beta_j x_{ij} \quad (7)$$

where βs are estimated coefficients, x_{ij} is the explanatory variables, and $\frac{P_i}{1-P_i}$ represents odds ratio in logarithmic form.

If error term is assumed as normally distributed, then probit model can be estimated. Actually, the distribution of the error terms in both procedures are almost the same and estimation results do not differ substantially (Maddala, 2002) so there is no reason, at least theoretically, to prefer one over another. For the female labor force participation model estimated here, logit estimation is preferred since odds ratios provided by logit estimation ease the interpretation of the results.

3.2.1.2. Variables Used and Descriptive Statistics

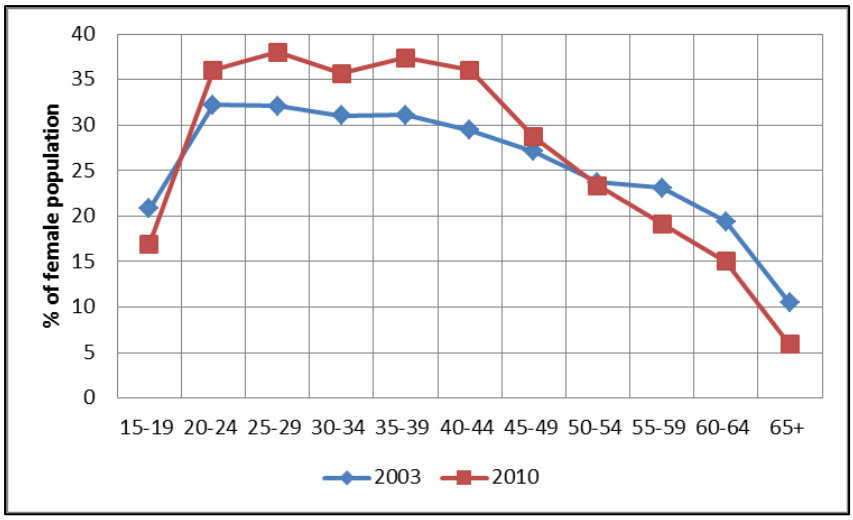
Female labor force participation is the dependent variable of the model which is a dummy variable taking "1" if the woman participates into labor force and "0" otherwise. The Household Budget Surveys provide information on current working status household members in working ages. In addition, questions are available which give information on whether the individual is currently looking for a job, and whether the individual can start to work in the following 15 days in case of finding a job. By using those three sources of information in the surveys, a woman aged 15 and over is assigned "1" if she is currently working or if she is not currently working but actively looking for a job and ready to start to work in the following 15 days in case of finding a job, in line with the definition of labor force participation used by TURKSTAT. The independent variables of the female

labor force participation model comprise of individual characteristics of women and household characteristics as follows.

As mentioned earlier, educational attainment is one of the most important determinants of female labor supply since it has a direct impact on the earnings potential of women in market work. As shown in Figure 2.40, female labor force participation increases with educational attainment in Turkey. Therefore, education status of women which is expected to have a positive coefficient is added into the model

- as an independent variable which takes "1" for illiterate women, "2" for women who are literate but have not graduated from any school, "3" for graduates of primary school, "4" for secondary school, "5" for high school and equivalent, and "6" for college, university, and post-graduates degrees, and
- as a set of dummy variables which take"1" for the completed level of schooling of the woman, and "0" otherwise.

Female labor force participation rates in Turkey are also affected by marital status. As Figure 2.39 shows, married women do not tend to participate into labor force as much as never married or divorced women. In this respect, a dummy variable is added to control for marital status which takes "1" if the woman is married and "0" otherwise. In 2003 Household Budget Survey, there are six categories for marital status which are never married, married, cohabiting, widowed, divorced, and living apart. In 2010, cohabiting partners without civil marriage and women living apart from their partners are classified under married category in line with their declaration. In order to accord the variable in 2003 and 2010 Household Budget Surveys, women coded as cohabiting and living apart in 2003 are also accepted under married category in line with the classification of 2010 Household Budget Survey. As a result, the dummy variable which is expected to have a negative coefficient assigns "1" to women who are married and "0" who are never married, divorced, or widowed.



Source: TURKSTAT, Household Labor Force Surveys, 2003 and 2010

Figure 3.1: Age-specific labor force participation rates of females in Turkey, 2003 and 2010

Age is another factor which has an effect on female labor supply decision. As could be seen from Figure 3.1, female labor force participation reaches its peak at 25-29 age group, and after that, a declining trend starts to establish except the M-shaped curve between the ages of 25-39 in 2010. To capture this firstly increasing and then declining pattern, age is added into the model as a control variable in a quadratic form. In 2003 Household Budget Survey, completed single-year ages of individuals are available; however, 2010 Household Budget Survey includes information on completed age groups of individuals. Therefore, single-year ages in the 2003 survey are grouped in line with the classification in the 2010 survey so the age variable here represents completed age groups of women.

As explained in Section 2.2.4.1, dissolution of agriculture and migration from rural to urban areas have a negative impact on female labor force participation (Uraz, et al., 2010; Dayıoğlu & Kırdar, 2010). To capture the effect of urban/rural differentiation in female labor supply, a dummy variable is included which takes the value of "1" if the woman lives in urban areas and "0" if the woman lives in

rural regions. Considering lower female labor force participation in urban areas, the coefficient of the variable is expected to be negative.

Besides the individual characteristics of women mentioned so far, household income or wealth might have an impact on female labor supply decisions (Mincer, 1962). An increase in household income might cause a negative effect on female labor supply, especially in lower income groups in Turkey (Uraz, et al., 2010; Dayıoğlu & Kırdar, 2010). In this respect, log of household income is added into the model to observe the impact of household income level on female labor supply decision. Besides the logarithmic transformation of the variable, a set of dummy variables are constructed and used in another specification to detect the differential impact at each income level. To employ dummy variables, first household income quintiles are constructed and dummies are defined for each quintile which take "1" for the woman in the specified income quintile. In Turkey, the new Turkish Lira without six zeros started to be used as of January 1, 2005 so 2003 Household Budget Survey represents household income in the old version of Turkish Lira while the 2010 survey uses the new one. To allow comparison, the scales are equalized by dividing household income variable in the 2003 survey by 1,000,000.

Finally, as the aim of this thesis is to observe the impact of demographic change on behavioral economic channels, two separate demographic variables are employed in the female labor force participation model.

The first demographic variable is young age dependency calculated at household level. It is calculated in a similar manner to population-level young age dependency ratio such that household-level young age dependency is the percentage ratio of number of children aged below 15 in the household to the number of household members in the age group of 15-64.

As mentioned in Section 3.1, the Household Budget Surveys are selected for this study since these surveys provide information on household income and expenditures needed to do estimations in this thesis; however, these surveys do

not provide information on all children born to a woman in her whole reproductive life, these surveys give information only on children living in the household. In this respect, young age dependency ratio calculated at household level could not fully capture the fertility differentials among women. Although, it seems as a shortcoming of the analysis, household-level young age dependency provides a reliable approximation for fertility differentials across women by realistically assuming that children aged below 15 usually lives with their parents in the same household[3]. In addition, the dependency ratio approach reflects well the age structure in the household which is an important indicator for demographic window of opportunity. Considering other advantages of Household Budget Surveys for this study, household-level young age dependency provides adequate information to see the impact of fertility differentials across women on their labor force participation.

The second demographic variable is old age dependency calculated at household level, again in a similar manner to its population-level counterpart. Household-level old age dependency is the percentage ratio of number of elderly aged 65 and over in the household to the number of household member in 15-64 age group. Similar to young age dependency ratio, old age dependency ratio is also an indicator of age structure in the household.

Since increasing fertility is expected to negatively affect labor force participation of women, young age dependency is expected to have a negative coefficient. Moreover, considering the care of elderly is among the duties of women in traditional gender based division of labor (Ercan, et al., 2010), old age dependency is also expected to have a negative coefficient.

Descriptive statistics for the variables used in female labor force participation models estimated by using 2003 and 2010 Household Budget Surveys are presented in Table 3.1 and Table 3.2, respectively. From 2003 to 2010, female labor force participation has increased by almost 4% reflecting the increase in

[3] As the sample statistics of 2003 and 2010 Household Budget Surveys reveal, higher than 95% of children in the age group of 0-14 live in nuclear and extended families.

female labor force participation in recent years provided in Section 2.2.4.1. Nevertheless, participation rate in 2010 is around 30% which means approximately 7 out of 10 women aged 15 and over are out of labor force.

Table 3.1: Descriptive statistics – Female labor force participation model (2003)

Variable	Mean	Median	Standard Deviation	Maximum	Minimum
Female labor force participation	0.27	0	0.44	1	0
Education	3.09	3	1.33	6	1
Marital status	0.67	1	0.47	1	0
Age	6.87	6	2.99	13	3
Urban/rural residence	0.62	1	0.49	1	0
Household income	9095.83	6630.49	10654.27	329522.30	0
Young age dependency	45.28	33.33	55.17	700.00	0
Old age dependency	11.06	0	29.50	300.00	0

Source: Author's calculations from 2003 Household Budget Survey

Table 3.2: Descriptive statistics – Female labor force participation model (2010)

Variable	Mean	Median	Standard Deviation	Maximum	Minimum
Female labor force participation	0.32	0	0.47	1	0
Education	3.13	3	1.43	6	1
Marital status	0.71	1	0.45	1	0
Age	7.14	7	2.98	13	3
Urban/rural residence	0.69	1	0.46	1	0
Household income	25025.66	20019.24	21673.72	444327.60	9
Young age dependency	42.74	33.33	53.16	700.00	0
Old age dependency	11.37	0	30.14	200.00	0

Source: Author's calculations from 2010 Household Budget Survey

A slight increase is also observed in mean educational attainment of women aged 15 and over. "3" represents graduation from primary and "4" represents graduation from secondary school as explained above. Thus, as the mean level of education shows primary school graduation loses its dominance among women

aged 15 and over and educational attainment of women is increasing towards secondary school completion.

Proportion of married women seems low when one considers that marriage is a universal phenomenon in Turkey such that almost all women in Turkey marry the end of their reproductive period as TDHS 2008 results reveal. However, it should be noted that the marriage definition used in this study considers currently married women as married, and never married, divorced and widowed women as single so it should not be confused with the definition of ever-married women. Proportion of married women seems to increase from 2003 to 2010. This might be interpreted as a decline in divorce rates, an increase in marriage rate, or a decline in probability of being widowed due to increase in life expectancy. Considering the increase in crude divorce rate in recent years published by TURKSTAT, the other two explanations seem more realistic. Besides the effect of changing mortality conditions on the probability of being widowed, changing age structure of population might affect marriage rate due to accumulation of more and more people in working age group.

Mean age of women aged 15 and over is observed over "7" indicating the completion of age group of 35-39. The slight increase in the mean age from 2003 to 2010 might be also a reflection of changing age structure of the population.

From 2003 to 2010, percentage of women aged 15 and over and living in urban areas increased from 61% to 69%. This 8% increase is an expected finding considering the faster urbanization in Turkey.

Mean values of household income seem high but it should be noted that those statistics belong to household annual disposable income, not to individual or monthly income. In addition, looking to median values is much more meaningful to eliminate the outlier effect of abnormally high incomes on the mean. Nevertheless, a substantial increase in annual household disposable income is visible from 2003 to 2010. As national accounts statistics published by

TURKSTAT reveal, GDP per capita has increased by almost 4% from 2003 to 2010; in this respect, such an increase in household income might be expected.

From 2003 to 2010, mean level of young age dependency ratio for the sample of women aged 15 and over has declined from 45% to 43%. In addition, old age dependency has increased by 0.3% at the same time period. Those statistics seem consistent with the changing demographic structure in Turkey and could be considered as the reflection of changing demographics at household level due to declining fertility and increasing life expectancy through time. However, those values should be evaluated with caution since the sample here covers women aged 15 and over. Therefore, those dependency ratios do not reflect the mean at household level. In this respect, descriptive statistics on young and old age dependency ratio provided in 3.2.2.2 reveal more accurate values for household level.

Cross tabulations provided in Table A.1 allow obtaining first-pass information on the relationship between female labor force participation and the variables listed above. It is observed that women who have college or higher educational attainment have higher participation rates in both years while almost 80% of the women who do not participate into labor force have primary school or lower educational attainment. Similarly, most of the women who do not participate are married and living in urban areas. On the other hand, a shift in the age composition of female labor force is observed between years of 2003 and 2010. In 2003, most of the women participating into labor force are in the 20-24 age group while share of 30-34 age group in total participation is the highest in 2010. It seems that share of women aged 30 and over in total participation has increased from 2003 to 2010. A similar shift is also visible when female labor force participation rates are examined by income quintiles. From 2003 to 2010, share of women participating into labor force in all income quintiles has increased but it is observed that share of women in third, fourth, and fifth income quintiles in total participation is higher in 2010 compared to 2003. It is an unexpected finding in the sense that an increase in household income is expected to negatively affect

female labor force participation as mentioned earlier. A further cross tabulation between educational attainment and household income quintiles reveal that share of more educated women becomes higher as income quintile increases so the positive effect of education on female labor supply might be embedded in the results revealed by the cross tabulation of female labor force participation and household income quintile. Finally, cross tabulations between female labor supply and number of children and elderly in the household do not reveal a direct positive and negative relationship. Relatively higher participation rates are observed among women who live in the households which include higher number of children or elderly. Further cross tabulations between urban/rural residence and number of children and elderly in the household show that presence of higher number of children and elderly in the household is a rural phenomenon. As mentioned earlier, female labor force participation in rural areas are higher compared to urban so cross tabulations between female labor supply and number of children and elderly in the household actually hide the effect of urban/rural differentiation in female labor force participation. Although cross tabulations whose details could be found in Table A.1 provide first-pass information on the effects of the variables listed above on female labor force participation, estimation results of multivariate analyses provided in Section 4.1 put the direction and magnitude of the effects in a much more clear way.

3.2.2. Child Quality Model

Increasing educational attainment is both a reason and a result of demographic transition process. As mentioned in Section 2.2.3.2, increasing returns to educational attainment in economic development process results in a decline in fertility due to increasing opportunities for women as well as increasing human capital through parents' increasing incentive to invest more on their children's education. While fertility is declining, more resources will be available for each child. This phenomenon is called quality-quantity transition, which is the third channel to be investigated in Turkish context.

3.2.2.1. Theoretical Framework and Methodology

According to the theory of fertility proposed by Becker (1960), children are consumption goods similar to consumer durables which provide some form of utility to their parents. Since children are considered as consumption goods, Becker (1960) states that in a utility maximization problem, a family decides the number of children to be consumed. However, a family should also decide the quality of children as well as quantity which is determined by the level of resources devoted to children for their education, health, and so on (Becker, 1960).

