Analyses of health and health related policies in Turkey

Submitted for the degree of Doctor of Philosophy in Economics

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to the One, Who is the Greatest,

with all my love…

Abstract

This thesis investigates inequalities in health and fertility and the impact of health and fertility related policies in Turkey. Consisting of four empirical studies; (i) analysing socioeconomic variations over time, (ii) analysing regional variations, (iii) examining the effects of healthcare reform, and (iv) examining the impacts of compulsory schooling; the research employs econometric methods for a range of health and fertility indicators. The studies apply a range of measurements and econometric techniques including, Concentration Indices, Decomposition of Concentration Indices, Oaxaca-Blinder Decomposition, Recentered Influence Function Regression Decomposition, difference-in-differences, regression discontinuity design and instrumental variables using the data from the Turkish Demographic and Health Survey.

The thesis reveals that women with lower socioeconomic status have relatively higher number of children and child mortality. Contrastingly, they have relatively lower abortion and contraception. In addition, income related inequalities in child mortality have increased over time while the inequalities in abortion and contraception have decreased. Also wealth, age and education are associated with inequalities in health, while living in the developed parts of Turkey is also influential for inequalities in fertility. Results suggest that western Turkey has pro-rich inequalities in obesity, similar to developed countries, while eastern Turkey exhibits pro-poor inequalities, similar to developing countries. Age, education and

ethnicity are associated with the obesity gap between developed (western) and developing (eastern) parts of Turkey while wealth and ethnicity account for the income related obesity inequalities between these regions. Additionally, it is found that extended access to healthcare reduces child mortality and the number of children in the developing part of Turkey. On the contrary, the policies extending access are almost ineffective in the developed part. Finally, it is discovered that the extension of compulsory schooling not only leads to improvements in selected educational indicators; but also reduces the number of children and child mortality.

Declaration

I hereby declare that this Ph.D. thesis entitled “Analyses of health and health related policies in Turkey” is a presentation of my original research work for the Degree of Philosophy in Economics under the guidance and supervision of Professor John Wildman and Dr Nils Braakmann.

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Chapter 1

Introduction

1.1. Aims and Originality

This thesis aims to investigate inequalities in Turkish health and fertility through the application of econometric methods to Turkish data. By this examination, the thesis also proposes to evaluate health and fertility related policies in Turkey. It is believed that the findings are crucial for the literature as the studies analysing the inequalities in Turkey are scarce.

Turkey is a country that is developing – on edges of Europe. It is an upper-middle-income country of 75.6 million people and straddles Europe (on the West) and Asia (on the East) (Atun et al., 2013). It has been going through a far-reaching reform process in the last decade with the aim of participating to the European Union (Tatar et al., 2011). As a result, it has undergone impressive achievements in economic and social grounds (as well as population health); however it still faces existence of socioeconomic differences within the country (Atun et al., 2013). It consists of both well-developed parts in the West and relatively less-developed (or developing) parts in the East. This makes Turkey an interesting case as there are clear distinguishable differences between the said two parts.

The research will contribute to the literature in different stages. In early stages, in other saying in fourth, fifth and sixth chapters, the research will stress socioeconomic inequalities in health by focusing distribution of health on a socioeconomic basis and socioeconomic determinants of health. Afterwards, in seventh and eighth chapters, the research will highlight not only the distribution of health but also the accessibility of healthcare services and related issues in following stages. Therefore, firstly, the thesis explores socioeconomic determinants of health and

fertility in Turkey. Afterwards, it measures income-related inequalities using different aspects of health and fertility to see to what extent inequalities exist among the Turkish women at reproductive age (15-49). Subsequently, the research decomposes measured inequalities into their components to reveal how socioeconomic variations contribute to the inequalities in health and fertility. Accordingly, augmenting effects of age and mitigating impacts of age at first marriage have been observed on almost all health (child mortality and obesity) and fertility indicators (induced abortion, contraception and number of children). In addition, the findings suggest that the women with lower socioeconomic status have relatively high child mortality and number of children. In contrast, they have lower rates of abortion and contraception. Inequality analyses confirm that child mortality and the number of children are more concentrated among deprived women while abortion and contraception are more concentrated among affluent women. Furthermore, income related inequalities in child mortality have been increasing over time. On the contrary, inequalities in abortion and contraception have been decreasing during the period between 2003 and 2008. As for the inequalities in the number of children, they have almost remained the same. The decomposition analyses suggest that wealth, age and education are the most important contributors of income related inequalities in health indicators. On the other hand, it appears that not only wealth, age and education, but also living in the developed parts of Turkey also significantly contributes to the inequalities in fertility indicators.

Since everyone has the right to enjoy the highest attainable standard of health in their society (WHO, 1946), the inequalities in health are unfair and unjust (Whitehead and Dahlgren, 1991; Gwatkin 2000; Woodward and Kawachi, 2000; Marmot, 2007, 2010). Furthermore, there are some other reasons to worry about the inequalities: (i) they lead to higher costs both in human terms (losing lives and diminishing lifespan) and economic terms (the costs of additional diseases caused by the inequalities); and (ii) they are detrimental not only for vulnerable people but also for advantaged ones in a society (Woodward and Kawachi, 2000).

Their existence poses the most serious challenge to improving the achievements in health in a population (Whitehead and Dahlgren, 1991). Therefore, the findings are important as they may enlighten policy makers tackling inequalities with the aim of improving Turkish health and fertility. The results highlight the roles of wealth and education in improving health and fertility. Accordingly, policies increasing the level of wealth and education among deprived women may be beneficial in reducing child mortality. They may also help to reduce fertility rates. The results also reveal the importance of socioeconomic development for the accessibility of family planning services. Thus, enhancing the accessibility of family planning services especially for deprived and/or rural women may be worthwhile in reducing higher fertility. In the light of existing literature it is believed that this may lead to better outcomes in maternal and child health, schooling and wealth of households (Gupta et al., 2011).

There is a clear gap between the developments of western and eastern Turkey. Western Turkey constitutes the most developed part of Turkey, whereas eastern Turkey forms the least developed part (when the development is measured considering GDP per capita, banking, urbanisation, schooling, healthcare, investment, employment and export rates) (Ersungur et al., 2007). Therefore, the thesis, secondly, extends the research by investigating obesity in the most and the least developed parts of Turkey. Specifically, the research examines obesity determinants and inequalities in these regions respectively. Following this, it decomposes the obesity inequalities to divulge how each characteristic contributes to the variations between these regions.

The findings suggest that, age, ethnicity, education, income, marital status and employment are significantly associated with obesity in Turkey. Inequality analyses indicate that obesity is more concentrated among aflluent women in eastern Turkey while it is more concentrated among deprived women in western Turkey, implying that western Turkey reflects the characteristics of developed countries while eastern Turkey is closer to developing countries. In addition, wealth and ethnicity are the

dominant contributors of income related obesity inequalities between these regions. Such inequalities are attributable to the differences in the obesity determinants rather than the differences in the inequality in obesity determinants. Furthermore, the decomposition of the obesity gap between these regions suggests that the difference in their level of obesity is attributable to the differences in their characteristics (composition effects) rather than the differences in the coefficients (structural effect). In addition, the composition effect is predominantly driven by the differences in the distributions of age, ethnicity and education level while respondent's age, marital status, wealth and the number of children make the largest contributions to the structural effect.

These findings are crucial as they shed light on the different characteristics of developed and developing parts of Turkey. Therefore it is believed that the study may support efforts to reduce obesity by encouraging policy makers to design specific policies for regions with different levels of development. The study reveals that the policies encouraging healthy behaviour and targeting deprived women in western Turkey and affluent women in eastern Turkey may be helpful in reducing obesity. Additionally, the policies dealing with the nutritional issues of deprived women in eastern Turkey may also be useful in reducing the inequalities between these regions.

Thirdly, the research analyses the health and fertility effects of recent healthcare reforms in Turkey. Specifically, it investigates the effects of extended access to healthcare through changes in health insurance on child mortality and fertility. The study uses a difference-in-differences-type design, since it is the most appropriate design for measuring exogenous shocks (such as policy changes), which affect certain groups (Lechner, 2011). By using the difference-in-differences technique, the differential impacts on child mortality and fertility of the recent reforms in accessing healthcare will be evaluated. In particular, the reforms which expanded access to healthcare facilities for only GreenCard- and *Social Insurance Organisation*-assureds will be examined.

The findings suggest that the policy extended access to healthcare and decreased the child mortality and fertility rates of GreenCard assureds living in eastern Turkey. In addition, this policy decreased the probability of having children among GreenCard assureds living in western Turkey. The policy extended coverage (for the people insured by the *Social Insurance Organisation*) led to a decrease in child mortality among the people insured by the Social Insurance Organisation and living in eastern Turkey.

Identifying the extent of the effectiveness of policy changes is critical because Turkey has, for a long time, faced lower health status and higher fertility than other developed countries. The results highlight that the extended accessibility of healthcare services decreased child mortality and fertility of deprived and rural women. In the light of existing literature, it is believed that the policies enhancing (i) the accessibility of healthcare services and (ii) the knowledge of family planning especially in eastern Turkey will be beneficial not only for improving health and fertility (Lindrooth and McCullough, 2007; Kutinova and Conway 2008; Chou et al., 2011; Dennis et al., 2012) but also for reducing the costs of maternal and infant care (Currie and Gruber, 1996b; Lindrooth and McCullough, 2007) and increasing the utilisation of healthcare services (Currie and Gruber, 1996a; Chen et al., 2007; Kutinova and Conway 2008; Wagstaff et al., 2009).

The causal effects of education on health and fertility are well established. Accordingly, better education improves health through increasing productivity (Grossman, 1972). On the other hand, it reduces fertility as it increases the opportunity cost of children (Becker, 1960; Mincer, 1963) and improves the knowledge of health-related behaviour (Becker, 1960; Grossman, 1972; Rosenzweig and Schultz, 1987; Thomas et al., 1991; Schultz, 2007). Even though there is a large literature investigating the causal link between education and health or fertility, the studies are still rare for Turkey. Therefore, finally, the research further examines the health and fertility effects of education by exploiting certain educational reforms. To do this, the research employs an instrumental variables

technique in a regression discontinuity design. Specifically, it exploits the discontinuity in education led by an exogenous shock (the policy extending compulsory schooling). Accordingly, the women affected by the policy change (forced to have eight years of compulsory schooling instead of five years) are assigned according to their time of birth as an instrumental variable. By doing this examination the research firstly highlights the impacts of education on Turkish health and fertility. This is critical as another educational reform bearing similar characteristics (further extending compulsory schooling) has been implemented recently. Thus, it is believed that the findings may enlighten further research about recent policy.