If children are consumer goods, then increase in income is expected to increase the quantity demanded of children. Formerly, Malthus put forward a similar argument that increase in income results in rise of fertility, and so family size. However, Becker (1960) stated that increase in income does not necessarily imply an increase in quantity of children; effect of rising income might be observed in quality of children demanded or consumed similar to consumer's behaviour in case of other durable goods. Therefore, at theoretical level, increase in income might positively affect both quantity and quality so the net effect is determined by the relative income elasticities of quantity and quality of children.

Formally, the utility maximization problem of an agent who considers the quantity and quality of children demanded is as follows.

$$U = U(n, q, y) \tag{8}$$

subject to

$$I = nq\pi + y\pi_y \tag{9}$$

where

n: quantity of children

q: quality of children

π: price of a child

y: quantity of other goods consumed

π_y: price of other goods

The first order conditions and solution of the optimization problem are below.

$$\frac{U_n}{q\pi} = \frac{U_q}{n\pi} = \frac{U_y}{\pi_y} \tag{10}$$

The equality between the two first order conditions above implies that an extra unit of money spent for an additional quantity of children is equal to the extra amount spent for a unit of increase in quality of a child. Although this equality forms the basis of the notion of quality-quantity transition, it does not theoretically explain why parents prefer quality over quantity. To explain the preference of quality over quantity, Becker (1960) speculated that in a modern society quantity elasticity might be small although it is positive. Becker and Lewis (1974) further elaborated the analysis by showing that income elasticity of quality is higher, and price elasticity of quality is lower than that of quantity so quantity is substituted with quality as income increases.

In the light of the theoretical framework proposed by Becker (1960) and Becker and Lewis (1974), the variables listed in Section 3.2.2.2 are selected as potential explanatory variables which determine quality of the child measured by educational spending per child. Household-level young age dependency ratio is subject to special attention in order to investigate the presence of quality-quantity transition in Turkish context. In this respect, the model to be estimated is specified as follows.

$$\begin{aligned} EXP\_EDUC_i = {} & \gamma_0 + \gamma_1 EDUC_i^{Mother} + \gamma_2 EDUC_i^{Father} + \gamma_3 SEX_i \\ & + \gamma_4 AGE_i + \gamma_5 URBAN_i + \gamma_6 LFPR_i + \gamma_7 HHINC_i \\ & + \gamma_8 YOUNGDEP_i + \varepsilon_i \end{aligned} \tag{11}$$

where

EXP_EDUC_i: educational expenditure for the child i

$EDUC_i^{Mother}$: educational attainment of the mother of the child i

$EDUC_i^{Father}$: educational attainment of the father of the child i

SEX_i: sex of the child i

AGE_i: age of the child i

$URBAN_i$: place of residence of the child i

$LFPR_i$: labor force participation status of the child i

$HHINC_i$: income of the household of the child i

$YOUNGDEP_i$: young age dependency in the household of the child i

The child quality model whose specification is provided above is estimated by ordinary least squares. The definitions and explanations of the variables used are provided in the next section together with descriptive statistics.

3.2.2.2. Variables Used and Descriptive Statistics

Child quality is the dependent variable of the model which is measured by education expenditure per child in the household. The monthly household expenditure data set provided by the Household Budget Surveys includes information on monetary value of each expenditure item grouped by Classification of Individual Consumption According to Purpose (COICOP) purchased in the survey month. Education expenditures are grouped as expenditures for pre-primary and primary education, secondary education, post-secondary and pre-higher education, higher education, and education with unspecified level. Since the sample is restricted to children in the age group of 6-19 living with their both parents for the estimation of child quality model, education expenditures for pre-primary and primary, secondary, and post-secondary and pre-higher education levels are summed up considering the age group of the children. Since this sum represents monthly expenditure, annual education expenditure is calculated by multiplying it with 12. Then, annual education expenditure per child is calculated by dividing annual education expenditure to the number of children aged 6-19 living in the household. Logarithmic transformation of this value is used as the dependent variable of the child quality model.

The first independent variables on which child quality indicator are regressed on is the educational attainments of both parents. Educational attainment of parents is a significant determinant of resources devoted for children's education (Montgomery, et al., 2000) since education status of parents might affect the level of those resources through its impact on fertility behavior, household income, and attitudes towards academic success of children. In this respect, educational attainment variables are constructed as defined in Section 3.2.1.2 for both mother and father of the children in the household, and expected to have positive coefficients.

Age of the child is also added into the model. The children considered here are in the age group of 6-19 which corresponds to primary, secondary, and pre-tertiary education level. As age increases, it is expected that education expenditure per child also increases considering concentrated private expenditure on preparation for university entrance in Turkey so a positive coefficient for this variable is expected.

Enrollment rate statistics published by TURKSTAT reveal that gender gap in education in Turkey has been closed in recent years, especially at primary education level. However, a relatively higher difference in enrollment rates to secondary school has been observed between girls and boys. To control the effect of gender, a dummy variable is added into the model which takes "1" if sex of the child is girl and "0" if the child is a boy. A negative coefficient is expected for this variable considering lower enrollment rate of girls to secondary and high school.

Employment of children is expected to exert a negative impact on their educational attainment since it might constitute a barrier for their enrollment. In this respect, educational spending for a working child might be lower also considering the possibility of household income of those working children being lower. Therefore, a dummy variable which represents the working status of the child is added into model which takes "1" if the child is currently working. Information on the working status of household members are available in

Households Budget Surveys but working status is reported for individuals aged 12 and over in the 2003 survey while it is available for individuals aged 15 and over in the 2010 survey. Therefore, labor force participation status of children derived from the 2003 survey covers the age group of 12-19 while it covers the age group of 15-19 for 2010.

Another dummy variable added into the model aims to control the effect of urban/rural differentiation in educational spending per child. The variable again takes "1" for children living in urban areas. In urban areas, access to schooling so educational spending might be higher considering the importance of education in urban labor market. In addition, private education opportunities might be more in urban areas compared to rural areas so a positive coefficient is expected for this variable.

Socioeconomic status of the household is one of the most important determinants of educational spending per child since it is expected that the higher the household income is, the higher the resources available to be devoted per child is. Therefore, log of household monthly income is added into the model which is expected to have a positive coefficient.

Finally, household-level young age dependency ratio which is included in female labor force participation and household savings model is introduced into the model to observe the effect of child dependency burden on child quality. Here, household-level young age dependency ratio is calculated in a slightly different manner such that children aged 19 and below in the household are considered as the dependents while 20-64 age group is taken as primary age group. Such a definition is preferred to be used in child quality model since children in age group of 6-19 is considered as school-age children here so they are expected to be economically dependent. As the number of children aged 19 and below is higher in the household, young age dependency is expected to be higher; hence, it provides a good approximation for quantity of children in the household. Higher number of children is expected to lower educational spending per child so this is

the variable indicating quality-quantity transition which is expected to have a negative coefficient.

Descriptive statistics for the variables listed above are derived from 2003 and 2010 Household Budget Surveys and presented in Table 3.3 and Table 3.4, respectively. It seems that annual education expenditure per child aged 6-19 in the household which is 90.8 Turkish liras in 2003 has increased to 300.9 Turkish liras by 2010. Considering the extensity of public education services, such low levels of household education spending per child are not surprising; however, more than 200% increase in education spending per child from 2003 to 2010 can be interpreted as either parents' giving more importance to invest on their children's education or a reflection of commercialization of education in the household budget.

Mothers' mean education level is almost "3" which represents graduation from primary school, and it has not changed substantially from 2003 to 2010 although a slight increase is observed. Similar to mothers of the children aged 6-19, fathers' mean educational attainment has slightly increased from 2003 to 2010 but it is around 3.5 in both years which reflects the dominance of fathers with primary and secondary school degree in the population.

Almost half of the children aged 6-19 are girls in both years. On the other hand, proportion of children aged 6-19 living in urban areas increased by 8% from 2003 to 2010 which is in line with the continuously increasing proportion of population living in urban areas in Turkey.

As emphasized in Section 3.2.1.2, mean and median values of household income as well as young age dependency might exhibit some differences due to different samples selected for estimations of different models but consistent with the statistics provided in Section 3.2.1.2 and Section 3.2.3.2, median level of household income has increased from 2003 to 2010.

Table 3.3: Descriptive statistics – Child quality model (2003)

Variable	Mean	Median	Standard Deviation	Maximum	Minimum
Education spending per child	90.79	0	821.14	60000.00	0
Mother's education	2.72	3	1.23	6	1
Father's education	3.46	3	1.16	6	1
Age	2.35	2	0.48	3	2
Sex	0.50	0	0.50	1	0
Urban/rural residence	0.60	1	0.49	1	0
Household income	8298.15	6096.73	9826.72	329522.30	0
Labor force participation	0.11	0	0.31	1	0
Young age dependency	138.99	100.00	81.99	800.00	11.11

Source: Author's calculations from 2003 Household Budget Survey

Table 3.4: Descriptive statistics – Child quality model (2010)

Variable	Mean	Median	Standard Deviation	Maximum	Minimum
Education spending per child	300.93	0	1553.65	55704.60	0
Mother's education	2.86	3	1.29	6	1
Father's education	3.55	3	1.19	6	1
Age	2.34	2	0.48	3	2
Sex	0.48	0	0.50	1	0
Urban/rural residence	0.68	1	0.47	1	0
Household income	23272.49	18729.39	19814.00	433268.90	480.00
Labor force participation	0.10	0	0.30	1	0
Young age dependency	125.78	100.00	71.65	500.00	12.50

Source: Author's calculations from 2010 Household Budget Survey

It seems that share of children participating into labor force has declined by 1% from 2003 to 2010. However, as mentioned above, information on labor force participation status is collected for individuals aged 12 and over in 2003 Household Budget Survey while it is collected for individuals aged 15 and over in 2010 Household Budget Survey. Considering the discrepancy between age groups

for which labor force status is defined in those two surveys, this interpretation should be taken into consideration with caution.

Finally, statistics for young age dependency ratio, similar to the case of household income, exhibit differences from the statistics presented for this variable in Section 3.2.1.2 and Section 3.2.3.2. However, it should be noted that household-level young age dependency ratio is calculated in a different manner to be used in child quality model considering dependency of school-aged children as explained above. It seems that mean young age dependency ratio for the sample of children aged 6-19 has declined from 139% to 126% from 2003 to 2010. In other words, mean number of dependent children aged 6-19 per individual aged 20-64 in a household has declined from 1.39 to 1.26 between those two years considered. This finding is in line with the observed decline in household-level young age dependency calculated for female labor force participation and household savings models as well as demographic transition experienced in Turkey.

The sample of children aged 6-19 are divided into two by taken education expenditure per child in the household into account to provide cross tabulations of education expenditure per child by explanatory variables listed above. Those cross tabulations reported in Table A.4 provide evidence on the positive effect of mother's and father's education, household income, and urban residence on education spending per child. Furthermore, the negative effects of labor force participation and number of children aged 19 and below in the household on education expenditure per child are also apparent in the cross tabulations. However, the expected relationships between age and sex of the child and educational spending are not visible. Distribution of educational spending across sex seems smooth. In addition, cross tabulation of education expenditure by age does not reveal any evidence for increasing education spending in the 15-19 age group. Further analysis is needed to observe the effects of those variables on education spending per school-aged child in the household; thus, multivariate analyses for child quality are provided in Section 4.2.

3.2.3. Household Savings Model

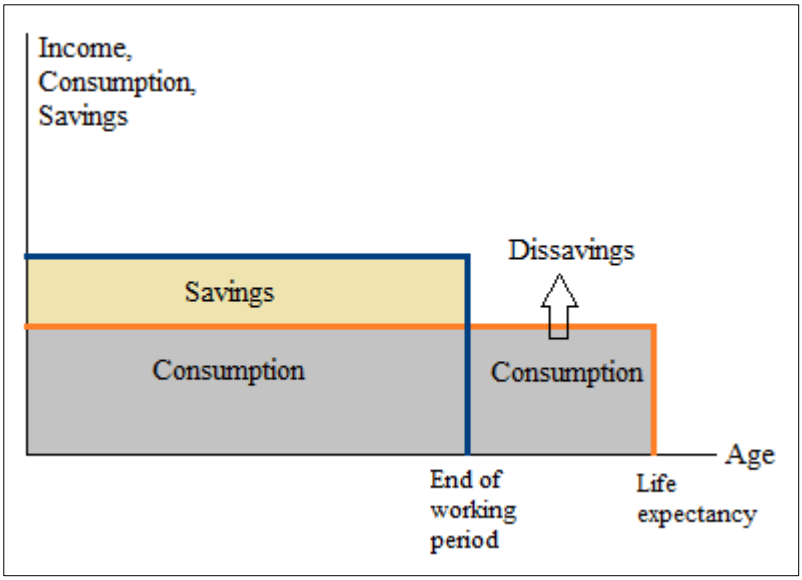
Demographic window of opportunity period is associated with accumulation of relatively more people in working ages who have potential to earn income and to save unlike the economically dependent population. As explained in Section 2.2.3.3, declining fertility in demographic transition process is expected to have a positive impact on household savings since less number of children allows more resources to be devoted for savings. In addition, increasing life expectancy is expected to create an incentive to save more to smooth consumption for longer years, and to prepare for a longer retirement period and future potential health risks in older ages. On the other hand, increasing old age dependency, similar to young age dependency, negatively affects savings since elderly people are not considered economically active. Aggregate measures of household savings in Turkey presented in Section 2.2.4.3 do not exhibit a bright picture for utilization of demographic window of opportunity in Turkey; in this respect, the second channel whose functionality is investigated in this study is the household savings in Turkey.

3.2.3.1. Theoretical Framework and Methodology

In *The General Theory*, Keynes (1936 cited in Browning & Lusardi, 1996) listed eight main motives to explain the question that why people save. One of those is life cycle motive meaning that people tend to save to meet their needs in case of anticipated income changes in the future. Later, Modigliani (1966) focused on this motive and developed his life cycle hypothesis.

According to the life cycle hypothesis, individuals make their consumption and saving decisions based on their future expected lifetime resources as well as on their current income. According to Modigliani (1966), sharp changes in consumption behaviour based on current income is not observed since individuals tend to smooth their consumption over their life cycle. In this respect, as presented in Section 2.2.3.3, individuals are expected to save and build assets when they are

at working ages in order to use them to sustain a certain standard of living in their anticipated post-retirement period (Modigliani, 1966).



Source: Modigliani, 1966

Figure 3.2: Income, consumption, and savings over life cycle

Modigliani's hypothesis has major implications for changes in aggregate savings with changing demographic structure. According to Modigliani (1966), population growth positively affects savings since it leads to accumulation of individuals at younger ages when earnings and savings potential are higher. However, life cycle is implicitly divided into two – i.e., working ages and old-age period – in Modigliani's perspective which was later challenged by Coale and Hoover (1958) who considered the early period of young ages as the economic dependency period. As mentioned in Section 2.2.3.3, Coale-Hoover hypothesis is based on the argument that high fertility and high population growth depresses savings by increasing share of economically dependent population and so diverting resources to consumption which might be alternatively used to save.

Modigliani's life cycle hypothesis together with demographic implications on savings further revised by Coale-Hoover hypothesis form the theoretical basis of

household savings analysis in the empirical literature. Besides income and wealth, demographic variables such as age composition and structure of the family/household come to the fore as the major sources of savings differentials across households (Browning & Lusardi, 1996). In the light of the theoretical framework explained above and empirical studies on Turkish household savings most of which are mentioned in Section 2.2.4.3, the explanatory variables explained in Section 3.2.3.2 are selected to investigate the sources of differentials across household savings. As in female labor force participation model, household-level young and old age dependency ratios are subject to special attention to detect the contribution of differential demographic structure on household savings; in other words, to observe the functionality of savings channel in Turkish context in line with the aim of this thesis. The model is specified as follows.

$$S_i = \beta_0 + \beta_1 HHINC_i + \beta_2 EDUC_i^{Head} + \beta_3 AGE_i^{Head} + \beta_4 AGE_i^{Head^2} + \beta_5 HEALTH_i + \beta_6 URBAN_i + \beta_7 HHTYPE_i + \beta_8 WORK_i + \beta_9 YOUNGDEP_i + \beta_{10} OLDDEP_i + \varepsilon_i \quad (12)$$

where

S_i: saving rate of the household i

$HHINC_i$: income of the household i

$EDUC_i^{Head}$: educational attainment of the head of household i

AGE_i^{Head}: age of the head of household i

$AGE_i^{Head^2}$: age squared of the head of household i

$HEALTH_i$: health insurance coverage of the head of household i

$URBAN_i$: place of residence of the household i

$HHTYPE_i$: type of the household i

$WORK_i$: working status of the head of household i

$YOUNGDEP_i$: young age dependency in the household i

$OLDDEP_i$: old age dependency in the household i

The household savings model specified as above is estimated by using ordinary least squares. The definitions and explanations of the variables used together with descriptive statistics are provided in detail in the following section.

3.2.3.2. Variables Used and Descriptive Statistics

The dependent variable of the household savings model is the household saving rate derived from the Household Budget Surveys. There are three approaches to calculate household savings (Aktaş, et al., 2012). Two of those approaches include expenditures on consumer durables and human capital items such as education and health, respectively, based on the idea that those expenditures are, indeed, a form of savings for households and individuals. In the other approach, saving rate is conventionally calculated as the ratio of household savings out of disposable income to the total household disposable income where all types of expenditures are considered as consumption. This definition is employed in this study for household savings analysis. The Household Budget Surveys include information on annual household disposable income and monthly household expenditures. After calculating annual household expenditures by simply multiplying monthly household expenditures with 12, the logarithmic difference between annual household disposable income and annual household expenditures gives an approximation of annual household saving rate. Logarithmic transformation is preferred to ease the interpretation of the results as well as to lessen the effects of outliers in the data set.

Besides the demographic variables (i.e., household level young age dependency and old age dependency ratios) used in this study to examine the effect of age structure, household saving rate is regressed on two sets of independent variables which are related with characteristics of household head and household features. Those variables conventionally used in the literature of household savings analyses are as follows.

The first variable representing the characteristics of household head is educational attainment of him/her. Since higher educational attainment is associated with

higher income, and so higher savings, household head's education level is added into the model to control its effect. The educational attainment variable is constructed as the same as in Section 3.2.1.2, and a positive coefficient is expected for this variable.

The second variable included is the age of household head. The age variable here again represents completed age group of household head as mentioned in Section 3.2.1.2. By the life cycle hypothesis, income is expected to increase with age up to a certain point and decline thereafter. Parallel with income changes through life cycle, savings are also expected to first increase and then decrease as age increases. Therefore, age of the household head is included into the model in a quadratic form to test whether life cycle hypothesis holds for household savings in Turkey. As the hypothesis suggested, positive and negative coefficients are expected for age and age-squared, respectively.

As mentioned in Section 2.2.4.3, Ceritoğlu (2009) showed that precautionary motive is important for savings of Turkish households. In the household savings model estimated in this study, precautionary motive is also taken into consideration by adding a dummy variable which takes "1" if the household head has health insurance. If perceived risk of income loss in case of a health problem is low due to the possession of health insurance, then households do not need to save more as a precaution for a potential health problem. Thus, a negative coefficient is expected for this variable.

The last variable related with characteristics of household head is working status which is a dummy variable taking "1" if household head is working in the reference year. A working household head is expected to have a higher income and higher savings compared to an unemployed/not working household head so a positive coefficient is expected for this variable.

When variables related with household characteristics are considered, household income comes to the fore as the most important determinant of household savings. Household income constitutes the basis of resources a part of which is devoted for

savings so higher household income means higher marginal propensity to save. In this respect, a positive coefficient for household income is expected which is added into the model in logarithmic form.

In addition, different household types might affect household savings in different ways (Browning & Lusardi, 1996; Attanasio & Székely, 2000) Extended families might have more potential income earners compared to nuclear or single-adult families so higher saving rates. Therefore, a set of dummy variables are included into the model to differentiate the effect of nuclear, extended, and single-adult family types on household savings where nuclear family type is taken as reference group. Compared to nuclear families, extended families are expected to have higher saving rates and single-adult households have lower saving rates so positive and negative coefficients for these dummies are expected, respectively.

Another dummy variable to control for the residence of household is added which takes "1" if the household lives in urban and "0" for rural. Considering the income uncertainty in rural agricultural production which might result in a higher precautionary savings (Van Rijckeghem & Üçer, 2009), and the variety of expenditure items in urban areas, a negative coefficient is expected for this variable.

Finally, household level young age and old age dependency ratios are added into the model which are calculated as described in Section 3.2.1.2. Both variables are expected to have negative coefficients since increase in both young and old age dependency means increase in the share of economically dependent household members compared to economically active income earners in the household. Thus, increase in young and old age dependency is expected to have a depressing effect on household savings.

Besides, young and old age dependency, which are hypothetical measures of economic dependency, another variable is calculated to be used in a different specification of household savings model. This variable is support ratio, which is conventionally calculated as the ratio of working population to non-working

population. In this study, support ratio is calculated at household level as the ratio of working household members to household size. This calculation is different than its conventional definition but such a measure is preferred since some households do not include any working members. This fact results in missing values in the data set which cause the loss of some observations. As an alternative to young and old age dependency ratio, such a measure is employed in the model to observe the actual effect of economic dependency on household savings considering the possible economic dependency in working age group due to low labor force participation rates in Turkey, especially among women. A positive coefficient is expected for support ratio as more income earners in the household are expected to positively affect household income, and so savings.

The descriptive statistics for those variables derived from 2003 and 2010 Household Budget Surveys are presented in Table 3.5 and Table 3.6, respectively. As could be seen from Table 3.5 and Table 3.6, household saving rate in Turkey substantially declined from 2003 to 2010. After eliminating some problematic entries in the data which might be the result of inaccurate reporting of income and consumption expenditures, mean levels of household savings out of disposable income are calculated as 10.3% and 2% in 2003 and 2010, respectively. Nevertheless, mean household saving rate is exposed to outlier effect of abnormally high and low values so looking at median values is more reliable considering also the skewness of income distribution. As median values of household saving rate also exhibit, household saving rate in Turkey has declined by almost 7% from 2003 to 2010 which is consistent with the values reported in Section 2.2.4.3.

On the other hand, median household income exhibits a substantial increase from 2003 to 2010, similar to those reported in descriptive statistics calculated from the data set of female labor force participation model. Descriptive statistics of household income as well as young and old age dependency ratios reported in this section might exhibit some differences compared to those statistics reported in sections of female labor force participation and child quality models since the

sample subject to analysis in each model is different from each other. However, as could be seen from the tables below, those differences are minor and trends are almost consistent.

Mean educational attainment of the household heads is near to 4 in both years which represents the dominance of household heads with primary and secondary school degrees in the samples. On the other hand, mean age of the household heads is near to 9 in both years with a slight increase from 2003 to 2010. This value shows that the household heads in Turkey are usually in 40-44 and 45-49 age groups.

Table 3.5: Descriptive statistics – Household savings model (2003)

Variable	Mean	Median	Standard Deviation	Maximum	Minimum
Saving rate	10.31	13.38	34.01	96.64	-99.92
Household income	8925.62	6447.87	10518.71	329522.30	418.49
Education of the head	3.60	3	1.26	6	1
Health insurance	0.74	1	0.44	1	0
Age of the head	8.67	8	2.39	13	3
Urban/rural residence	0.64	1	0.48	1	0
Nuclear family	0.73	1	0.45	1	0
Extended family	0.20	0	0.40	1	0
Families with single adults	0.07	0	0.26	1	0
Working status	0.75	1	0.43	1	0
Young age dependency	51.11	33.33	59.82	600.00	0
Old age dependency	9.92	0	29.29	300.00	0
Support ratio	0.34	0.29	0.25	1	0

Source: Author's calculations from 2003 Household Budget Survey

Table 3.6: Descriptive statistics – Household savings model (2010)

Variable	Mean	Median	Standard Deviation	Maximum	Minimum
Saving rate	2.00	5.99	34.14	95.07	-99.25
Household income	25112.83	19690.75	23021.78	623595.30	1972.28
Education of the head	3.71	3	1.33	6	1
Health insurance	0.90	1	0.30	1	0
Age of the head	8.69	9	2.41	13	3
Urban/rural residence	0.72	1	0.45	1	0
Nuclear family	0.74	1	0.44	1	0
Extended family	0.19	0	0.39	1	0
Families with single adults	0.07	0	0.25	1	0
Working status	0.79	1	0.41	1	0
Young age dependency	46.52	33.33	56.57	700.00	0
Old age dependency	9.74	0	29.66	200.00	0
Support ratio	0.43	0.33	0.27	1	0

Source: Author's calculations from 2010 Household Budget Survey

As mentioned earlier, health insurance coverage of the household head is included in the model as an indicator of the importance of precautionary motive in Turkish household savings. Health insurance coverage of the household heads has increased from 74% to 90% from 2003 to 2010.

Similar to the statistics reported in Section 3.2.1.2, share of households living in urban areas has increased by 8% from 2003 to 2010 consistent with the pattern of urbanization in Turkey. In addition, descriptive statistics below reveal that most of the households in Turkey consist of nuclear families. The family structure of Turkish households is almost same between the years compared. While nuclear and extended family types sustain their dominance, 7% of households consist of families with single adult. Furthermore, more than 70% of household heads are working in the reference year of the survey with a minor change between the years compared.

Almost 5% decline in household-level young age dependency ratio is visible from 2003 to 2010 which is consistent with the demographic transition under way in Turkey. Nevertheless, household-level old age dependency ratio does not exhibit the same trend presented in Section 3.2.1.2. As mentioned in that section, statistics for old age dependency ratio presented here is much more accurate to reflect the age structure at household level since the sample used for estimation of household savings model consists of households unlike the sample used in female labor force participation model. Although population-level old age dependency ratio is increasing in Turkey due to increasing life expectancy, it is not reflected at household level considering the extensity of nuclear family type in Turkey. Nevertheless, it is still a good indicator of the age structure in the household considering that aging of the population is not still a major phenomenon in Turkey.

Finally, support ratio calculated to be used in a separate specification to observe the effect of actual economic dependency exhibit an increase from 34% to 43% between the years 2003-2010. This ratio means that in a four-person household, 1.36 persons are working to support the whole family in 2003 while this ratio has increased to 1.72 in 2010. Changing age structure in favor of working ages as reflected by declining young age dependency and slightly declining old age dependency at household level might lead to such an increase in support ratio but this explanation is missing since support ratio considers the actual working status of the household members. In this respect, although it is still very low, increasing female labor force participation in recent years might be another reason of such an increase.

Table A.2 and Table A.3 in the Appendix provide cross tabulations of household savings which are presented as saving rate quintiles to ease interpretation and the explanatory variables used in the model in order to obtain a first-pass outlook for the relationship between those variables mentioned. As mentioned in this section, household income comes to the fore as the major determinant of household savings. In both 2003 and 2010 Household Budget Surveys, it is observed that household saving rate increases as household income increases. A similar direct

and expected relationship is also observed between household saving rate quintiles and support ratio quintiles and working status of the household head. It seems that as support ratio in the household increases, the probability of the household's being in higher quintiles increases. Similarly, ratio of households with working heads is higher in higher household saving rate quintiles in both of the years. Those findings might reflect the effect of household income on savings since household income is expected to increase as support ratio increases and the head of the household is employed. Unexpectedly, a positive relationship is also visible between health insurance coverage of the household head and household saving quintile. As mentioned earlier, health insurance coverage is expected to lower precautionary savings motive. However, observing such a positive relationship is normal in two-way cross tabulation in the sense that working household heads are more likely to be covered by a health insurance system. In this respect, the expected negative relationship might be masked by the effect of working status of the household head associated with the level of household income.

Cross tabulations of household saving rate quintiles with other explanatory variables do not reveal a similar direct relationship. When educational attainment of the household head is observed, it seems that households with heads graduated from college or higher educational institution constitute relatively higher portion of households in the highest saving rate quintile. However, group-specific distribution seems smooth across saving rate quintiles. On the other hand, cross tabulation of household saving rate quintiles by age reveals interesting results. It is observed that households with heads in the age group of 20-29 tend to concentrate in lower saving rate quintiles but more interestingly cross tabulation by age shows that a significant portion of household heads aged 65 and over are in the highest saving rate quintile in both years. This finding might be interpreted as that life cycle hypothesis might not hold for Turkish household savings. Consistent with this finding, a direct negative relationship between old age dependency ratio and household savings is not visible in cross tabulations. The expected negative relationship between young age dependency ratio and

household savings could be observed in households with relatively more number of children aged 15 and over; however, this relation becomes blurred in case of households with 2 or less number of children. Finally, a slight positive relationship between household savings and urban residence and extended family system might be inferred from cross tabulations of household saving rate quintiles by residential place and household type; however, those cross tabulations are not sufficient to present net arguments about the determinants of household savings in Turkey. Multivariate analyses provided in Section 4.3 put the direction and magnitude of the effects of those explanatory variables on household savings in a much more clear way.

CHAPTER 4

ESTIMATION RESULTS

4.1. Female Labor Force Participation Model

Female labor force participation models whose specification is provided in Section 3.2.1.1 are estimated by logit estimation procedure and results are provided in Table 4.1 and Table 4.2. All models estimated are significant overall at 1% although pseudo-R^2 values seem low. However, pseudo-R^2 does not provide a measure of explanatory power of the model similar to R^2 in ordinary least squares estimations so it does not exhibit a limitation for the analysis.

As expected, educational attainment has a positive effect on probability of female's being participated into labor force at 1% significance level. According to the odds ratios presented in Table 4.1, one level increase in educational attainment increases the probability of the woman to participate into labor force by 25% in 2003, and 30% in 2010[4]. However, when participation probability is differentiated for different levels of educational attainment as presented in Table 4.2, this direct relationship disappears. Compared to the illiterate women who constitute the base group in the analysis, probability of participation of women with primary and secondary school degree and literate women with no school graduation is lower, and participation probability of women with high school or above degree is higher. It seems that increase in educational attainment does not create a tendency among women to participate into labor force more up to high school level which is an expected finding considering low participation rates of low educated women especially in urban areas.