The findings suggest that the change in compulsory education led to an increase in having more than five years of education for women affected by the policy. It also resulted in an increase in having eight or more years of education for affected women. Furthermore, the women, forced by the changes, to have eight years of schooling (instead of five) have lower fertility (around 0.6 less children born) and lower child mortality (approximately 0.05 less children died) than their counterparts.

These findings stress the importance of education in improving health and fertility. Since educational variations are associated with the disparities in health and fertility (Cutler and Lleras-Muney, 2006), improving educational levels of lower educated individuals (e.g. reducing the educational variations) may lead to reductions in health and fertility inequalities, and therefore, improvements in health and fertility (Woodward and Kawachi, 2000; Marmot, 2010).

1.2. Structure of the Thesis

The thesis consists of ten chapters in total, including an introductory chapter, an illustrative chapter which portrays country profile of Turkey, a descriptive chapter of data, five chapters of original research, a conclusion and a chapter of appendices.

Chapter 1 presents a background to the research and outlines the structure of the thesis.

Chapter 2 briefly introduces Turkey's profile.

Chapter 3 describes the datasets used in the research and introduces the variables employed during the empirical analyses.

Chapter 4 investigates the socioeconomic determinants of health and fertility. Using ordinary least squares regressions, estimations have been done for two different aspects of health, obesity and child mortality, and three different aspects of fertility, number of children, induced abortion and contraception use.

Chapter 5 analyses the socioeconomic variations in health and fertility. It employs the concentration indices to measure income-related inequalities in health and fertility among the Turkish women at reproductive age (15-49). Afterwards, it decomposes the measured inequalities into components to see how much each component contributes to income-related inequalities in health and fertility.

Chapter 6 examines the socioeconomic determinants of obesity in different regions of Turkey. It also measures income related obesity inequalities in these regions. Finally, it decomposes the income related inequalities and the obesity gap between these regions into the contributions made by each factor.

Chapter 7 concentrates on the evaluation of recent healthcare reforms exploiting two major changes for certain parts of the population. Specifically, it investigates health and fertility effects of extended access to healthcare using the difference-in-differences technique.

Chapter 8 explores the effects of women's education on health and fertility exploiting an educational policy extending compulsory schooling. It employs the instrumental variables technique in a regression discontinuity design.

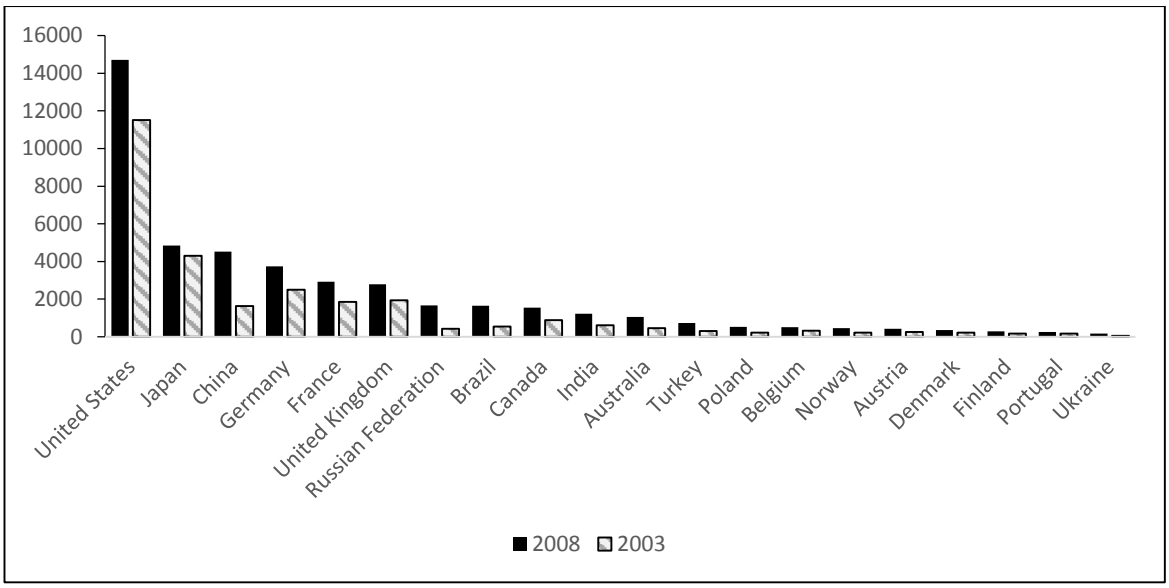
Chapter 9 summarises and interprets the findings of the empirical analyses. It also discusses the effectiveness of health-related policies.

Chapter 2

Turkey at a Glance

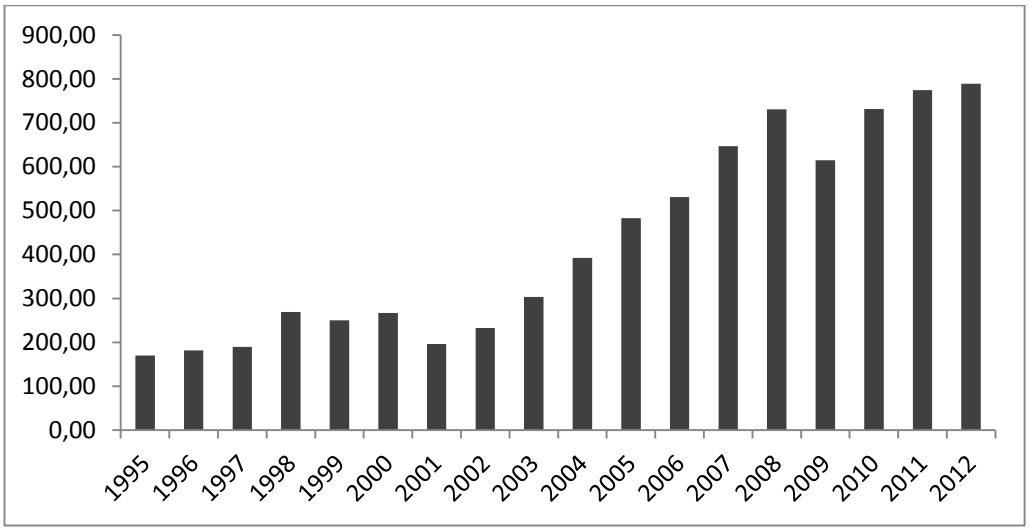
The following descriptive statistics will portray the economic and social circumstances of Turkey in order to provide an overview to interpret the findings.

Although exhibiting impressive economic growth for approximately the last 15 years, Turkey still lies between developed and developing countries on a range of development indicators such as Gross Domestic Product (hereafter GDP) and GDP per capita. Figures 2.1-2.4 show the levels of GDP and GDP per capita at power purchasing parity (PPP) in current United States dollars (US$) not only for Turkey but also for other selected countries for the period under analysis. Accordingly, it can be clearly seen that Turkey has lower levels of GDP and GDP per capita at PPP than certain developed countries. On the contrary it has higher GDP levels than some of the developing countries and relatively small western countries. It also has higher levels of GDP per capita at PPP than populous eastern countries. It could have higher levels of GDP per capita, i.e., closer levels to those in developed countries, if only the western part of Turkey was considered - given that there are clear developmental and demographic gaps between eastern and western Turkey. It has seen remarkable increases in the levels of GDP and GDP per capita at PPP even though they shrunk slightly in 2009 (see Figures 2.2 and 2.4). On the one hand, the GDP has increased from around $200 billion in 2002 to almost $800 billion in 2012. On the other hand, the level of GDP per capita at PPP has increased approximately from $3000 in 2002 to $10000 in 2012. The levels of GDP and GDP per capita at PPP can be seen in Figures 2.1-2.4 below.