[4] Mean level of female labor force participation is 27% in 2003 and 32% in 2010 as presented in descriptive statistics in Section 3.2.1.2. In this respect, probability of participation is 0.27 in 2003 and 0.32 in 2010. Based on these probabilities, change in the participation probability presented above is calculated by multiplying participation probability and non-participation probability with odds ratios presented in Table 4.1and Table 4.2.

Table 4.1: Female labor force participation model: Estimation results of first specification

	2003		2010	
	Coefficient	**Odds Ratio**	**Coefficient**	**Odds Ratio**
Educational attainment	0.23100*	1.25986*	0.29897*	1.34847*
	(0.01419)	(0.01788)	(0.01820)	(0.02454)
Marital status	-0.74867*	0.47300*	-0.41258*	0.66194*
	(0.04213)	(0.01993)	(0.06257)	(0.04142)
Age	0.91020*	2.48481*	0.98830*	2.68666*
	(0.03661)	(0.09096)	(0.05528)	(0.14852)
Age-squared	-0.06319*	0.93876*	-0.06649*	0.93567*
	(0.00244)	(0.00229)	(0.00366)	(0.00342)
Urban residence	-1.47294*	0.22925*	-1.23441*	0.29101*
	(0.03177)	(0.00728)	(0.05090)	(0.01481)
Household income	0.05245**	1.05385**	0.14883*	1.16048*
	(0.02378)	(0.02506)	(0.03702)	(0.04296)
Young age dependency	-0.00153*	0.99847*	-0.00239*	0.99761*
	(0.00031)	(0.00031)	(0.00045)	(0.00045)
Old age dependency	0.00356*	1.00357*	0.00137	1.00137
	(0.00059)	(0.00059)	(0.00088)	(0.00088)
Constant	-3.59418*		-5.13025*	
	(0.22304)		(0.38096)	
Pseudo R-squared	0.1104	0.1104	0.1009	0.1009
Number of observations	38457	38457	13299	13299

Source: Author's calculations

Notes: The dependent variable is a dummy variable indicating labor force participation status of female.

, **, * denote to 1%, 5%, and 10% significance level, respectively. Robust standard errors are presented in parentheses.*

Sample of 2003 and 2010 Household Budget Surveys are restricted to women aged 15 and over. Households which consist of unrelated people and relatives living together are not included in the analyses. A small portion of households with missing young age dependency are dropped from the data set.

Table 4.2: Female labor force participation model: Estimation results of second specification

	2003		2010	
	Coefficient	Odds Ratio	Coefficient	Odds Ratio
Literate but no school completed	-0.28977*	0.74843*	0.20105**	1.22268**
	(0.07142)	(0.05345)	(0.09807)	(0.11991)
Primary school	-0.15598*	0.85558*	0.14579**	1.15696**
	(0.04847)	(0.04147)	(0.06965)	(0.08059)
Secondary school	-0.39166*	0.67593*	0.26746**	1.30664**
	(0.08291)	(0.05604)	(0.11658)	(0.15233)
High school	0.19666*	1.21733*	0.54826*	1.73023*
	(0.06378)	(0.07764)	(0.08851)	(0.15314)
College, university or higher degree	1.79310*	6.00803*	2.00491*	7.42540*
	(0.08257)	(0.49609)	(0.10997)	(0.81657)
Marital status	-0.67064*	0.51138*	-0.35146*	0.70366*
	(0.04334)	(0.02216)	(0.06430)	(0.04525)
Age	0.88243*	2.41676*	0.98481*	2.67730*
	(0.03732)	(0.09019)	(0.05606)	(0.15008)
Age-squared	-0.06415*	0.93787*	-0.06757*	0.93466*
	(0.00249)	(0.00233)	(0.00371)	(0.00346)
Urban residence	-1.52762*	0.21705*	-1.20374*	0.30007*
	(0.03231)	(0.00701)	(0.05055)	(0.01517)
Household income quintile 2	-0.24996*	0.77883*	-0.03056	0.96990
	(0.04756)	(0.03704)	(0.07166)	(0.06950)
Household income quintile 3	-0.13736*	0.87166*	0.17812**	1.19497**
	(0.04868)	(0.04243)	(0.07189)	(0.08591)
Household income quintile 4	-0.13078*	0.87741*	0.02014	1.02034
	(0.04974)	(0.04364)	(0.07425)	(0.07576)
Household income quintile 5	0.09082***	1.09507***	0.19825*	1.21927*
	(0.05076)	(0.05559)	(0.07684)	(0.09369)
Young age dependency ratio	-0.00221*	0.99780*	-0.00266*	0.99734*
	(0.00031)	(0.00031)	(0.00046)	(0.00046)
Old age dependency ratio	0.00387*	1.00388*	0.00134	1.00134
	(0.00060)	(0.00061)	(0.00090)	(0.00090)
Constant	-2.08848*		-3.07483*	
	(0.11756)		(0.18132)	
Pseudo R-squared	0.1340	0.1340	0.11730	0.11730
Number of observations	38457	38457	13299	13299

Source: Author's calculations

Notes: The dependent variable is a dummy variable indicating labor force participation status of female.

, **, * denote to 1%, 5%, and 10% significance level, respectively. Robust standard errors are presented in parentheses.*

Sample of 2003 and 2010 Household Budget Surveys are restricted to women aged 15 and over. Households which consist of unrelated people and relatives living together are not included in the analyses. A small portion of households with missing young age dependency are dropped from the data set.

A negative coefficient which is significant at 1% is observed for marital status variable. According to odds ratios in Table 4.1, being married declines the probability of women in working ages to participate into labor force by 9% in 2003 and by 14% in 2010. The negative effect of being married on labor force participation probability of women seems to increase from 2003 to 2010. In the time period considered, urbanization rate has increased and employment opportunities in agriculture have declined; therefore, the negative effect of being married might become much more apparent. It is again an expected result considering lower participation rates of married women in Turkey.

Age is included into the model in a quadratic form to observe the first increasing and then declining labor force participation of women by age. Age and age-squared have significant positive and negative coefficients, respectively, which confirm the hump-shaped pattern of female labor force participation by age. According to the estimation results, the inflection point coincides with 35-39 age group.

As mentioned in Section 2.2.4.1, urbanization and dissolution of agriculture have a negative impact on female labor force participation rate in Turkey. The results here confirm this statement such that participation probability of women living in urban areas is 5% and 6% less than women living in rural areas in 2003 and 2010, respectively. Especially women who formerly are employed as unpaid family

workers in rural areas tend to move out of labor force with urbanization so this is an expected finding considering Turkish context.

Increase in household income is actually expected to have a negative impact on female labor force participation due to the fact that income effect might create a tendency for especially women with lower educational attainment to devote their time in house works instead of working at market where their earnings potential is limited. However, such a relationship is not visible in Turkish context considering the results provided in Table 4.1. The coefficient of household income is observed positive and significant at 5% and 1% in 2003 and 2010, respectively. However, when labor force participation tendency of women are investigated separately by income quintiles, the direct relationship observed in Table 4.1 disappears. As presented in Table 4.2, household income level has a positive impact on female labor force participation only in the highest income quintile which is significant at 10%. As mentioned in Section 3.2.1.2, more educated women are concentrated in higher income quintiles in the data set so the positive impact observed might be attributed to this fact. These findings overall reveal that in lower income quintiles, income effect which causes a depressing effect on female labor force participation (Becker, 1965; Mincer, 1962) is under way to some extent for women living in households with lower income; while substitution effect functions for more educated women living in households with higher income since those women have higher earnings potential in the market.

Finally, the coefficient of the household-level young age dependency is observed as negative and significant at 1%, as expected. One percentage point increase in household-level young age dependency declines the probability of women to participate into labor force by 20% and 22% in 2003 and 2010, respectively. This finding is consistent with the results of similar studies conducted on this issue (Dayıoğlu & Kırdar, 2010; Uraz, et al., 2010) and confirms the functionality of the first behavioral channel investigated in this study. As the result imply, women's labor supply decisions in Turkey respond to fertility changes. In another aspect, this result might be interpreted such that higher young age dependency in

the household constitutes a barrier for participation of women in Turkey in the market work since care for children are one of the major responsibilities of women in Turkey (Ercan, et al., 2010). The second demographic variable which reflects the age structure in the household is old age dependency ratio which is observed positive and significant at 1% in 2003. According to odds ratios provided in Table 4.1, one percentage point increase in household-level old age dependency increases the participation probability of the woman by 20%. This is actually an unexpected and interesting finding. Considering the fact that care for elderly is also accepted as a responsibility of women in traditional gender-based division of labor (Ercan, et al., 2010), a negative relationship is expected. This finding might be interpreted as that presence of elderly in the household might positively affect participation of women into market work by alleviating their responsibilities related to child care and house works. However, this relationship disappears in 2010 as the coefficient of the variable is insignificant.

The aim of this study is to investigate the impact of changes in demographic structure on behaviors of agents in several spheres of economic life in the context of demographic window of opportunity. In this respect, the first behavioral channel investigated is female labor supply. As the results presented above exhibit, fertility differentials which lead to a change in age structure across households affect labor supply decisions of women. Based on those results, it might be argued that declining fertility due to demographic transition under way has a potential to increase female labor force participation rate in Turkey.

4.2. Child Quality Model

Child quality is the final channel investigated in this study to observe the changes in parents' behaviors related to educational quality of their children as demographic patterns shift. Child quality model specified in Section 3.2.2.1 is estimated by using ordinary least squares and results are presented in Table 4.3. The models estimated are significant overall at 1% but the explanatory power of them is relatively low as in household savings estimations.

Mother's and father's educational attainment has a positive and significant impact at 1% on child quality which is measured by educational expenditure per child aged 6-19 in the household. One level increase in mother's education increases educational expenditure per child by 0.13% to 0.17% in 2003 while the magnitude of the impact becomes much higher in 2010 such that one level increase in educational attainment of the mother contributes 0.32% to 0.39% to educational spending per child. Similarly, one level increase in father's education increases educational spending per child by 0.13%-0.20% in 2003 and 0.36%-0.52% in 2010. Parents' educational attainment is expected to affect education spending per child through its effect on household income and fertility level but even after those variables are controlled, such a positive relationship appears. This might be due to the fact that more educated parents give more importance to their children's education so they tend to spend more for their children's education.

As expected, the coefficient of the age variable is observed positive and significant. One level increase in age group of children increases education spending per child by 0.28%-0.34% in 2003 and 0.37-0.48% in 2010. It is an expected finding in the sense that private spending on education is concentrated on 15-19 age group in which children start to prepare for university entrance exam in Turkey. On the other hand, education spending per child differs between girls and boys although the significance of the coefficient is low compared to other variables in the model. Such a finding is also reasonable considering lower enrollment ratio of girls especially in secondary/high school level.

Household income is one of the most important determinants of education spending per child as the result presented in Table 4.3 reveal. 1% increase in household income increases education spending per child by 0.45% in 2003 but the magnitude is higher in 2010 such that there is almost one-to-one relationship between household income and education spending.

Urban residence is also associated with higher education spending per child as expected. On the other hand, labor force participation of children significantly

lowers education spending per child most probably due to the fact that working children cannot continue to their education.

Table 4.3: Child quality model:

Estimation results

	2003		2010	
	Coefficient		Coefficient	
Mother's education	0.12933*	0.16883*	0.31899*	0.38524*
	(0.01432)	(0.01462)	(0.02981)	(0.03043)
Father's education	0.12713*	0.19944*	0.36506*	0.51502*
	(0.01508)	(0.01507)	(0.03163)	(0.03140)
Age	0.28414*	0.33920*	0.37043*	0.48416*
	(0.03398)	(0.03438)	(0.07425)	(0.07572)
Sex	-0.04637***	-0.03784	-0.11078***	-0.11868**
	(0.02572)	(0.02603)	(0.05790)	(0.05945)
Household income	0.45852*		1.00667*	
	(0.02790)		(0.04988)	
Urban residence	0.25095*	0.29583*	0.19408*	0.39534*
	(0.02594)	(0.02620)	(0.06217)	(0.06222)
Labor force participation status	-0.44444*	-0.44043*	-0.99970*	-0.95100*
	(0.03728)	(0.03730)	(0.10476)	(0.10607)
Young age dependency	-0.00019	-0.00073*	-0.00089**	-0.00232*
	(0.00014)	(0.00013)	(0.00037)	(0.00038)
Constant	-4.83846*	-1.27362*	-10.85380*	-1.89724*
	(0.24645)	(0.09674)	(0.48065)	(0.21532)
R-squared	0.1008	0.0764	0.2123	0.1713
Number of observations	28182	28182	9012	9012

Source: Author's calculations

Notes: The dependent variable is log of education expenditure per child aged 6-19 living in the household.

*, **, *** *denote to 1%, 5%, and 10% significance level, respectively. Robust standard errors are presented in parentheses.*

Sample of 2003 and 2010 Household Budget Surveys are restricted to school-age children in the age group of 6-19. Households with no school-age children, single-adult households, and households which consist of unrelated people and relatives living together are not included in the analyses. Problematic observations with missing values of young age dependency are dropped from the data set.

Finally, the coefficient of the young age dependency ratio exhibits the presence of quality-quantity transition in Turkey. When household income is not controlled, one percentage point increase in young age dependency ratio in the household causes 0.00073% decline in education spending per child in 2003 while the magnitude of the decline is 0.00232% in 2010. However, when household income is controlled, the significance and magnitude of the coefficient decreases in both years; even it falls into insignificance in 2003 but presence of quality-quantity transition is apparent in 2010. Although quality-quantity transition seems to be under way in Turkey, the contribution of decline in child quantity to child quality is very small considering the very small magnitudes of the coefficients. Those small magnitudes might be a result of dominance of public resources in primary and secondary education in Turkey which might be also a reason of low explanatory power of the models. However, an increase in private resources devoted per child is visible from 2003 and 2010 as presented in Table 3.3 and Table 3.4, and quality-quantity transition becomes much more apparent in 2010 compared to 2003, which is date near to the beginning of demographic window of opportunity in Turkey.

4.3. Household Savings Model

Household savings as the second behavioral channel investigated in this study are analyzed by using ordinary least squares for the model specified in Section 3.2.3.1. The estimation results are provided in Table 4.4 and Table 4.5. The models estimated are significant overall at 1% significance level but their explanatory power are relatively low as in other studies analyzed Turkish household savings in a similar manner (Aktaş, et al., 2012; Van Rijckeghem & Üçer, 2009).

As the results in Table 4.4 reveal, household income is the most important determinants of Turkish household savings. As the comparison of estimations reported in Table 4.4 and Table 4.5 show, the explanatory power of the model declines significantly when household income is not added into the model. According to the results, 1% increase in household income increases household

saving rate by 0.32% and 0.30% in 2003 and 2010, respectively. 0.02% decline is observed in response of household saving rate to change in household income which might be an expected finding considering declining household savings in recent years in Turkey.

On the other hand, increase in educational attainment of the household head seems to associate with lower household savings. Actually, a positive relationship between educational attainment and savings is expected considering that increase in educational attainment leads to higher earnings. Such a positive relationship is visible as presented in Table 4.5 but when household income is controlled, the relationship turns to negative. Kulikov, et al. (2007) observed a similar relationship between educational attainment of the household head and household savings for Estonia. The authors argued that more educated individuals have more stable income flows; thus their need to save for an unexpected income shock is less (Kulikov, et al., 2007). Van Rijckeghem and Üçer (2009) also observed the same relationship for Turkey and they interpreted that more educated individuals have greater access to credit so their savings are lower. In this respect, finding a negative relationship between education and household savings seems reasonable after controlling for household income.

Health insurance coverage of the household head is added into the model to observe the importance of precautionary saving motive for Turkish households, if there is any. As presented in Table 4.5, when household income is not controlled, health insurance coverage is associated with higher household savings. This finding covers the effect of household income since working household heads who earn income are more likely to be covered by health insurance system. When income is controlled, a negative relationship appears reflecting the importance of precautionary motive in 2003. However, this relationship is insignificant in 2010 which might be an indicator of declining precautionary motive among Turkish households.

Table 4.4: Household savings model:

Estimation results

	2003		2010	
	Coefficient		Coefficient	
Household income	0.32504*	0.32232*	0.30120*	0.29784*
	(0.00639)	(0.00648)	(0.00890)	(0.00909)
Education of the head	-0.04191*	-0.04129*	-0.03235*	-0.03229*
	(0.00287)	(0.00285)	(0.00364)	(0.00363)
Health insurance	-0.04314*	-0.04176*	-0.01361	-0.01299
	(0.00745)	(0.00743)	(0.01352)	(0.01354)
Age of the head	-0.06273*	-0.06970*	-0.06030*	-0.07431*
	(0.00940)	(0.00878)	(0.01357)	(0.01264)
Age-squared	0.00362*	0.00403*	0.00353*	0.00434*
	(0.00055)	(0.00050)	(0.00079)	(0.00072)
Extended family	-0.03354*	-0.02989*	-0.02292**	-0.01606
	(0.00806)	(0.00787)	(0.01144)	(0.01133)
Single-adult family	0.04346*	0.03736*	0.13060*	0.12543*
	(0.01182)	(0.01206)	(0.01581)	(0.01609)
Urban residence	-0.12583*	-0.12241*	-0.08949*	-0.08975*
	(0.00711)	(0.00732)	(0.00979)	(0.00992)
Working status of the head	0.05094*	0.03677*	0.02453***	0.01765
	(0.00818)	(0.00958)	(0.01255)	(0.01484)
Young age dependency	0.00000		0.00012	
	(0.00005)		(0.00008)	
Old age dependency	0.00027**		0.00045*	
	(0.00012)		(0.00017)	
Support ratio		0.04015*		0.01732
		(0.01469)		(0.01851)
Constant	-2.20157*	-2.15640*	-2.50114*	-2.40568*
	(0.05755)	(0.05486)	(0.09058)	(0.08759)
R-squared	0.24130	0.24150	0.2126	0.2115
Number of observations	23358	23358	8534	8534

Source: Author's calculations

Notes: The dependent variable is household saving rate calculated by logarithmic difference of household income and expenditures.

*, **, *** *denote to 1%, 5%, and 10% significance level, respectively. Robust standard errors are presented in parentheses.*

Sample of 2003 and 2010 Household Budget Surveys are restricted to household heads; thus, households in terms of their characteristics. Households which consist of unrelated people and relatives living

together are not included in the analyses. A small portion of households with missing and abnormally low values of savings rate and missing young age dependency are dropped from the data set.

Table 4.5: Household savings model:

Estimation results of specification without household income

	2003		2010	
	Coefficient		Coefficient	
Education of the head	0.02933*	0.03012*	0.03033*	0.02994*
	(0.00280)	(0.00276)	(0.00360)	(0.00355)
Health insurance	0.04905*	0.05616*	0.03589**	0.03985*
	(0.00820)	(0.00815)	(0.01515)	(0.01510)
Age of the head	0.01097	0.01454	0.00231	-0.00051
	(0.01038)	(0.00961)	(0.01479)	(0.01366)
Age-squared	0.00062	0.00029	0.00094	0.00103
	(0.00061)	(0.00055)	(0.00087)	(0.00078)
Extended family	0.06303*	0.06292*	0.05655*	0.06198*
	(0.00899)	(0.00881)	(0.01229)	(0.01201)
Single-adult family	0.02498**	0.00052	0.05381*	0.03490**
	(0.01200)	(0.01219)	(0.01661)	(0.01691)
Urban residence	-0.06221*	-0.04682*	-0.00634	0.00508
	(0.00773)	(0.00781)	(0.01044)	(0.01042)
Working status of the head	0.12457*	0.05383*	0.06109*	-0.00091
	(0.00881)	(0.01043)	(0.01345)	(0.01591)
Young age dependency	-0.00025*		-0.00018**	
	(0.00006)		(0.00008)	
Old age dependency	0.00010		0.00028	
	(0.00014)		(0.00019)	
Support ratio		0.18701*		0.15452*
		(0.01600)		(0.01992)
Constant	-0.15722*	-0.19990*	-0.20966*	-0.22511*
	(0.04578)	(0.04273)	(0.06560)	(0.06110)
R-squared	0.0385	0.0464	0.0268	0.0352
Number of observations	23358	23358	8534	8534

Source: Author's calculations

Notes: The dependent variable is household saving rate calculated by logarithmic difference of household income and expenditures.

, **, * denote to 1%, 5%, and 10% significance level, respectively. Robust standard errors are presented in parentheses.*

Sample of 2003 and 2010 Household Budget Surveys are restricted to household heads; thus, households in terms of their characteristics. Households which consist of unrelated people and relatives living together are not included in the analyses. A small portion of households with missing and abnormally low values of savings rate and missing young age dependency are dropped from the data set.

Savings are expected to increase with age up to a certain point and then decline as suggested by life cycle hypothesis. Here, an exactly opposite relationship is observed when the coefficients of age and age-squared are considered in Table 4.4 but it should be noted that almost all of the variances of age variables are explained by the other explanatory variables in the model. Considering the multicollinearity problem, coefficients estimated for age variables are not reliable so life cycle hypothesis could not be proved for Turkish household savings.

As Attanasio and Székely (2000) and Browning and Lusardi (1996) mentioned, different household types are expected to have different impacts on household savings. Extended families might be composed of more potential income earners so higher savings might be observed in extended families while single-adult families might have lower savings compared to nuclear and extended families. As presented in Table 4.5, it is observed that extended families have higher household savings compared to nuclear families which form the base group in the analysis. However, when income is controlled, it is observed that saving rates of extended families are lower. Interestingly, single-adult families have higher saving rates compared to nuclear families in Turkey. When support ratio is added into the model, it is observed that magnitude and significance of the coefficient in different specifications decline. In this respect, it might be interpreted that single-adult families in Turkey have higher support ratio compared to other types of families; in other words, actual economic dependency is lower in those types of families so they might have higher saving rates.

As presented in Table 4.4, urban residence is associated with lower saving rate. In addition, working status of the household head has importance on household

savings except the insignificant coefficient observed in the estimation of the model specified by including support ratio for 2010.

Household saving model estimated without household income variable presented in Table 4.5 show that young age dependency ratio has a significant negative impact on household savings. This is an expected finding since children are considered as a part of economically dependent population and they use the resources of their parents. However, the magnitude of the effect of young age dependency on household savings is very small. One percentage point increase in young age dependency contributes to household saving rate only by 0.00025% and 0.00018% in 2003 and 2010, respectively. When household income is controlled, this small effect also disappears. It seems that differentials in the age structure of the household in terms of children do not cause any difference in saving rates across households.

On the other hand, old age dependency is observed insignificant when income is not controlled but significant when income is controlled. Although it is small, the magnitude of the effect has also increased from 2003 to 2010. This is an interesting finding in the sense that increase in old age dependency is expected to lower savings since elderly people are also considered as "resource users" similar to children. This finding might be interpreted in several ways. Firstly, family reunification might be considered as a reason of such a finding (Cilasun & Kırdar, 2009). Elderly parents living with their children might contribute to savings of households through their pension benefits. In each year considered for estimation, this explanation might be valid but this does not explain the increasing magnitude of contribution from 2003 to 2010 considering declining old age dependency ratio at household level from 2003 to 2010 as presented in Table 3.5 and Table 3.6. Another potential explanation might be that increasing portion of elderly people might not actually be economically dependent; in other words, they might continue to work after age of 65. Considering improving mortality conditions and increasing life expectancy in Turkey, such a speculation seems reasonable but Household Budget Surveys do not provide support for this argument. According

to data derived from 2003 and 2010 Household Budget Surveys, 18% of elderly aged 65 and over are working in the reference period the surveys in both years so there is no increase in the share of working elderly. A further explanation might be that precautionary motive of elderly people has increased in Turkey. Increasing life expectancy might cause an increase in precautionary savings of elderly for unexpected health problems but more proof is needed to justify such an explanation.

Finally, as presented in Table 4.5, support ratio defined as the proportion of working individuals to household size has positive and significant impact on household savings. After controlled for income, the coefficient of the variable falls to insignificance in 2010 which might be a reflection of increasing consumption propensity in the household as working household members increase. This might be expected considering declining household savings in Turkey in recent years.

As those results presented above exhibit, it seems that household savings channel is not functioning in Turkey. Unexpectedly, increase in old age dependency ratio contributes household savings, but small in magnitude. In addition, decline in young age dependency has no significant effect on household savings after household income is controlled. In this respect, it could be interpreted that changing age structure in the household does not have any major impact on household savings which might constitute a barrier for realization of demographic dividend in Turkey since household savings are vital to finance new investment and to produce productive employment opportunities for individuals in working ages. Non-functionality of this channel might eventually cause low investment and limited improvements in employment opportunities for new entrants into labor market which might result in Turkey's losing its demographic window of opportunity.

Positive and significant impact of support ratio on household savings provides an important policy implication at this stage. Considering low labor force

participation rates in Turkey especially among women, actual economic dependency which covers also the dependency in working ages might be an important reason of low savings in Turkey. As showed in Section 4.1, female labor supply channel is responding to changes in demographic structure so future potential increase in female labor force participation might contribute to an increase in support ratio which further positively affects household savings. In this respect, positive and significant relationship between support ratio and household savings is crucial in terms of showing the importance of policy environment in creation of new employment opportunities to utilize demographic window of opportunity.

CHAPTER 5

CONCLUSION AND DISCUSSION

Turkey's demographic window of opportunity is opened at the beginnings of 2000s so Turkey is now experiencing a unique transitory period which is favorable for its socioeconomic development in terms of its demographic structure. Although demographic window of opportunity is a phenomenon which has been mostly studied from a macroeconomic perspective, realization of demographic dividend is, indeed, based on the functionality of contribution channels at household or individual level. Therefore, this study focused on the behavioral impacts of differential demographic structures at household level on female labor supply, household savings, and child quality which are determined as the micro-level behavioral channels of contribution to economic development on the basis of literature investigating East Asian demographic dividend. For this purpose, three models are specified and estimated by using Household Budget Surveys conducted by TURKSTAT in 2003 and 2010.

Firstly, it is observed that educational attainment is the most important factor that affects female labor force participation in Turkey. Additionally, married women and women living in urban areas have lower probability of participation into labor force. When the impacts of demographic variables are considered, it is observed that household-level old age dependency has currently no impact on female labor supply which might be attributed to the extensity of nuclear family type. However, increase in young age dependency which is another demographic variable reflecting the age dependency at household level lowers probability of women to participate into labor force by almost 20%. This is an expected finding considering the fact that child care responsibilities might constitute a barrier for participation of women into market work. This finding provides evidence to the functionality of the first behavioral channel investigated in this study since it

indicates that female labor supply decisions respond to the changes in demographic structure at household level.

Secondly, it is observed that household income and parents' education are important factors determining educational spending per school-aged child in Turkey. It is also observed that educational spending increases as age of the child increases and gender gap persist to some extent in terms of educational spending. These findings are expected since enrollment rates of girls compared to boys are lower at high school level in Turkey. Furthermore, young age dependency ratio at household level is found negative and statistically significant in 2010 unlike the results observed in 2003. This finding indicates that higher young age dependency lowers resources available per child in the household; in other words, quality-quantity transition has established in Turkey. Thus, this result provides evidence that the second behavioral channel investigated in this study started to functions since it shows that education expenditures respond to fertility differentials in Turkey. However, this conclusion should be evaluated with caution since small coefficients observed for household-level young age dependency put a question mark to the efficiency of this channel. Dominance of public resources in education expenditures in Turkey which might be also reflected by low explanatory power of child quality models might hinder to observe quality-quantity transition at household level in such a setting where private education expenditures per child is subject to analysis.

Thirdly, household income is observed as the major determining factor of household savings. When different specifications with and without household income as explanatory variable are compared, the significance of household income becomes more apparent. By Coale-Hoover hypothesis, it is expected that increase in young age dependency is expected to negatively affect savings since children are considered as economically dependent but such a relationship is not visible in Turkey. It is observed that household-level young age dependency has no impact on household savings after income is controlled. In this respect, it is concluded that household savings channel do not respond to changes in

demographic structure at least from fertility side. On the other hand, it is normally expected that increase in old age dependency to have a negative impact on savings due to life cycle hypothesis but an inverse relationship appears in Turkish case. After controlled for household income, it is observed that increase in household-level old age dependency contributes to household savings. This might be attributed to family reunification or old-aged individuals' working in the market for longer years but those explanations are not sufficient to clarify the increase in the effect of old age dependency on household savings when the results for the years 2003 and 2010 are compared. At this point, it might be speculated that increasing life expectancy might trigger precautionary savings of elderly people but more proof is needed to justify such an explanation. When insignificance of young age dependency and significant but small impact of old age dependency on household savings are considered together, it seems that the third behavioral channel does not function in Turkey.

From a microeconomic perspective, response of female labor force participation, child quality, and households' savings to demographic changes has vital importance to utilize demographic window of opportunity period for achieving high economic growth rates and socioeconomic development. In case of Turkey, nonresponse of households savings to demographic changes is not promising for utilization of demographic opportunity window which started at the beginnings of 2000s (Koç, et al., 2010; Tansel, 2012) but response of female labor force participation and child quality to demographic changes at micro level provides a bright point to realize demographic dividend.