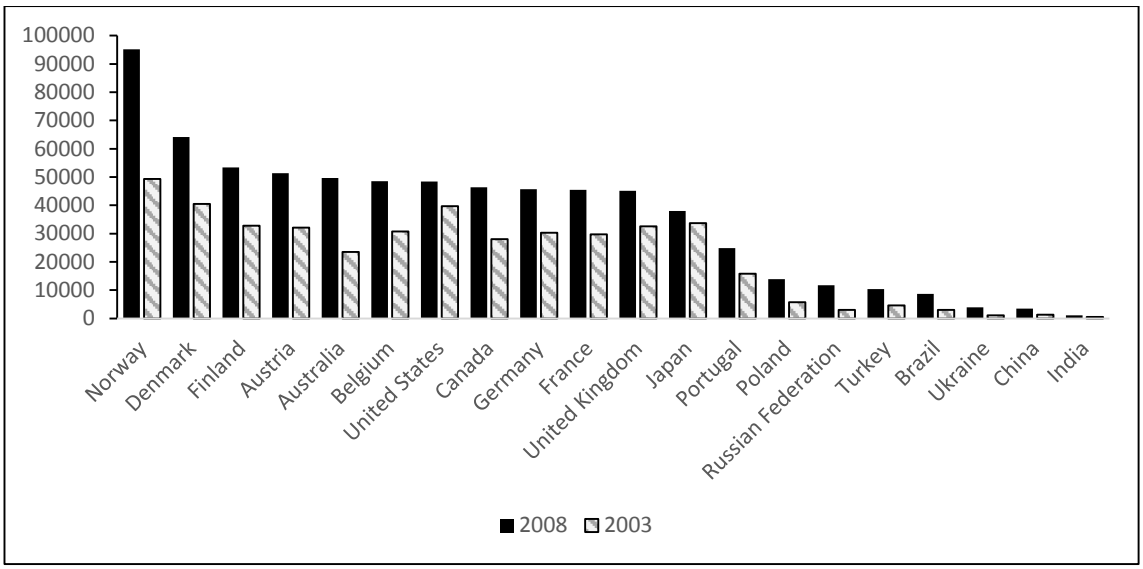
Source:The World Bank, 2015

Figure 2.1: GDP levels in current US$ - billions



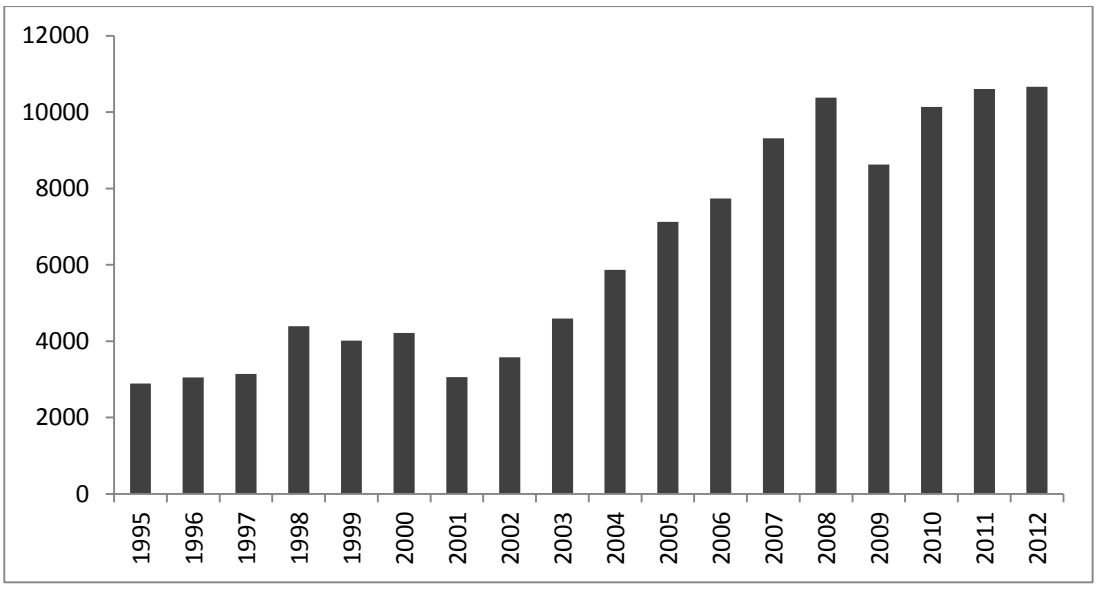
Source: The World Bank, 2015

Figure 2.2: GDP levels of Turkey by year - in current US$ - billions



Source: The World Bank, 2015

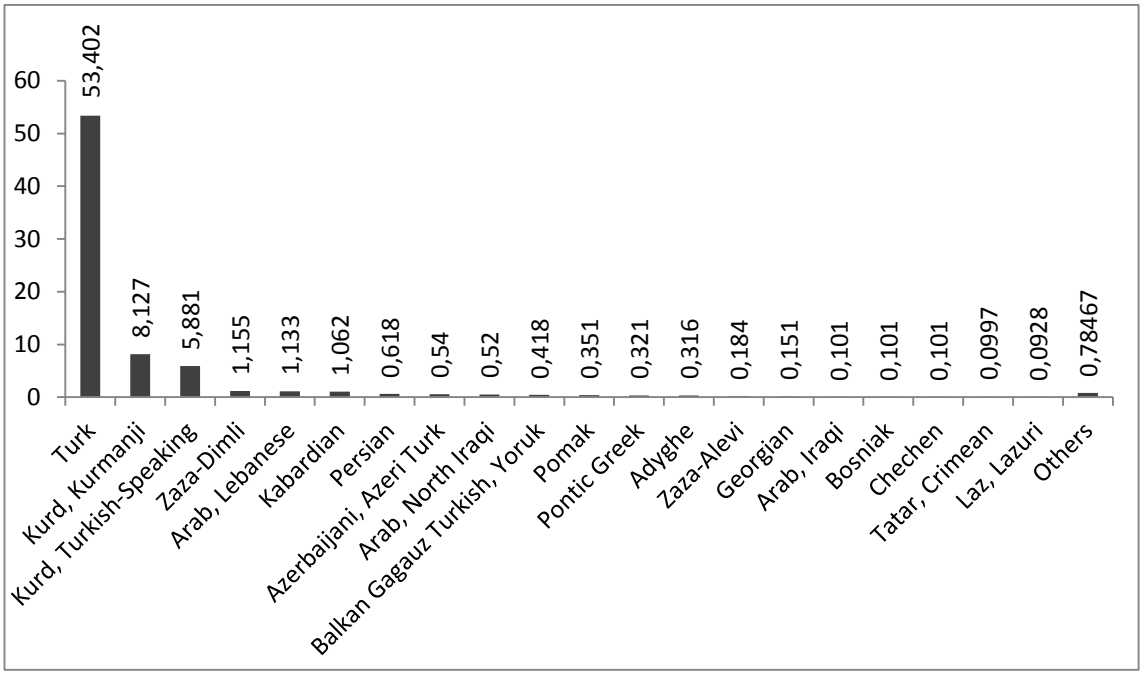
Figure 2.3: GDP per capita at PPP – in current US$ - ($10,000)



Source: The World Bank, 2015

Figure 2.4: GDP per capita levels of Turkey by years – in current US$

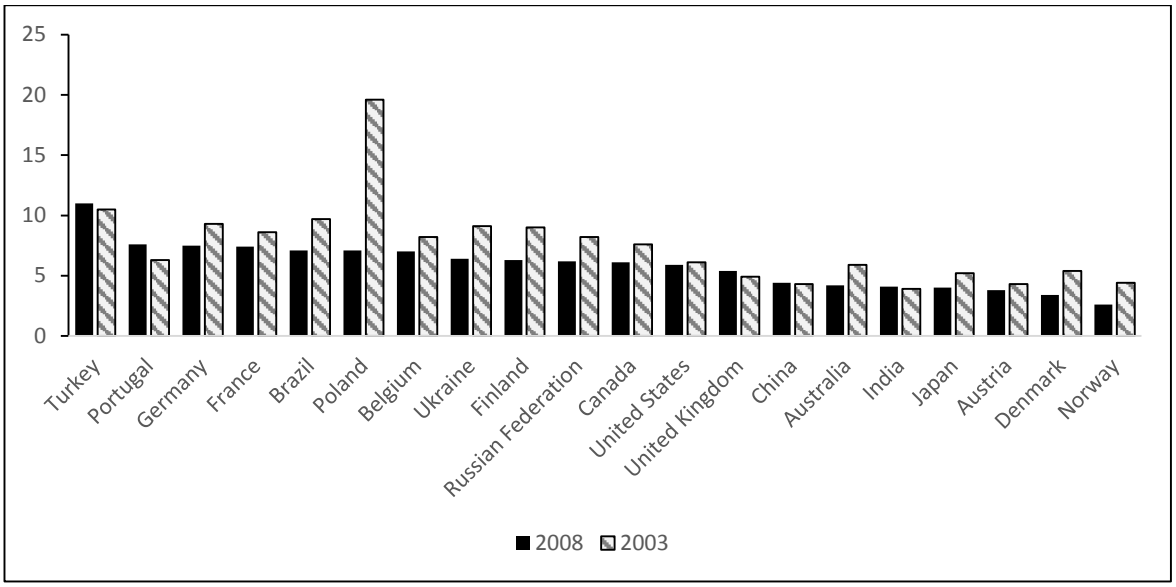
There are various ethnicities currently living in Turkey with Turkish is the predominant ethnic background which is followed by Kurdish and Arabic. Figure 2.5 shows the ethnic backgrounds in Turkey. The "Others" category indicate almost fifteen different (relatively less populous) ethnic minorities including Albanian, Armenian, Tatar, Abaza and Bulgarian.



Source: Joshua Project, 2014

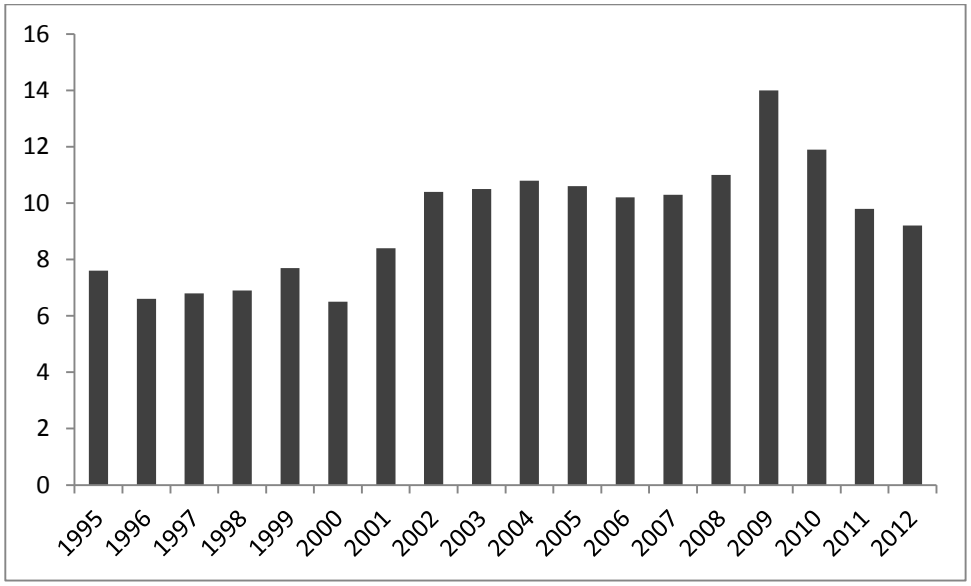
Figure 2.5: Ethnicities in Turkey (population - millions)

Additionally, Turkey struggles with unemployment; the rates have fluctuated over the years and still remain high. It has definitely higher rates of unemployment than developed countries and even some of the populous developing countries such as Brazil and India. On the other hand, female participation of labour force is significantly lower compared to the developed world. The rates could be even worse if only the eastern part of Turkey was considered. Unemployment rates and the female participation of labour force in selected countries for the periods under analysis can be seen in Figure 2.6-2.8 below. Figure 2.7 illustrates the level of unemployment in Turkey over time.