Although those micro level behavioral changes are crucial to seize opportunities coming with demographic window of opportunity, functioning of those channels does not guarantee to automatically achieve high economic growth rates or socioeconomic development. In order to realize demographic dividend, countries should succeed to turn those micro level impacts of changing demographics to aggregates through supporting sets of policies which increase the efficiency of aforementioned contribution channels through which demographic transition

shows its impact on the economy. To emphasize the importance of right policy environment, comparison of Latin American and East Asian countries comes to the fore in this literature. Similar to East Asian countries, demographic structure of Latin American countries has changed in favor economic growth since 1970s but GDP per capita growth in Latin America was 0.7% on average in 1975-1995 while it was 6.8% in East Asia at the same period and age structure itself explains 11% of this gap (Bloom, et al., 2003). Bloom, et al. (2003) states that weak governance and closed-economy system in Latin American countries which hindered new investment and creation of new employment opportunities constituted a barrier for realization of demographic dividend in Latin American countries unlike East Asia. When interaction of age structure with policies related to governance and openness is considered, almost 50% of the gap between economic growth of Latin American and East Asian countries is explained (Bloom, et al., 1999 cited in Bloom, et al., 2003). This finding reveals that sustaining the efficiency of markets through certain policies is also important for realization of demographic dividend so functioning of micro-level channels satisfies a necessary condition but is not sufficient to fully capture demographic dividend.

Realization of demographic dividend is important to achieve high levels of economic development so increasing the standards of living in a country. However, it is also important to prepare for the demographic era associated with larger elderly cohorts. When large working age cohorts which constitute the basis of demographic window of opportunity start to hit their old ages, aging problem in such a population is expected to reveal. Considering population-level life cycle, when more and more number of people in a population is located in old ages, then their economic behaviors and needs will be different such that larger elderly cohorts require more pension income and more health spending compared to a population with younger age structure (Bloom, et al., 2003). If demographic window of opportunity could not be utilized, then the opportunity of achieving higher standards of living is lost together with the opportunity to financially prepare for higher pension and health expenditures (Bloom, et al., 2003). In this

respect, realization of demographic dividend is very important for Turkey. However, as mentioned earlier, window of opportunity is just an opportunity period so it does not guarantee an automatic development process. As the comparison of East Asian and Latin American countries provided above shows, policy environment for utilization of demographic window of opportunity is also important to turn the micro-level impacts of demographics into aggregates. In the literature, East Asian countries attracted attention with their successful performance in realization of their demographic dividend so policies implemented in East Asian countries might be instructive for other countries experiencing similar demographic shift like Turkey.

East Asian countries implemented several policies addressing labor market, education system, and financial market to sustain the efficiency of those sectors which in turn provided the utilization of demographic window of opportunity. The details of policies implemented are already discussed in Section 2.2.1 and the lessons derived from East Asian experience are that

- new employment opportunities should be created for large working age cohorts,
- education policies are implemented to increase skills of labor force in line with the level of technological development and international best practices,
- a proper financial system should be established and macroeconomic stability should be sustained to encourage savings, to inject those savings into system, and to turn those savings into investment

for utilization of demographic window of opportunity period. Those general policy implications might provide a guideline for Turkey how to realize its potential demographic dividend. Although, these general policy implications remain valid for all modern economies by economic theory, the contents and application methods of those policies might change from time to time. In other words, such a general policy guideline is instructive for Turkey but one-to-one application of East Asian policies might not be helpful for utilization of window of opportunity in Turkey since the time period and international context in which

Turkey and East Asian countries experience their window of opportunity is different. At this stage, a comparison of Turkish and East Asian contexts might be also instructive to better understand Turkey's position in terms of its demographic window of opportunity on the basis of each channel considering the factors which constitute a barrier for market efficiency in Turkey.

First of all, as the analysis reveal, female labor supply decisions are responding to fertility differentials but overall female labor force participation rate in Turkey is very low as presented in Section 2.2.4.1 which indicates that Turkey could not succeed so far to turn the behavioral impact into aggregates in labor market. As already discussed in Section 2.2.4.1, the possible barriers causing inefficiency in labor market for female labor force participation might be listed as low educational attainment of women, extensity of informality especially in female labor market, high unemployment rates especially in urban areas, and traditional division of labor related to childbearing and house works. When all of those factors are combined, it seems that gender policies are needed in Turkey to eliminate the differences between men and women in terms of education and employment opportunities. Gender differences at household level are also important barriers for female labor force participation since childbearing and house works especially after marriage constitute major barriers when combined with gender differences in labor market; however, elimination of these traditional roles might take a longer time since a change in cultural setting is required. Nevertheless, institutionalization of childbearing might ease the responsibilities of women so encourage their participation into labor force in Turkey (Tansel, 2012).

As one of the barriers mentioned above, one of the reasons of low female labor force participation rate in Turkey is the discouraged-worker effect due to high unemployment rates especially among women in urban areas (Tansel, 2012) as already highlighted in Section 2.2.4.1. This fact might be attributed to the limited capacity of Turkey's economic growth to create new employment opportunities (Taymaz, 2010) and comparison of East Asian and Turkish cases in terms of employment creation might be important at this point. East Asian case reveals that

employing women productively is a major source of demographic dividend (Bauer, 2001a) so this trend in Turkish economy also constitutes a barrier to utilize demographic opportunity window.

Although the importance of creation of new employment opportunities to productively employ women in the market is derived as a policy lesson from East Asian case, the method of job creation is subject to discussion under current international economic circumstances. In East Asian case, it seems that export push strategy based on labor intensive manufacturing created productive employment opportunities for new entrants to labor market and for working population moving out of agriculture as well as for women. Bai and Cho (1995 cited in Bauer, 2001a) stated that labor intensive exporting sectors such as textiles and electronics were the main sectors where women were employed such that share of women in manufacturing employment increased to 30-40% range by 1970s (Bauer, 2001a). However, creation of new employment opportunities based on such a development strategy is not applicable in Turkish context today. Some policies which were implemented by East Asian countries to protect their domestic markets or to promote their exporting sectors and firms might not be applicable under today's GATT system. In addition, as already presented in Section 2.2.4.1, sectoral share of employment in Turkey has been shifting in favor of services sector while decline in the share of agriculture is under way since share of industrial employment has remained almost stable in recent years mainly due to skill biased technological change. It is earlier mentioned by Ercan (1999) that skill biased technological change in 1980s created a depressing effect on industrial employment such that it is not expected to reach 35-40% levels as in developed countries at which shift to services sector started. In this respect, "growth without employment" is not actually a new phenomenon for Turkey since in his earlier study covering 1988-1993 period, Ercan (1999) stated that exporting sectors in Turkey such as clothing experienced much more higher productivity growth compared to growth of employment so change in labor requirements even in labor intensive production sectors due to skill biased technological change limits the growth of employment opportunities in Turkey. Under these

circumstances, the only sector which is mainly expected to absorb new entrants and surplus labor moving out of agricultural sector as well as women is services sector but Taymaz (2010) stated that services sector has provided limited formal employment opportunities for educated women while it has been a source of informal employment for low educated women in Turkey in recent years. Thus, in the light of more liberalized trade regime, skill biased technological change and rise of services sector, female labor supply channel as well as overall labor market channel should be reevaluated to support realization of demographic dividend.

Secondly, it is observed in Turkey that quality-quantity transition is under way but the magnitude of the impact is very small at household level. This might be due to the dominance of public resources at primary, secondary and high school level. In this respect, efficiency of public resources used for education is very important to turn window of opportunity into a demographic dividend as East Asian case reveals. In East Asian case, public educational spending was concentrated on primary and secondary education levels and gender gap in education was closed so those policies helped to increase the basic skills in the population overall while post-secondary education was concentrated on technical skills of labor force (Page, 1994). Those policies are instructive for Turkey to realize its demographic dividend since in child quality model, it is observed that gender differences in educational spending at household level continues. As TDHS 2008 results reveal, gender gap at primary school level is almost closed in Turkey but differences in enrollment to high school between girls and boys still persist. Results of female labor force participation model shows that educational attainment is a very important determinant of women's participation into labor force so gender gap at higher education levels should be addressed in policy discussions in Turkey. Furthermore, although concentration to primary and secondary level education in East Asian case is very important to improve the overall skills of population, such a strategy might not be sufficient in Turkish context since skill biased technological change and rise of information technologies require different skills for labor force to catch up international best practices when compared the East

Asian case in 1960s. Therefore, the ways of improving skills of labor force beyond general secondary level should also be discussed in Turkey.

Thirdly, it seems that household savings channel does not function in Turkey. When this channel at micro level is not responding to changes in demographics, turning it into aggregates is not possible as already reflected by declining ratio of private savings in Turkey in Section 2.2.4.3. As already discussed in Section 2.2.4.3, economic crises which caused an income loss and credit expansion after 2001 which enabled realization of postponed consumption might be the reasons of declining household savings in Turkey. In addition, household income is observed as the most important determinant of household savings in Turkey in the household savings analysis. Thus, as suggested by World Bank (2011), policies to increase income of households and to limit consumption credits might be discussed to increase savings in Turkey. When those external shocks such as crises and credit expansion are controlled through some macroeconomic and financial policies, then functionality of household savings channel might be visible. In addition, increase in female labor force participation might be used as a policy option to increase household savings since increase in female employment increases household income which forms the basis of household savings (World Bank, 2011). In addition, results of interviews with a focus group provided in World Bank's study (2011) reveal that women have a higher tendency to save for their children's education expenditures and other spending so increasing employment and improving status of women might positively affect household savings.

On the other hand, when the results of household savings analyses in this study are considered, it should be noted that household savings used in the analyses is defined as the difference between annual disposable income and annual expenditures of the households so the analyses provided in this study do not attempt to consider "under-the-mattress savings". World Bank (2011) stated that approximately 30% of Turkish households purchased gold and some form of jewelry in 2010 so under-the-mattress savings seems to constitute a significant

portion of household savings in Turkey. If those kinds of expenditures are considered as savings in the analyses, then the results observed might differ. Nevertheless, under-the-mattress savings are the savings out of financial system; in other words, those savings cannot be used in finance of new investment. East Asian case is instructive in the sense that those countries established several mechanisms (for instance, postal saving systems (Stiglitz & Uy, 1996)) to inject increasing savings into the economy so to finance new investment and economic growth. In this respect, a change in Turkish households' saving practices and their access to financial system seem important to attract savings into financial system to be used in finance of new investment.

In terms of household savings, another difference between East Asian and Turkish cases is as follows. East Asian countries realized demographic dividend between years 1960-1990. This period is associated with a relatively stable international economic environment free of economic crisis except the petroleum crisis in 1973 so stable macroeconomic environment associated with declining dependency ratios, increasing employment and high growth rates of GDP might resulted in increasing savings in East Asian case. However, Turkey has already experienced two severe economic crises since 2000 which are the economic crisis in 2001 and the global financial crisis in 2008. Those crises might cause a decline in household savings in Turkey due to income losses. However, declining trend of household savings has continued even in recovery periods after crises which might be explained by realization of postponed consumption (World Bank, 2011). The estimation results of household savings models reveal that household income and support ratio (ratio of working household members to household size) have positive impacts on household savings in Turkey. However, comparison of models estimated for 2003 and 2010 shows that the magnitude of the impact of household income on household savings declined slightly and the impact of support ratio falls to insignificance in 2010. Those findings imply that Turkish households' propensity to consume has increased between these two years. More working household members associated with more income cause higher consumption tendency instead of savings in Turkey so effect of changing age

dependency at household level might not become apparent in case of Turkish household savings. Together with postponed consumption, credit expansion experienced after 2001 might result in such a tendency in Turkish households (World Bank, 2011). When acceleration of reduction in controls on financial flows which resulted in increasing volume of cross-border financial flows and financial market globalization after 1980s (Camilleri, 2006) is considered, the extensity of the impact of international credit expansion on Turkish household savings might be much more clear from an international macroeconomic perspective. In this respect, the position of East Asian countries and Turkey in terms of savings channel is not comparable considering different volumes of financial flows in 1960s and in 2000s so the question that how savings channel can be activated to realize demographic dividend in Turkish context should be taken into consideration in policy discussions.

Finally, functionality of entrepreneurship and innovation channel is crucial to realize demographic dividend since producing productive employment opportunities for larger working age cohorts in demographic window of opportunity period is vital to seize opportunities coming with demographic transition. Although it seems that nonfunctionality of savings channel in Turkey does not provide a bright picture for domestic finance of new investments, testing the functionality of entrepreneurship and innovation channel against demographic changes in Turkey is not possible in the limited scope of this study. In this thesis, just a theoretical framework is tried to be constructed by incorporating effects of demographics into already existing literature on the determinants of entrepreneurship which provides a promising extension for future empirical analysis. Thus, entrepreneurship and innovation channel in relation with demographic change in Turkey is thought to be an issue covered in future studies.

Besides, this thesis has certain limitations. Female labor supply, households savings, and child quality channels are analyzed here by using household-level age dependency ratios to observe the impact of changing demographic structure on aforementioned spheres of economic life. Although pairwise correlations

between the variables used in the models do not reveal a severe multicollinerarity problem which causes a loss in reliability of estimates, it is known that especially fertility differentials are related with income, education level, and urbanization (Koç, et al., 2010). Thus, interaction terms which can be formed by multiplying young age dependency with education and household income variables, and urban dummies might be added into models to observe how those interactions affect women's labor supply decisions, household savings, and child quality.

Furthermore, this thesis tries to provide some explanations to the questions why functionality of some behavioral channels in response to changing demographics is not reflected in macroeconomic aggregates. However, those hypotheses remain missing unless further macroeconomic analyses are conducted. Therefore, the macroeconomic side of demographic window of opportunity is limited in this study considering that the scope of this thesis is narrowed to microeconomic analyses. To observe the impact of changing age structure and its interaction with policy variables on economic growth in Turkey, a growth accounting analysis might be helpful and such an attempt was already made by Mumcu and Çağlar (2006) on a cross country basis. In order to estimate the magnitude of the impact, a time series analysis might be also carried out but considering Turkey's window of opportunity is estimated to have started at the beginnings of 2000s (Koç, et al., 2010), there is not adequate number of observations to perform such an analysis. Even though the points listed so far constitute the limitations of this study, each point provides an extension for further studies which might be conducted on Turkey's demographic window of opportunity.

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APPENDIX

Table A.1: Cross tabulations of female labor force participation and explanatory variables

	2003			2010		
	Not participate	**Participate**	**Total**	**Not participate**	**Participate**	**Total**
Education status						
Illiterate	5202	1549	6751	1740	575	2315
	77.06	22.94	100.00	75.16	24.84	100.00
	18.52	14.94	17.55	19.22	13.54	17.41
Literate but no school completed	2201	663	2864	864	339	1203
	76.85	23.15	100.00	71.82	28.18	100.00
	7.83	6.40	7.45	9.54	7.98	9.05
Primary school	14436	5062	19498	4537	1846	6383
	74.04	25.96	100.00	71.08	28.92	100.00
	51.39	48.84	50.70	50.12	43.47	48.00
Secondary school	1742	437	2179	423	181	604
	79.94	20.06	100.00	70.03	29.97	100.00
	6.20	4.22	5.67	4.67	4.26	4.54
High school	3948	1580	5528	1212	640	1852
	71.42	28.58	100.00	65.44	34.56	100.00
	14.05	15.24	14.37	13.39	15.07	13.93
College, university, and higher degree	563	1074	1637	276	666	942
	34.39	65.61	100.00	29.30	70.70	100.00
	2.00	10.36	4.26	3.05	15.68	7.08
Marital status						
Not married	8935	3937	12872	2820	1227	4047
	69.41	30.59	100.00	69.68	30.32	100.00
	31.81	37.98	33.47	31.15	28.89	30.43
Married	19157	6428	25585	6232	3020	9252
	74.88	25.12	100.00	67.36	32.64	100.00
	68.19	62.02	66.53	68.85	71.11	69.57
Age group						
15-19	4458	1363	5821	1367	325	1692
	76.58	23.42	100.00	80.79	19.21	100.00
	15.87	13.15	15.14	15.10	7.65	12.72
20-24	3274	1730	5004	903	522	1425
	65.43	34.57	100.00	63.37	36.63	100.00

Table A.1 (continued)

	11.65	16.69	13.01	9.98	12.29	10.72
	3008	1373	4381	914	547	1461
25-29	68.66	31.34	100.00	62.56	37.44	100.00
	10.71	13.25	11.39	10.10	12.88	10.99
	2919	1249	4168	873	603	1476
30-34	70.03	29.97	100.00	59.15	40.85	100.00
	10.39	12.05	10.84	9.64	14.20	11.10
	2877	1247	4124	833	572	1405
35-39	69.76	30.24	100.00	59.29	40.71	100.00
	10.24	12.03	10.72	9.20	13.47	10.56
	2594	1064	3658	768	559	1327
40-44	70.91	29.09	100.00	57.87	42.13	100.00
	9.23	10.27	9.51	8.48	13.16	9.98
	2229	805	3034	854	421	1275
45-49	73.47	26.53	100.00	66.98	33.02	100.00
	7.93	7.77	7.89	9.43	9.91	9.59
	2015	626	2641	707	296	1003
50-54	76.30	23.70	100.00	70.49	29.51	100.00
	7.17	6.04	6.87	7.81	6.97	7.54
	1468	442	1910	634	207	841
55-59	76.86	23.14	100.00	75.39	24.61	100.00
	5.23	4.26	4.97	7.00	4.87	6.32
	1264	308	1572	466	125	591
60-64	80.41	19.59	100.00	78.85	21.15	100.00
	4.50	2.97	4.09	5.15	2.94	4.44
	1986	158	2144	733	70	803
65+	92.63	7.37	100.00	91.28	8.72	100.00
	7.07	1.52	5.58	8.10	1.65	6.04
Rural/urban residence						
	6278	5873	12151	2519	1833	4352
Rural	51.67	48.33	100	57.88	42.12	100.00
	22.35	56.66	31.6	27.83	43.16	32.72
	21814	4492	26306	6533	2414	8947
Urban	82.92	17.08	100	73.02	26.98	100.00
	77.65	43.34	68.4	72.17	56.84	67.28
Household income quintile						
	5759	2462	8221	1989	887	2876
Quintile 1	70.05	29.95	100.00	69.16	30.84	100.00
	20.50	23.75	21.38	21.97	20.89	21.63
	6028	1921	7949	1953	754	2707
Quintile 2	75.83	24.17	100.00	72.15	27.85	100.00
	21.46	18.53	20.67	21.58	17.75	20.35

Table A.1 (continued)

	5904	1922	7826	1823	826	2649
Quintile 3	75.44	24.56	100.00	68.82	31.18	100.00
	21.02	18.54	20.35	20.14	19.45	19.92
	5653	1818	7471	1802	781	2583
Quintile 4	75.67	24.33	100.00	69.76	30.24	100.00
	20.12	17.54	19.43	19.91	18.39	19.42
	4748	2242	6990	1485	999	2484
Quintile 5	67.93	32.07	100.00	59.78	40.22	100.00
	16.90	21.63	18.18	16.41	23.52	18.68
Number of children aged below 15 in the household						
	10289	4022	14311	3610	1780	5390
0	71.90	28.10	100.00	66.98	33.02	100.00
	36.63	38.80	37.21	39.88	41.91	40.53
	7156	2455	9611	2314	1147	3461
1	74.46	25.54	100.00	66.86	33.14	100.00
	25.47	23.69	24.99	25.56	27.01	26.02
	5995	1939	7934	1714	777	2491
2	75.56	24.44	100.00	68.81	31.19	100.00
	21.34	18.71	20.63	18.94	18.30	18.73
	2522	971	3493	745	297	1042
3	72.20	27.80	100.00	71.50	28.50	100.00
	8.98	9.37	9.08	8.23	6.99	7.84
	1015	483	1498	344	112	456
4	67.76	32.24	100.00	75.44	24.56	100.00
	3.61	4.66	3.90	3.80	2.64	3.43
	1115	495	1610	325	134	459
5 and over	69.25	30.75	100.00	70.81	29.19	100.00
	3.97	4.78	4.19	3.59	3.16	3.45
Number of elderly aged 65 and over in the household						
	22603	8233	30836	7091	3511	10602
0	73.30	26.70	100.00	66.88	33.12	100.00
	80.46	79.43	80.18	78.34	82.67	79.72
	4282	1585	5867	1530	553	2083
1	72.98	27.02	100.00	73.45	26.55	100.00
	15.24	15.29	15.26	16.90	13.02	15.66
	1162	538	1700	431	183	614
2	68.35	31.65	100.00	70.20	29.80	100.00
	4.14	5.19	4.42	4.76	4.31	4.62
	40	7	47	0	0	0
3	85.11	14.89	100.00	0	0	0
	0.14	0.07	0.12	0	0	0
4	5	2	7	0	0	0

Table A.1 (continued)

	71.43	28.57	100.00	0	0	0
	0.02	0.02	0.02	0	0	0
	28092	10365	38457	9052	4247	13299
Total	73.05	26.95	100.00	68.07	31.93	100.00
	100.00	100.00	100.00	100.00	100.00	100.00

Source: Author's calculations from 2003 and 2010 Household Budget Surveys

Notes: First rows in sub-groups represent frequencies, second rows represent sub-group-specific ratios (row percentages), and third rows represent distribution of participating and not participating women across sub-groups (column percentages). Data is not weighted so the frequencies and ratios represent sample statistics.

Table A.2: Cross tabulations of household saving rate quintiles and explanatory variables (2003)

	Household saving rate quintiles					
	Lowest 20%	**Lower 20%**	**Middle 20%**	**Upper 20%**	**Upmost 20%**	**Total**
Household income quintiles						
	1,620	1,108	785	557	276	4,346
Quintile 1	37.28	25.49	18.06	12.82	6.35	100
	34.78	23.63	16.6	11.92	5.98	18.61
	1,185	1,235	1,085	830	486	4,821
Quintile 2	24.58	25.62	22.51	17.22	10.08	100
	25.44	26.34	22.95	17.77	10.54	20.64
	868	1,073	1,128	1,073	730	4,872
Quintile 3	17.82	22.02	23.15	22.02	14.98	100
	18.63	22.89	23.86	22.97	15.83	20.86
	629	805	1,037	1,166	1,136	4,773
Quintile 4	13.18	16.87	21.73	24.43	23.8	100
	13.5	17.17	21.93	24.96	24.63	20.43
	356	467	693	1,046	1,984	4,546
Quintile 5	7.83	10.27	15.24	23.01	43.64	100
	7.64	9.96	14.66	22.39	43.02	19.46
Educational attainment of the household head						
	342	291	283	248	233	1,397
Illiterate	24.48	20.83	20.26	17.75	16.68	100
	7.34	6.21	5.99	5.31	5.05	5.98

Table A.2 (continued)

Literate but no school completed	242	220	213	223	227	1,125
	21.51	19.56	18.93	19.82	20.18	100
	5.2	4.69	4.51	4.77	4.92	4.82
Primary school	2,510	2,448	2,343	2,320	2,322	11,943
	21.02	20.5	19.62	19.43	19.44	100
	53.89	52.22	49.56	49.66	50.35	51.13
Secondary school	508	568	581	505	451	2,613
	19.44	21.74	22.23	19.33	17.26	100
	10.91	12.12	12.29	10.81	9.78	11.19
High school	742	807	855	853	766	4,023
	18.44	20.06	21.25	21.2	19.04	100
	15.93	17.21	18.08	18.26	16.61	17.22
College, university, and higher degree	314	354	453	523	613	2,257
	13.91	15.68	20.07	23.17	27.16	100
	6.74	7.55	9.58	11.19	13.29	9.66
Health insurance coverage of the household head						
Not covered	1,486	1,254	1,168	1,044	1,100	6,052
	24.55	20.72	19.3	17.25	18.18	100
	31.9	26.75	24.7	22.35	23.85	25.91
Covered	3,172	3,434	3,560	3,628	3,512	17,306
	18.33	19.84	20.57	20.96	20.29	100
	68.1	73.25	75.3	77.65	76.15	74.09
Age of the household head						
15-19	4	4	4	5	5	22
	18.18	18.18	18.18	22.73	22.73	100
	0.09	0.09	0.08	0.11	0.11	0.09
20-24	75	66	64	45	38	288
	26.04	22.92	22.22	15.63	13.19	100
	1.61	1.41	1.35	0.96	0.82	1.23
25-29	413	359	369	296	246	1,683
	24.54	21.33	21.93	17.59	14.62	100
	8.87	7.66	7.8	6.34	5.33	7.21
30-34	607	607	606	549	476	2,845
	21.34	21.34	21.3	19.3	16.73	100
	13.03	12.95	12.82	11.75	10.32	12.18
35-39	732	745	709	640	624	3,450
	21.22	21.59	20.55	18.55	18.09	100
	15.71	15.89	15	13.7	13.53	14.77
40-44	719	739	720	734	709	3,621
	19.86	20.41	19.88	20.27	19.58	100

Table A.2 (continued)

	15.44	15.76	15.23	15.71	15.37	15.5
	593	593	623	599	629	3,037
45-49	19.53	19.53	20.51	19.72	20.71	100
	12.73	12.65	13.18	12.82	13.64	13
	516	532	548	620	569	2,785
50-54	18.53	19.1	19.68	22.26	20.43	100
	11.08	11.35	11.59	13.27	12.34	11.92
	315	380	362	422	439	1,918
55-59	16.42	19.81	18.87	22	22.89	100
	6.76	8.11	7.66	9.03	9.52	8.21
	308	323	324	301	379	1,635
60-64	18.84	19.76	19.82	18.41	23.18	100
	6.61	6.89	6.85	6.44	8.22	7
	376	340	399	461	498	2,074
65+	18.13	16.39	19.24	22.23	24.01	100
	8.07	7.25	8.44	9.87	10.8	8.88
Household Type						
	3,393	3,562	3,463	3,362	3,127	16,907
Nuclear	20.07	21.07	20.48	19.89	18.5	100
	72.84	75.98	73.24	71.96	67.8	72.38
	887	812	900	981	1,185	4,765
Extended	18.61	17.04	18.89	20.59	24.87	100
	19.04	17.32	19.04	21	25.69	20.4
	378	314	365	329	300	1,686
Single adult	22.42	18.62	21.65	19.51	17.79	100
	8.12	6.7	7.72	7.04	6.5	7.22
Urban/rural residence						
	1,304	1,201	1,200	1,313	1,693	6,711
Rural	19.43	17.9	17.88	19.56	25.23	100
	27.99	25.62	25.38	28.1	36.71	28.73
	3,354	3,487	3,528	3,359	2,919	16,647
Urban	20.15	20.95	21.19	20.18	17.53	100
	72.01	74.38	74.62	71.9	63.29	71.27
Number of children aged below 15 in the household						
	1,565	1,644	1,762	1,869	1,912	8,752
0	17.88	18.78	20.13	21.36	21.85	100
	33.6	35.07	37.27	40	41.46	37.47
	1,176	1,191	1,174	1,126	1,116	5,783
1	20.34	20.59	20.3	19.47	19.3	100
	25.25	25.41	24.83	24.1	24.2	24.76
2	1,054	1,018	1,081	1,052	980	5,185

Table A.2 (continued)

	20.33	19.63	20.85	20.29	18.9	100
	22.63	21.72	22.86	22.52	21.25	22.2
	484	469	403	387	377	2,120
3	22.83	22.12	19.01	18.25	17.78	100
	10.39	10	8.52	8.28	8.17	9.08
	195	206	158	126	129	814
4	23.96	25.31	19.41	15.48	15.85	100
	4.19	4.39	3.34	2.7	2.8	3.48
	184	160	150	112	98	704
5 and over	26.14	22.73	21.31	15.91	13.92	100.00
	3.94	3.41	3.18	2.4	2.12	3.01
Number of elderly aged 65 and over in the household						
	4,009	4,109	4,053	3,891	3,749	19,811
0	20.24	20.74	20.46	19.64	18.92	100
	86.07	87.65	85.72	83.28	81.29	84.81
	515	452	561	628	672	2,828
1	18.21	15.98	19.84	22.21	23.76	100
	11.06	9.64	11.87	13.44	14.57	12.11
	133	125	113	149	183	703
2	18.92	17.78	16.07	21.19	26.03	100
	2.86	2.67	2.39	3.19	3.97	3.01
	1	2	0	3	8	14
3	7.14	14.29	0	21.43	57.14	100
	0.02	0.04	0	0.06	0.17	0.06
	0	0	1	1	0	2
4	0	0	50	50	0	100
	0	0	0.02	0.02	0	0.01
Support ratio quintiles						
	1,221	1,256	1,141	999	706	5,323
Lowest quintile	22.94	23.6	21.44	18.77	13.26	100
	26.21	26.79	24.13	21.38	15.31	22.79
	1,335	1,405	1,395	1,238	1,077	6,450
Lower	20.7	21.78	21.63	19.19	16.7	100
	28.66	29.97	29.51	26.5	23.35	27.61
	728	712	784	742	718	3,684
Middle	19.76	19.33	21.28	20.14	19.49	100
	15.63	15.19	16.58	15.88	15.57	15.77
	754	680	721	863	969	3,987
Upper	18.91	17.06	18.08	21.65	24.3	100
	16.19	14.51	15.25	18.47	21.01	17.07
Upmost	620	635	687	830	1,142	3,914

Table A.2 (continued)

quintile	15.84	16.22	17.55	21.21	29.18	100
	13.31	13.55	14.53	17.77	24.76	16.76
Working status of the household head						
	1,225	1,278	1,260	1,167	935	5,865
Not working	20.89	21.79	21.48	19.9	15.94	100
	26.3	27.26	26.65	24.98	20.27	25.11
	3,433	3,410	3,468	3,505	3,677	17,493
Working	19.62	19.49	19.83	20.04	21.02	100
	73.7	72.74	73.35	75.02	79.73	74.89
	4,658	4,688	4,728	4,672	4,612	23,358
Total	19.94	20.07	20.24	20	19.74	100
	100	100	100	100	100	100

Source: Author's calculations from 2003 Household Budget Survey

Notes: First rows in sub-groups represent frequencies, second rows represent sub-group-specific ratios (row percentages), and third rows represent distribution of participating and not participating women across sub-groups (column percentages). Data is not weighted so the frequencies and ratios represent sample statistics.