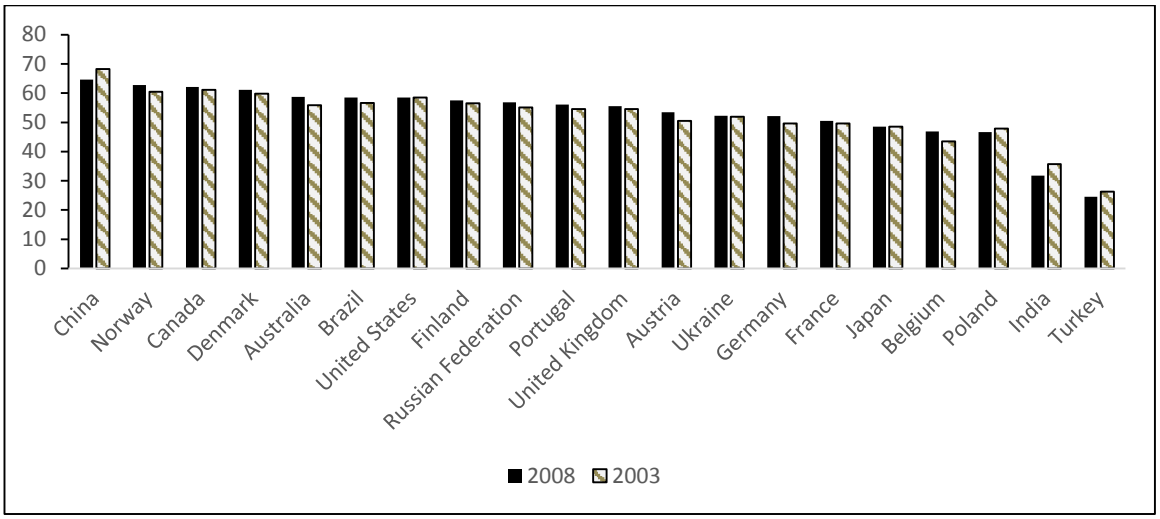
Source: The World Bank, 2015

Figure 2.6: Unemployment rates - percentage



Source: The World Bank, 2015

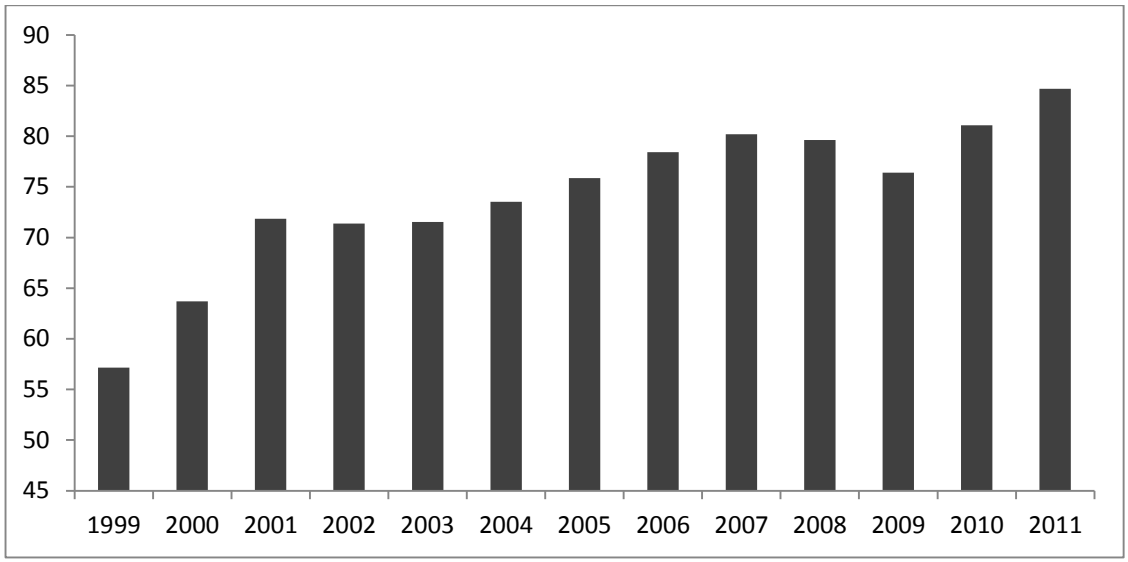
Figure 2.7: Unemployment rates in Turkey by years - percentage



Source: The World Bank, 2015

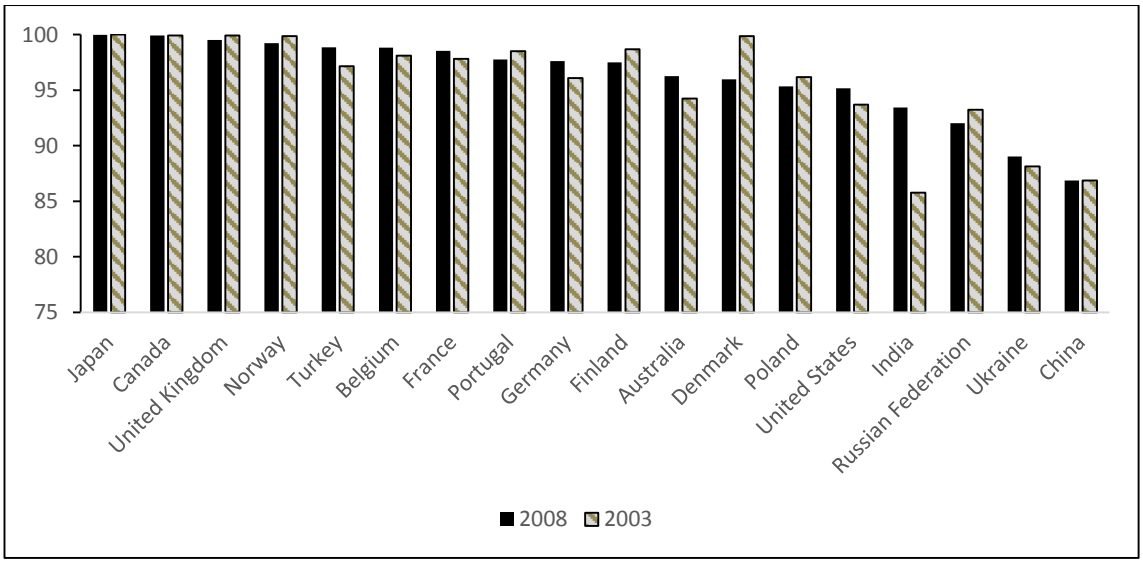
Figure 2.8: Female participation of labour force - percentage

As for education, there has been an increase in schooling over the years. Due to this increase, Turkey stays among developed countries even though it has slightly lower rates than relatively less populated western countries. Lower enrolment of girls was a long standing problem in Turkey especially in the eastern part (Ministry of National Education, 2005). However, it represents an important increase for the last ten years. Despite the improvements, Turkey still has lower enrolment of girls compared to the countries from developed world. Unfortunately, Turkey still has the lowest ratio of girls to boys enrolled among selected countries. The ratio could be higher if only the western part was considered. Figures 2.9-2.11 illustrate the improvements in Turkish education and its situation among selected countries in the periods under analysis. Accordingly, enrolment in secondary education increased from approximately 70% to 85% within the ten years period. The ratio of girls to boys enrolled in primary and secondary education increased from approximately 85% in 2004 to almost 95% in 2011.



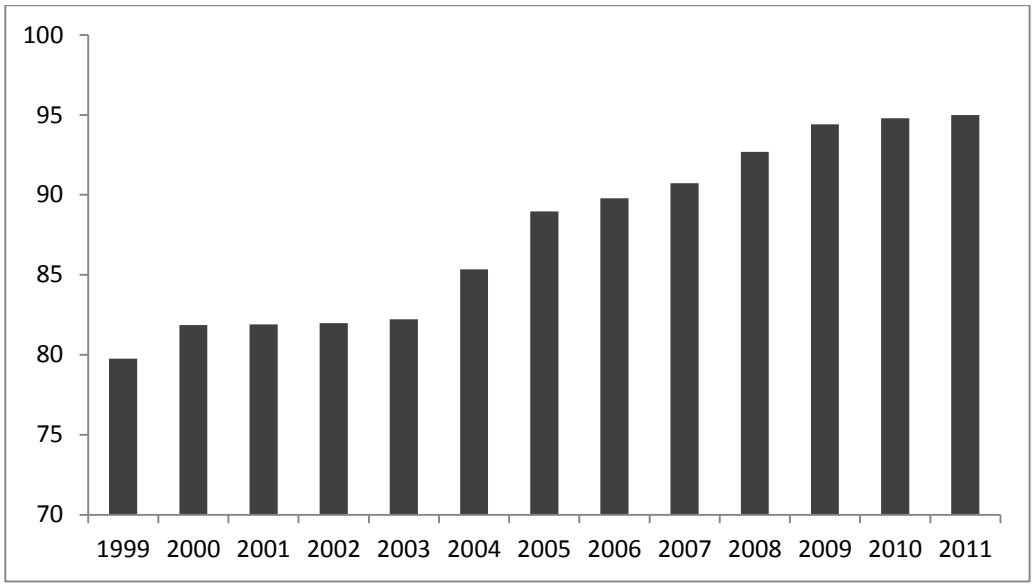
Source: The World Bank, 2015

Figure 2.9: Enrolment in secondary education in Turkey - percentage



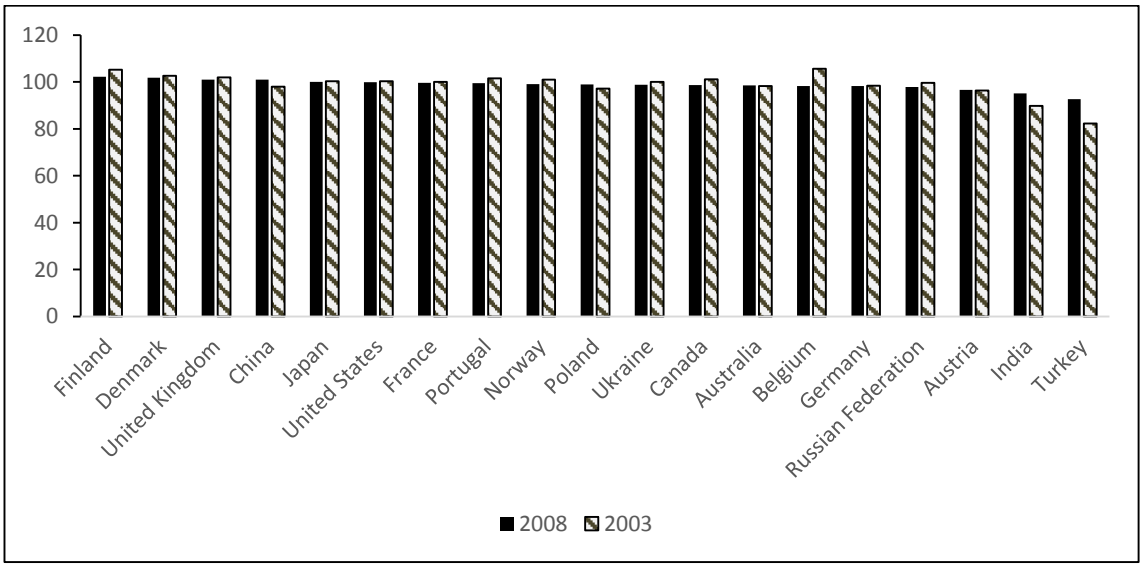
Source: The World Bank, 2015

Figure 2.10: Enrolment in primary education - percentage



Source: The World Bank, 2015

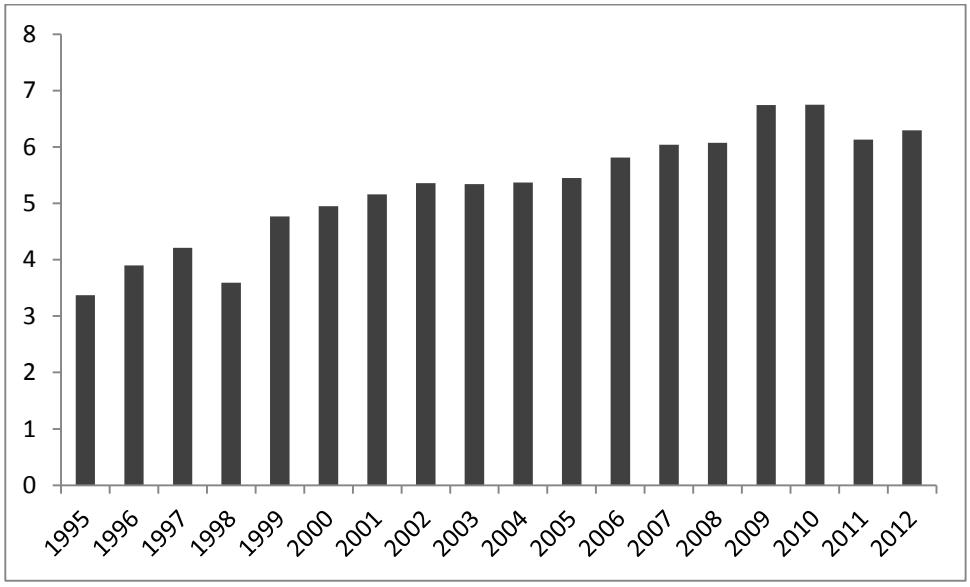
Figure 2.11: Ratio of girls to boys enrolled in primary and secondary education by year - percentage



Source: The World Bank, 2015

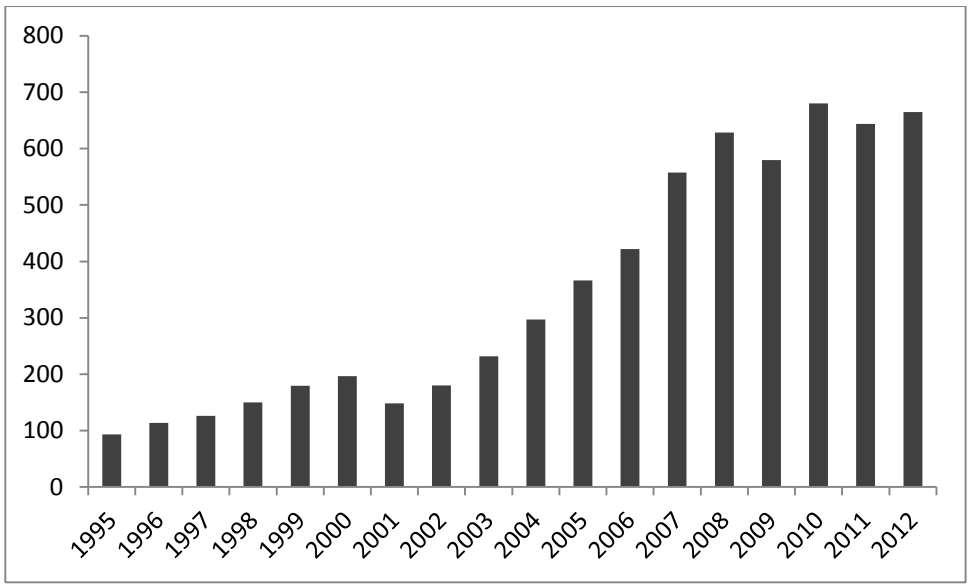
Figure 2.12: Ratio of girls to boys enrolled in primary and secondary education - percentage

Relative to the improvements in economic growth, the total share of health expenditures in GDP and the health expenditure per capita have increased. However, Turkey still spends less than other countries in the developed world. Figures 2.13 - 2.16 illustrate the total share of health expenditures in GDP and the health expenditures per capita in Turkey and other selected countries. Accordingly, there seems to have been an impressive increase in health expenditure per capita after 2002.



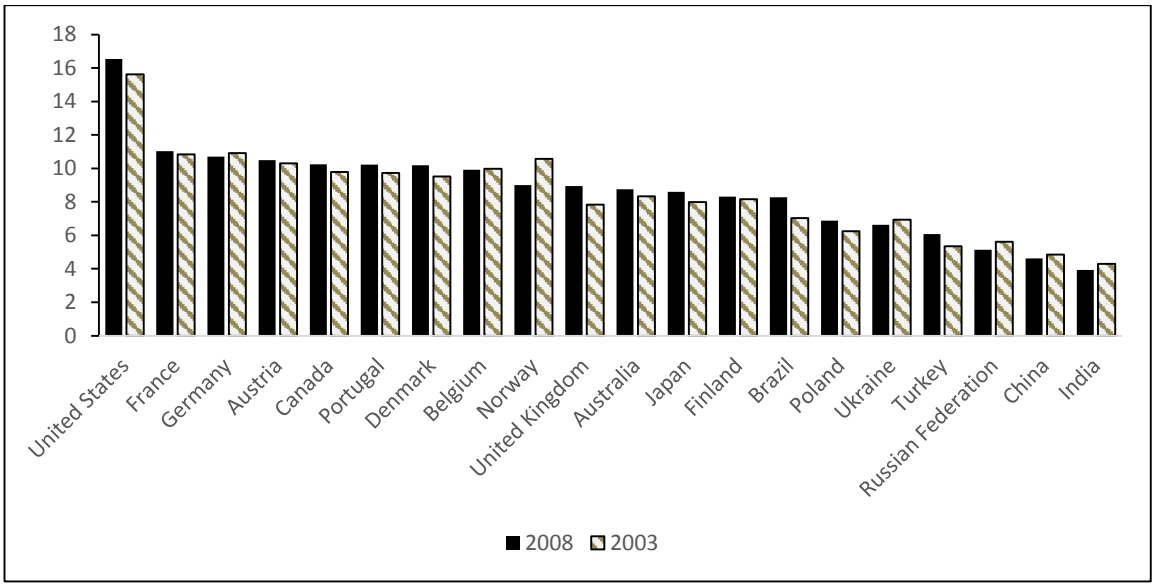
Source: The World Bank, 2015

Figure 2.13: Total share of health expenditure in Turkish GDP by year – current US$



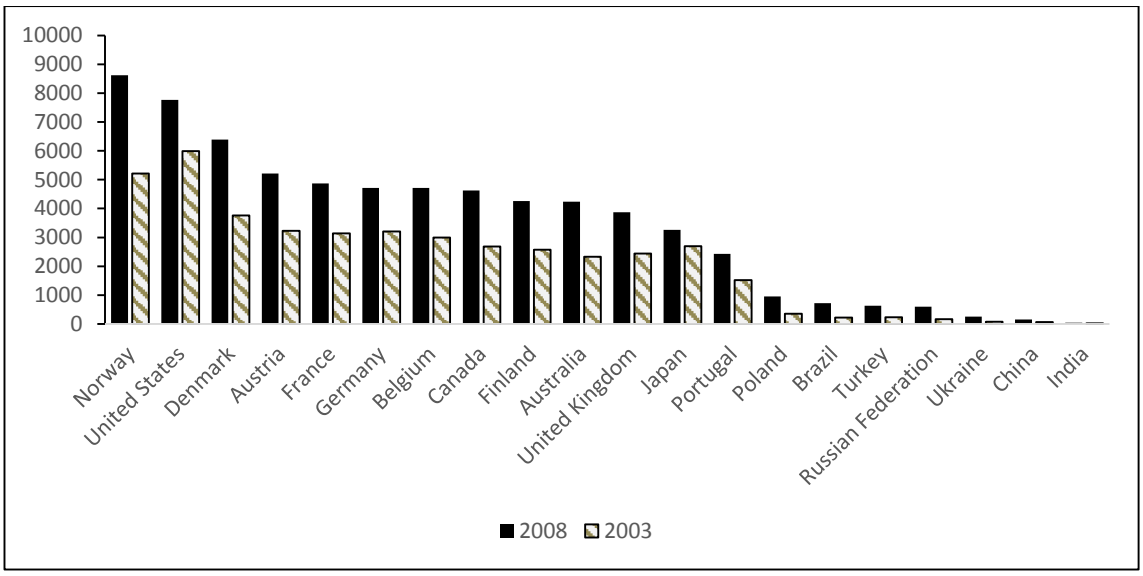
Source: The World Bank, 2015

Figure 2.14: Health expenditures per capita in Turkey by year – current US$



Source: The World Bank, 2015

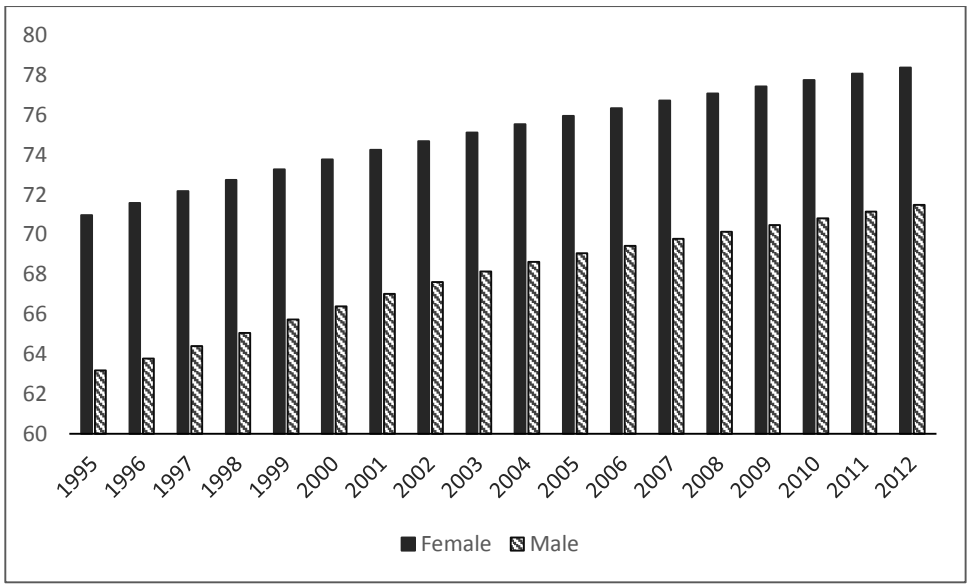
Figure 2.15: Total share of health expenditures in GDP- current US$



Source: The World Bank, 2015

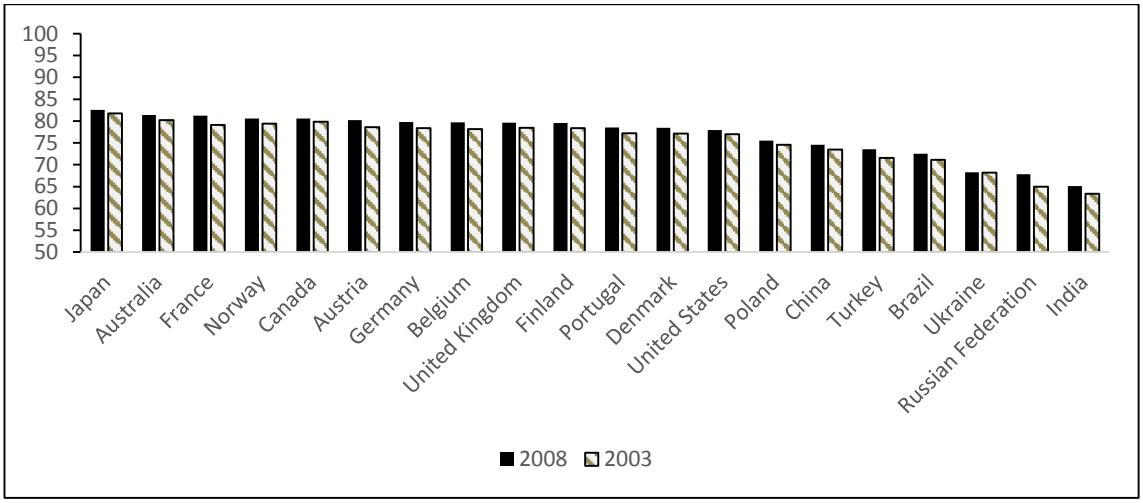
Figure 2.16: Health expenditures per capita- current US$

Turkish health has been improving for almost the last twenty years. The life expectancy at birth has been increasing steadily while child mortality has been decreasing continuously during this period. Despite these improvements, Turkey still needs to record improvements in health as it still has higher child mortality and lower life expectancy (on average) than the developed western countries. It could be closer to developed countries if only the western part was considered – given that eastern part has significantly higher child mortality and lower life expectancy than the western part. Figures 2.17 – 2.20 show the life expectancy at birth and child mortality in Turkey and other selected countries respectively.



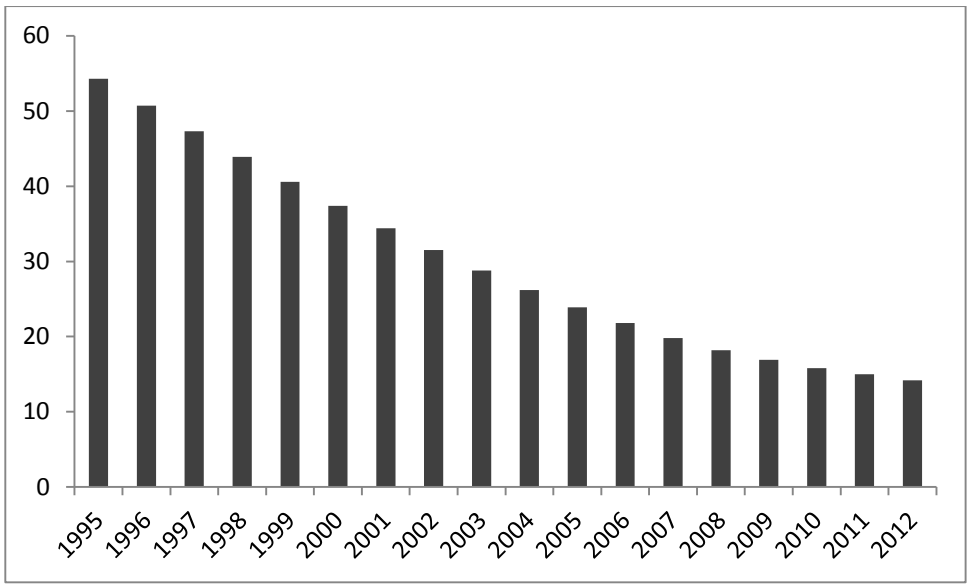
Source: The World Bank, 2015

Figure 2.17: Life expectancy at birth in Turkey



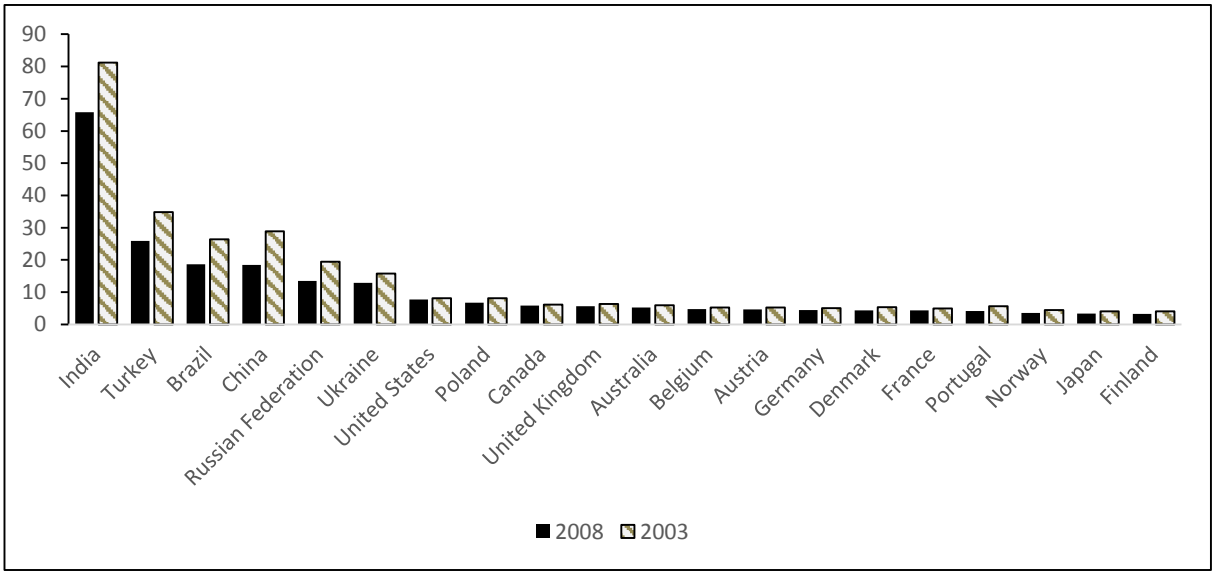
Source: The World Bank, 2015

Figure 2.18: Life expectancy at birth – total



Source: The World Bank, 2015

Figure 2.19: Under-five mortality in Turkey by year – per 1000 cases

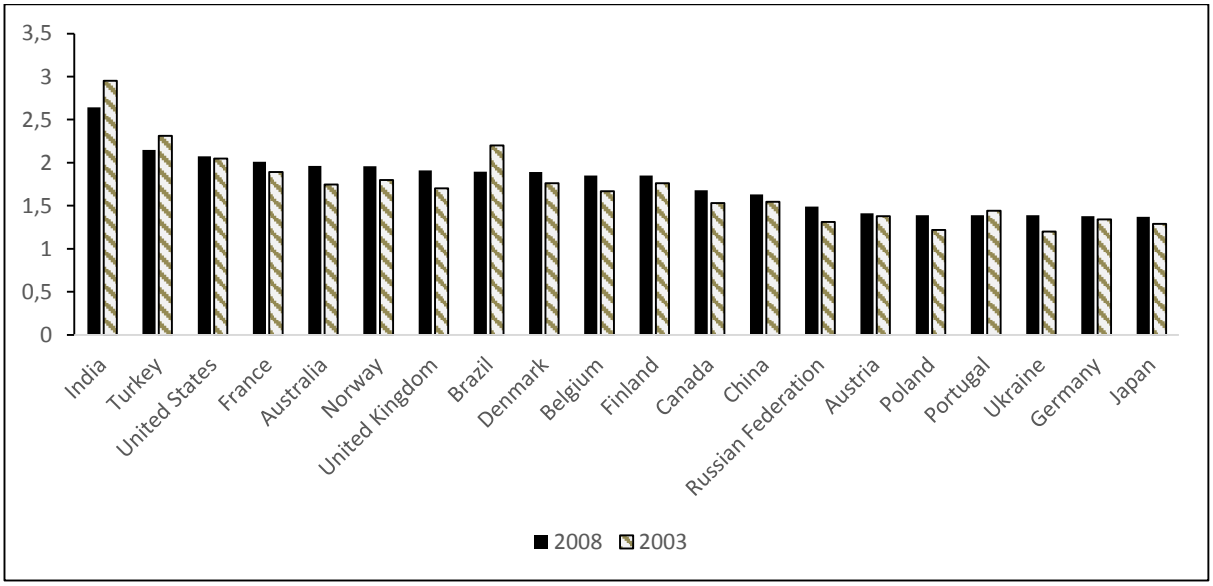


Source: The World Bank, 2015

Figure 2.20: Under-five mortality – per 1000 cases

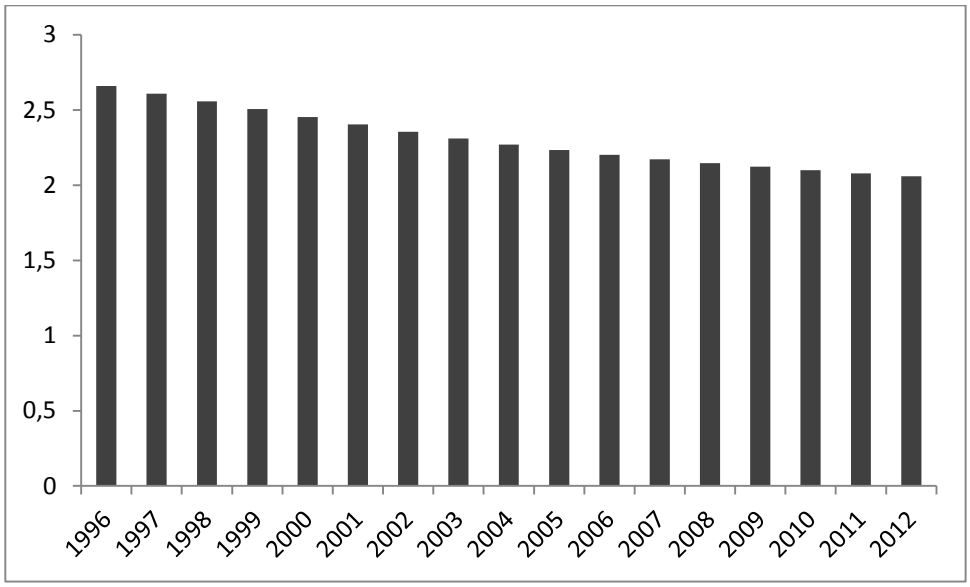
In addition, Turkey has higher fertility rates than developed countries. Although it has been decreasing steadily, on average, Turkey still has higher number of births per women than other countries in the developed world and even some of the developing countries. It could be closer to developed countries if only the western part was considered. However, significantly higher number of birth per women in eastern Turkey leads higher fertility rates on average.

On the other hand, number of abortion and prevalence of contraception have increased over the years. There seems a notable jump in the number of induced abortion after 2007. However, Turkey has comparatively lower number of induced abortion than most of the developed countries. As for contraception, it has increased gradually over time. Despite Turkey has higher prevalence of contraception than some of less populous western countries, it has slightly lower prevalence than the developed countries. Figure 2.21, 2.23 and 2.25 illustrate the number of births, the number of induced abortions and the prevalence of contraception in selected countries during the periods under analysis respectively. Figure 2.22, 2.24 and 2.26 show their changes in Turkey by year.



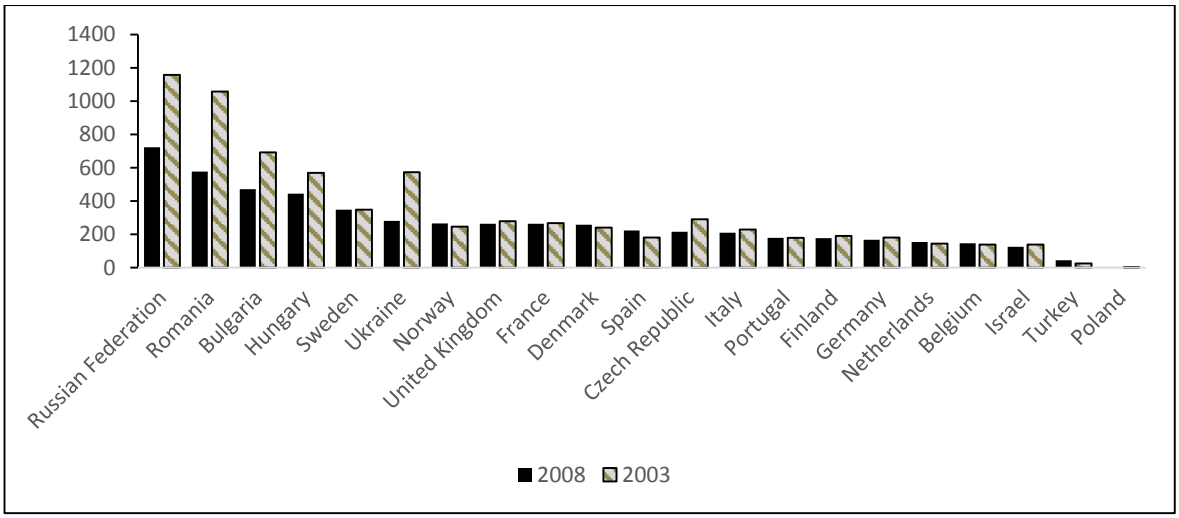
Source: The World Bank, 2015

Figure 2.21: Average number of births per women



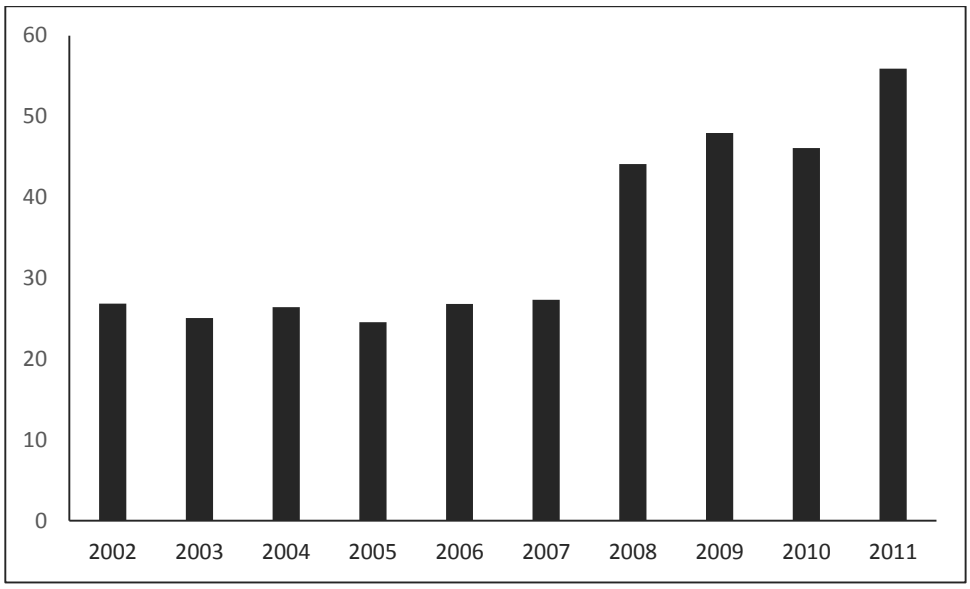
Source: The World Bank, 2015

Figure 2.22: Average number of births per women in Turkey by year



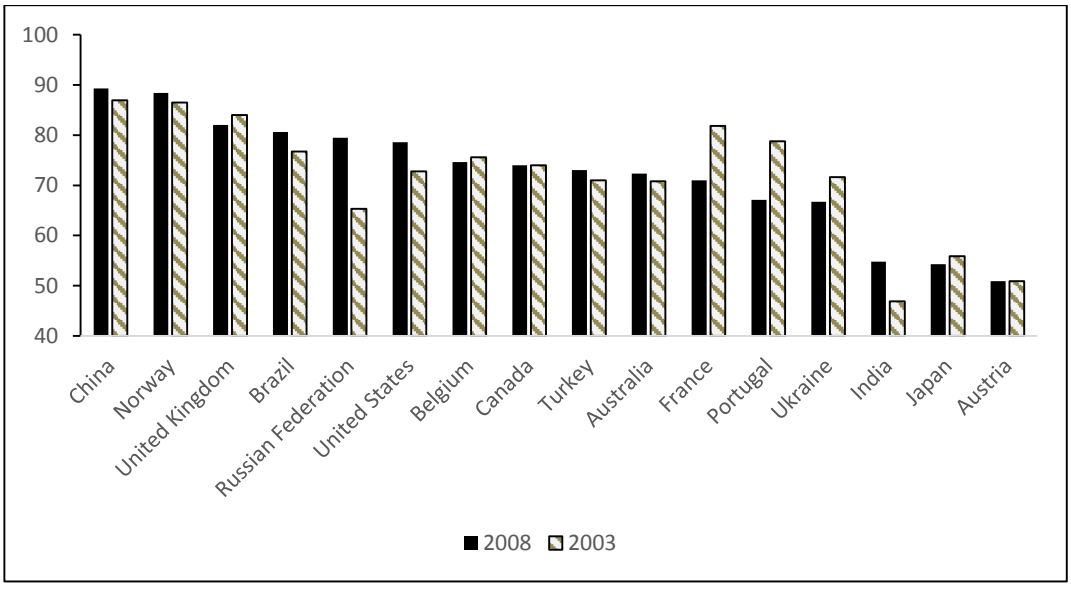
Source: World Health Organisation - Europe, 2015

Figure 2.23: Number of induced abortions per 1000 live births



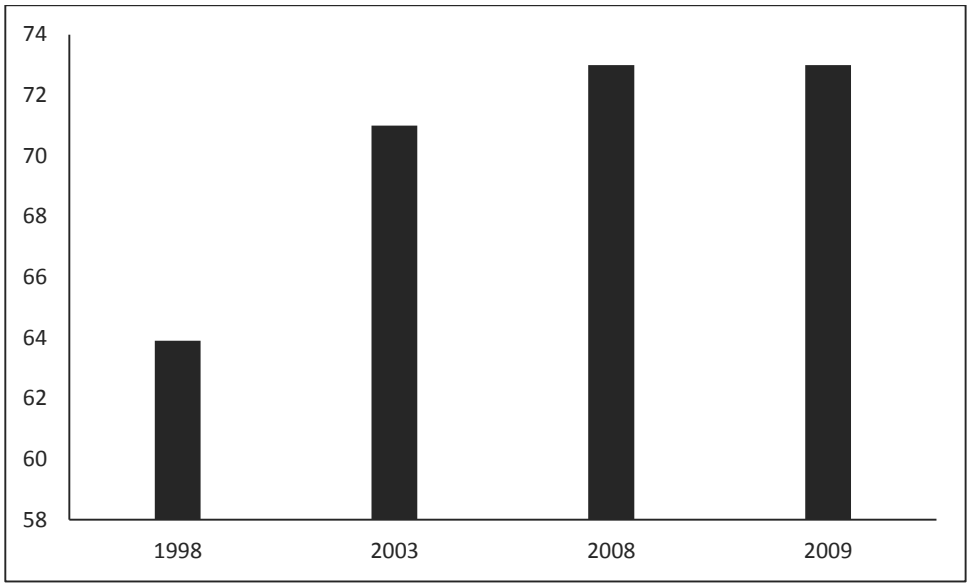
Source: World Health Organisation - Europe, 2015

Figure 2.24: Number of induced abortions per 1000 live births in Turkey by year



Source: The World Bank, 2015

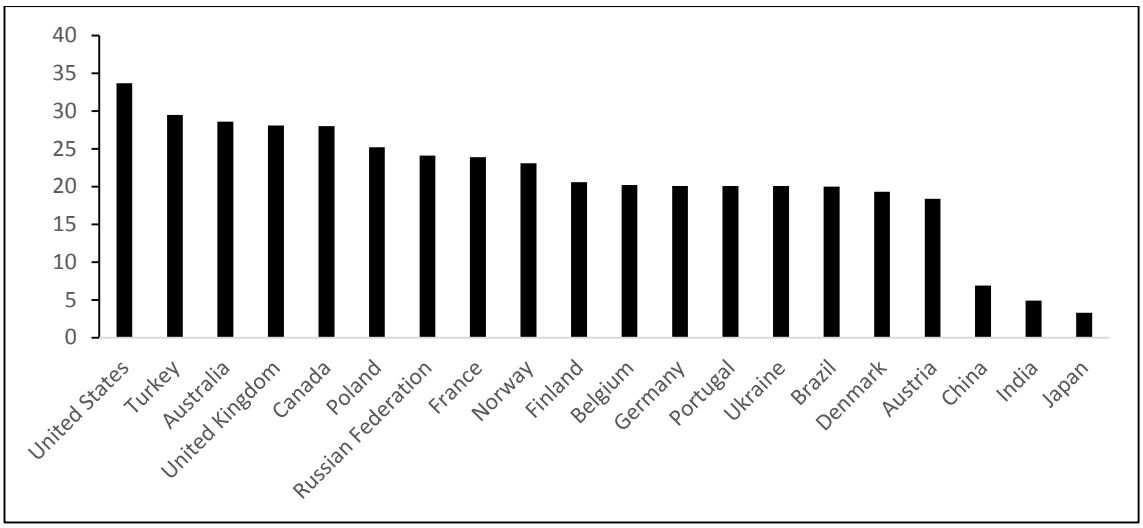
Figure 2.25: Prevalence of contraception – percentages



Source: The World Bank, 2015

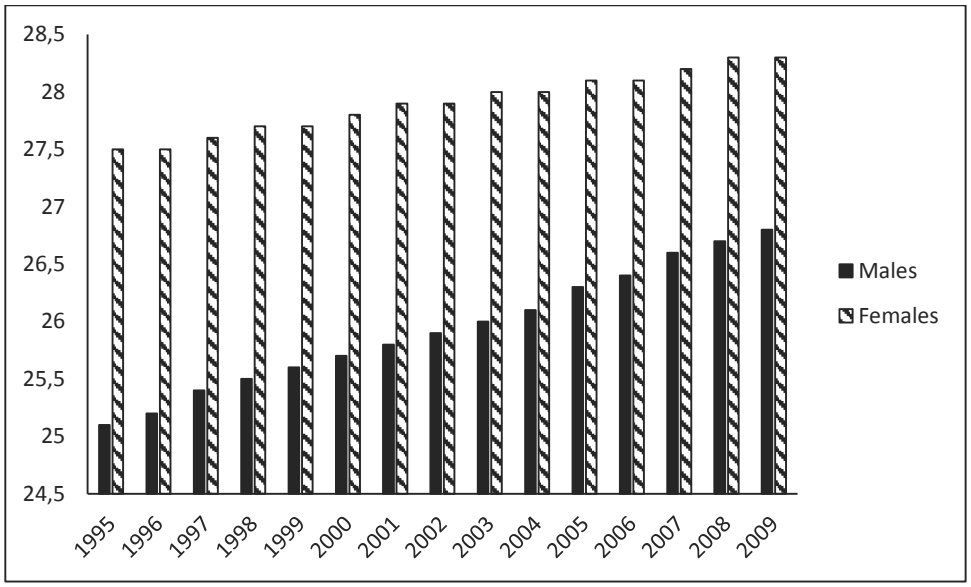
Figure 2.26: The prevalence of contraception in Turkey by year – percentages

Finally, Figure 2.27 illustrates that Turkey is closer to developed countries struggling with relatively higher obesity rates. It can be seen in Figure 2.28 that the Turkish population is getting more overweight over time. Furthermore, the trends of average BMI scores (of both genders) are similar to those observed in most of the developed countries. The trends of BMI scores across selected countries can be seen in Figure 2.29 below.



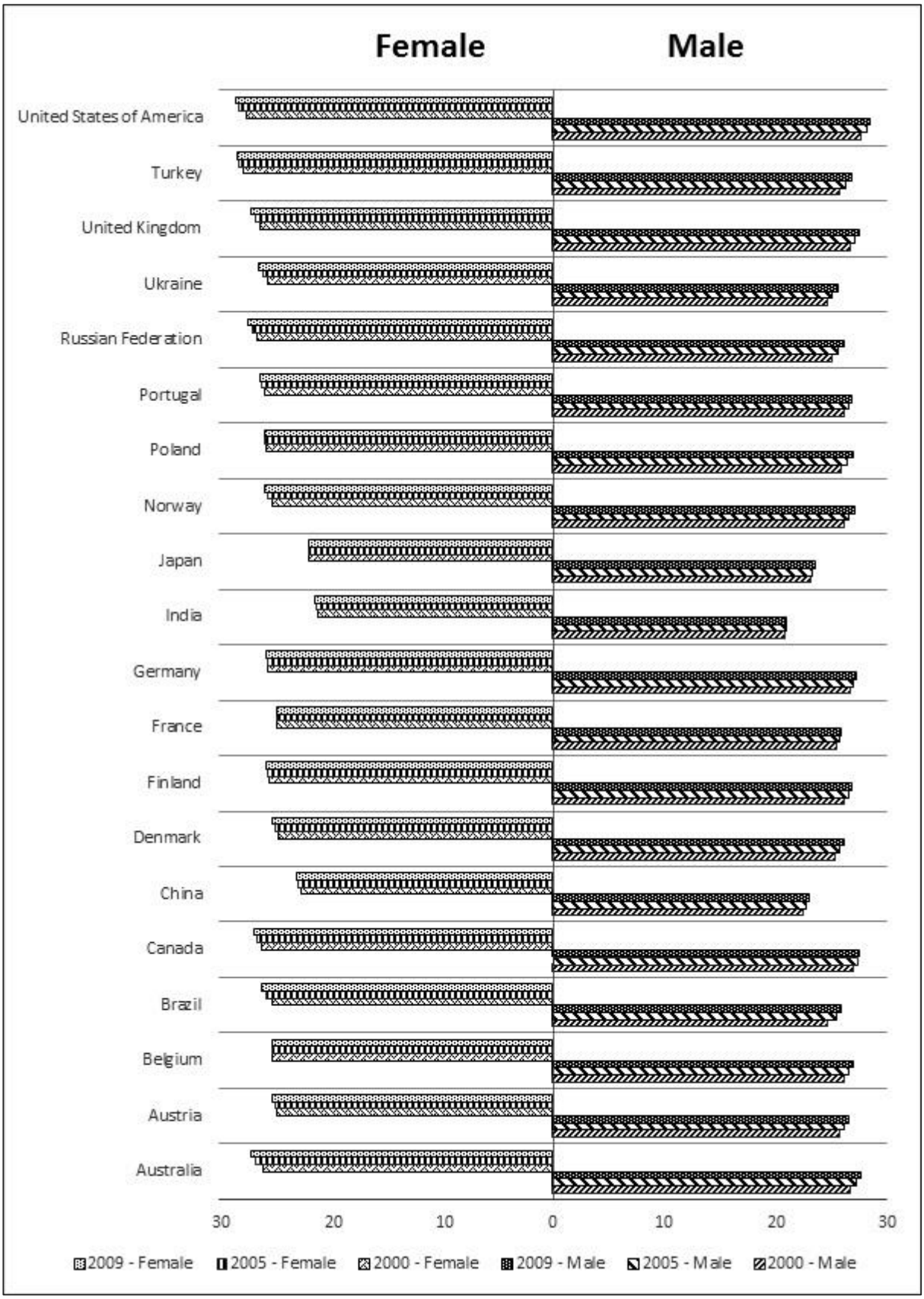
Source: World Health Organisation, 2015

Figure 2.27: Obesity (BMI>=30) (age-standardised) - percentage



Source: World Health Organisation, 2012

Figure 2.28: Average BMI scores (age-standardised) – Males &Females



Source: World Health Organisation, 2015

Figure 2.29: Trends of BMI scores (age-standardised) – Males & Females

Chapter 3

Data

In this thesis, the data taken from the latest three waves (the seventh, eighth & ninth) of the Turkish Demographic and Health Survey (hereafter TDHS) have been used to analyse health, fertility and health and fertility related policies in Turkey. TDHS is an application of Demographic and Health Surveys (DHS) in Turkey. It is a representative cross-sectional survey country-wide which has been repeated every five years since 1968.

TDHS is based on the standardised questionnaires of DHS surveys applied worldwide. The focus of DHS surveys are the women at reproductive age (15-49) (Rutstein and Rojas, 2006). The survey contains two different questionnaires, a household questionnaire and a questionnaire for women who have been married at some point in their lives. The household questionnaire is used to list all usual members in the selected households with the aim of detecting the women eligible for individual interview (Rutstein and Rojas, 2006). All detected women in a household are interviewed individually using the ever-married women questionnaire. The household questionnaire covers a wide range of information including social, economic and demographic characteristics (such as wealth, education, employment status, age, gender, marital status, region and neighbourhood) for each person listed. The individual ever-married questionnaire provides comprehensive information regarding health and fertility in addition to the aforementioned characteristics only for interviewed individuals. Therefore, it is important to note that data contains only the women at reproductive age who have been married once at their lives. In other saying, the data does not contain never-married women. This might lead representational problems if the marriage rates at reproductive age were low. However, it

seems that it is not an issue for Turkish case since the marriage rates of reproductive women are high. The rates can be seen in Table 3.1 below.

Marriage among reproductive women							
	15-19	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**
Single	90,2	54,4	22,7	10,8	4,3	1,7	0,1
Ever-married	9,8	45,5	77,3	89,2	95,7	98,2	100

Source: Turkish Demographic and Health Survey, 2008

Table 3.1: Marriage rates of reproductive women in Turkey - percentages

A weighted, multistage, stratified cluster sampling approach has been used in the selection of ever-married women samples (TDHS, 1998, 2003, 2008). At the first stage, settlements were selected based on population sizes. Settlements with a population of 10,000 or more are considered to be urban while the other settlements being defined as rural. At the second stage, a number of small area units (i.e. clusters) were sampled. At the third stage, a fixed number of households were randomly selected from each cluster (25 households from the clusters in urban areas, 15 households from the clusters in rural areas). All ever-married women at reproductive age (15-49) living in randomly selected households were asked to participate in an individual interview (TDHS, 1998, 2003, 2008).

The seventh wave of the survey was employed in 1998. It was conducted in 9,970 households (the response rate totalled 93.8%) (TDHS, 1998). It contains 8,576 individual interviews with women who have been married at some point of their lives. The eighth wave of the survey was performed in 2003. It was conducted in 10,836 households (the response rate was 92.9% in total) and it comprises 8,075 individual interviews with the ever-married women at reproductive age (TDHS, 2003). As for the ninth wave of the survey, it was carried out in 2008. It is also the latest wave currently available. It was performed in 10,525 households (the response rate was 88.4% in total). It embodies 7,405 individual interviews with ever-married women at reproductive age within selected households (TDHS, 2008).

There were two other datasets available to use in the research. First was the Turkish case of the National Burden of Disease Study which is a cross sectional survey conducted by the Ministry of Health in 2004. Consisting of two different questionnaires (a household questionnaire and a verbal autopsy questionnaire), it collects information about health and illness for both children and adults. It predominantly focuses on fatal and non-fatal effects of diseases. It also supplies information regarding some of household characteristics such as age, gender and neighbourhood; however it lacks of providing detailed information in wealth, education, ethnicity, employment and social security. Since socioeconomic determinants