Table A.3: Cross tabulations of household saving rate quintiles and explanatory variables (2010)

	Household saving rate quintiles					
	Lowest 20%	**Lower 20%**	**Middle 20%**	**Upper 20%**	**Upmost 20%**	**Total**
Household income quintiles						
	553	357	253	180	121	1,464
Quintile 1	37.77	24.39	17.28	12.3	8.27	100
	32.08	21.47	15.23	10.34	6.93	17.15
	439	436	382	305	178	1,740
Quintile 2	25.23	25.06	21.95	17.53	10.23	100
	25.46	26.22	23	17.52	10.2	20.39
	330	366	388	441	262	1,787
Quintile 3	18.47	20.48	21.71	24.68	14.66	100
	19.14	22.01	23.36	25.33	15.01	20.94
	256	296	380	425	429	1,786
Quintile 4	14.33	16.57	21.28	23.8	24.02	100
	14.85	17.8	22.88	24.41	24.58	20.93
	146	208	258	390	755	1,757
Quintile 5	8.31	11.84	14.68	22.2	42.97	100

Table A.3 (continued)

	8.47	12.51	15.53	22.4	43.27	20.59
Educational attainment of the household head						
Illiterate	101	105	94	92	114	506
	19.96	20.75	18.58	18.18	22.53	100
	5.86	6.31	5.66	5.28	6.53	5.93
Literate but no school completed	83	88	73	85	79	408
	20.34	21.57	17.89	20.83	19.36	100
	4.81	5.29	4.39	4.88	4.53	4.78
Primary school	879	815	810	806	770	4,080
	21.54	19.98	19.85	19.75	18.87	100
	50.99	49.01	48.77	46.3	44.13	47.81
Secondary school	213	187	176	196	163	935
	22.78	20	18.82	20.96	17.43	100
	12.35	11.24	10.6	11.26	9.34	10.96
High school	296	292	307	325	296	1,516
	19.53	19.26	20.25	21.44	19.53	100
	17.17	17.56	18.48	18.67	16.96	17.76
College, university, and higher degree	152	176	201	237	323	1,089
	13.96	16.16	18.46	21.76	29.66	100
	8.82	10.58	12.1	13.61	18.51	12.76
Health insurance coverage of the household head						
Not covered	203	159	147	158	142	809
	25.09	19.65	18.17	19.53	17.55	100
	11.77	9.56	8.85	9.08	8.14	9.48
Covered	1,521	1,504	1,514	1,583	1,603	7,725
	19.69	19.47	19.6	20.49	20.75	100
	88.23	90.44	91.15	90.92	91.86	90.52
Age group of the household head						
15-19	1	0	1	0	0	2
	50	0	50	0	0	100
	0.06	0	0.06	0	0	0.02
20-24	26	15	12	7	6	66
	39.39	22.73	18.18	10.61	9.09	100
	1.51	0.9	0.72	0.4	0.34	0.77
25-29	118	117	112	102	98	547
	21.57	21.39	20.48	18.65	17.92	100
	6.84	7.04	6.74	5.86	5.62	6.41

Table A.3 (continued)

	227	193	170	194	209	993
30-34						
	22.86	19.44	17.12	19.54	21.05	100
	13.17	11.61	10.23	11.14	11.98	11.64
	272	250	239	202	222	1,185
35-39	22.95	21.1	20.17	17.05	18.73	100
	15.78	15.03	14.39	11.6	12.72	13.89
	241	222	231	239	190	1,123
40-44	21.46	19.77	20.57	21.28	16.92	100
	13.98	13.35	13.91	13.73	10.89	13.16
	250	255	260	294	232	1,291
45-49	19.36	19.75	20.14	22.77	17.97	100
	14.5	15.33	15.65	16.89	13.3	15.13
	194	212	176	206	240	1,028
50-54	18.87	20.62	17.12	20.04	23.35	100
	11.25	12.75	10.6	11.83	13.75	12.05
	167	137	160	208	201	873
55-59	19.13	15.69	18.33	23.83	23.02	100
	9.69	8.24	9.63	11.95	11.52	10.23
	114	111	130	137	154	646
60-64	17.65	17.18	20.12	21.21	23.84	100
	6.61	6.67	7.83	7.87	8.83	7.57
	114	151	170	152	193	780
65+	14.62	19.36	21.79	19.49	24.74	100
	6.61	9.08	10.23	8.73	11.06	9.14
Household type						
	1,314	1,231	1,246	1,252	1,220	6,263
Nuclear	20.98	19.66	19.89	19.99	19.48	100
	76.22	74.02	75.02	71.91	69.91	73.39
	281	305	285	343	390	1,604
Extended	17.52	19.01	17.77	21.38	24.31	100
	16.3	18.34	17.16	19.7	22.35	18.8
	129	127	130	146	135	667
Single adult	19.34	19.04	19.49	21.89	20.24	100
	7.48	7.64	7.83	8.39	7.74	7.82
Urban/rural residence						
	555	461	445	486	588	2,535
Rural	21.89	18.19	17.55	19.17	23.2	100
	32.19	27.72	26.79	27.91	33.7	29.7
	1,169	1,202	1,216	1,255	1,157	5,999
Urban	19.49	20.04	20.27	20.92	19.29	100
	67.81	72.28	73.21	72.09	66.3	70.3

Table A.3 (continued)

Number of children aged below 15 in the household						
	663	651	698	750	788	3,550
0	18.68	18.34	19.66	21.13	22.2	100
	38.46	39.15	42.02	43.08	45.16	41.6
	428	451	420	465	446	2,210
1	19.37	20.41	19	21.04	20.18	100
	24.83	27.12	25.29	26.71	25.56	25.9
	353	349	353	356	307	1,718
2	20.55	20.31	20.55	20.72	17.87	100
	20.48	20.99	21.25	20.45	17.59	20.13
	154	127	121	116	120	638
3	24.14	19.91	18.97	18.18	18.81	100
	8.93	7.64	7.28	6.66	6.88	7.48
	65	49	41	33	44	232
4	28.02	21.12	17.67	14.22	18.97	100
	3.77	2.95	2.47	1.9	2.52	2.72
	61	36	28	21	40	186
5 and over	32.80	19.35	15.05	11.29	21.51	100.00
	3.54	2.16	1.69	1.21	2.29	2.18
Number of elderly aged 65 and over in the household						
	1,522	1,419	1,412	1,465	1,426	7,244
0	21.01	19.59	19.49	20.22	19.69	100
	88.28	85.33	85.01	84.15	81.72	84.88
	171	191	196	224	241	1,023
1	16.72	18.67	19.16	21.9	23.56	100
	9.92	11.49	11.8	12.87	13.81	11.99
	31	53	53	52	78	267
2	11.61	19.85	19.85	19.48	29.21	100
	1.8	3.19	3.19	2.99	4.47	3.13
Support ratio quintiles						
	425	426	417	370	270	1,908
Lowest quintile	22.27	22.33	21.86	19.39	14.15	100
	24.65	25.62	25.11	21.25	15.47	22.36
	552	518	515	485	428	2,498
Lower	22.1	20.74	20.62	19.42	17.13	100
	32.02	31.15	31.01	27.86	24.53	29.27
	372	360	368	432	461	1,993
Middle	18.67	18.06	18.46	21.68	23.13	100

Table A.3 (continued)

	21.58	21.65	22.16	24.81	26.42	23.35
	159	149	160	229	255	952
Upper	16.7	15.65	16.81	24.05	26.79	100
	9.22	8.96	9.63	13.15	14.61	11.16
	216	210	201	225	331	1,183
Upmost quintile	18.26	17.75	16.99	19.02	27.98	100
	12.53	12.63	12.1	12.92	18.97	13.86
Working status of the household head						
	367	394	395	380	359	1,895
Not working	19.37	20.79	20.84	20.05	18.94	100
	21.29	23.69	23.78	21.83	20.57	22.21
	1,357	1,269	1,266	1,361	1,386	6,639
Working	20.44	19.11	19.07	20.5	20.88	100
	78.71	76.31	76.22	78.17	79.43	77.79
	1724	1663	1661	1741	1745	8534
Total	20.2	19.49	19.46	20.4	20.45	100
	100	100	100	100	100	100

Source: Author's calculations from 2010 Household Budget Survey

Notes: First rows in sub-groups represent frequencies, second rows represent sub-group-specific ratios (row percentages), and third rows represent distribution of participating and not participating women across sub-groups (column percentages). Data is not weighted so the frequencies and ratios represent sample statistics.

Table A.4: Cross tabulation of education expenditure per child and explanatory variables

	2003			**2010**		
	Lower 50%	**Upper 50%**	**Total**	**Lower 50%**	**Upper 50%**	**Total**
Mother's education						
	6,950	489	7,439	1,608	467	2,075
Illiterate	93.43	6.57	100	77.49	22.51	100
	28.43	13.08	26.4	28.34	13.99	23.02
	1,797	208	2,005	512	217	729
Literate but no school completed	89.63	10.37	100	70.23	29.77	100
	7.35	5.56	7.11	9.02	6.5	8.09
	12,673	1,994	14,667	2,906	1,682	4,588
Primary school	86.4	13.6	100	63.34	36.66	100

Table A.4 (continued)

	51.85	53.33	52.04	51.22	50.39	50.91
Secondary school	1,124	283	1,407	273	256	529
	79.89	20.11	100	51.61	48.39	100
	4.6	7.57	4.99	4.81	7.67	5.87
High school	1,481	517	1,998	297	473	770
	74.12	25.88	100	38.57	61.43	100
	6.06	13.83	7.09	5.23	14.17	8.54
College, university, and higher degree	418	248	666	78	243	321
	62.76	37.24	100	24.3	75.7	100
	1.71	6.63	2.36	1.37	7.28	3.56
Father's education						
Illiterate	1,674	51	1,725	351	72	423
	97.04	2.96	100	82.98	17.02	100
	6.85	1.36	6.12	6.19	2.16	4.69
Literate but no school completed	1,344	116	1,460	382	87	469
	92.05	7.95	100	81.45	18.55	100
	5.5	3.1	5.18	6.73	2.61	5.2
Primary school	13,987	1,595	15,582	3,432	1,490	4,922
	89.76	10.24	100	69.73	30.27	100
	57.22	42.66	55.29	60.49	44.64	54.62
Secondary school	2,741	444	3,185	639	448	1,087
	86.06	13.94	100	58.79	41.21	100
	11.21	11.87	11.3	11.26	13.42	12.06
High school	3,433	939	4,372	642	712	1,354
	78.52	21.48	100	47.42	52.58	100
	14.04	25.11	15.51	11.31	21.33	15.02
College, university, and higher degree	1,264	594	1,858	228	529	757
	68.03	31.97	100	30.12	69.88	100
	5.17	15.89	6.59	4.02	15.85	8.4
Age group of the child						
6-14	16,179	2,318	18,497	3,688	2,233	5,921
	87.47	12.53	100	62.29	37.71	100
	66.19	62	65.63	65	66.9	65.7
15-19	8,264	1,421	9,685	1,986	1,105	3,091
	85.33	14.67	100	64.25	35.75	100
	33.81	38	34.37	35	33.1	34.3
Sex of the child						
Male	12,222	1,858	14,080	2,864	1,703	4,567
	86.8	13.2	100	62.71	37.29	100

Table A.4 (continued)

	50	49.69	49.96	50.48	51.02	50.68
	12,221	1,881	14,102	2,810	1,635	4,445
Female	86.66	13.34	100	63.22	36.78	100
	50	50.31	50.04	49.52	48.98	49.32
Household income quintile						
	5,655	256	5,911	1,537	451	1,988
Quintile 1	95.67	4.33	100	77.31	22.69	100
	23.14	6.85	20.97	27.09	13.51	22.06
	5,278	460	5,738	1,305	507	1,812
Quintile 2	91.98	8.02	100	72.02	27.98	100
	21.59	12.3	20.36	23	15.19	20.11
	5,023	639	5,662	1,175	576	1,751
Quintile 3	88.71	11.29	100	67.1	32.9	100
	20.55	17.09	20.09	20.71	17.26	19.43
	4,570	1,049	5,619	948	792	1,740
Quintile 4	81.33	18.67	100	54.48	45.52	100
	18.7	28.06	19.94	16.71	23.73	19.31
	3,917	1,335	5,252	709	1,012	1,721
Quintile 5	74.58	25.42	100	41.2	58.8	100
	16.03	35.7	18.64	12.5	30.32	19.1
Urban/rural residence						
	8,606	621	9,227	2,296	879	3,175
Rural	93.27	6.73	100	72.31	27.69	100
	35.21	16.61	32.74	40.47	26.33	35.23
	15,837	3,118	18,955	3,378	2,459	5,837
Urban	83.55	16.45	100	57.87	42.13	100
	64.79	83.39	67.26	59.53	73.67	64.77
Labor force participation status						
	21,471	3,555	25,026	5,002	3,156	8,158
Not participate	85.79	14.21	100	61.31	38.69	100
	87.84	95.08	88.8	88.16	94.55	90.52
	2,972	184	3,156	672	182	854
Participat e	94.17	5.83	100	78.69	21.31	100
	12.16	4.92	11.2	11.84	5.45	9.48
Number of children aged 19 and below in the household						
	2,690	469	3,159	756	520	1,276
	85.15	14.85	100	59.25	40.75	100
1						
	11.01	12.54	11.21	13.32	15.58	14.16
2	7,257	1,516	8,773	1,663	1,333	2,996

Table A.4 (continued)

	82.72	17.28	100	55.51	44.49	100
	29.69	40.55	31.13	29.31	39.93	33.24
	5,893	945	6,838	1,354	802	2,156
3	86.18	13.82	100	62.8	37.2	100
	24.11	25.27	24.26	23.86	24.03	23.92
	3,264	418	3,682	762	357	1,119
4	88.65	11.35	100	68.1	31.9	100
	13.35	11.18	13.07	13.43	10.7	12.42
	5,339	391	5,730	1139	326	1465
5 and over	93.18	6.82	100.00	77.75	22.25	100.00
	21.84	10.46	20.33	20.07	9.77	16.26
	24,443	3,739	28,182	5,674	3,338	9,012
Total	86.73	13.27	100	62.96	37.04	100
	100	100	100	100	100	100

Source: Author's calculations from 2003 and 2010 Household Budget Surveys

Notes: First rows in sub-groups represent frequencies, second rows represent sub-group-specific ratios (row percentages), and third rows represent distribution of participating and not participating women across sub-groups (column percentages). Data is not weighted so the frequencies and ratios represent sample statistics.

TEZ FOTOKOPİSİ İZİN FORMU

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YAZARIN

Soyadı : Özer
Adı : Merve Nezihe
Bölümü : İktisat

TEZİN ADI (İngilizce) : Demographic Roots of Socioeconomic Development: A Case Study for Turkey

TEZİN TÜRÜ : Yüksek Lisans ☐ Doktora ☐

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
3. Tezimden bir (1) yıl süreyle fotokopi alınamaz. ☐

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: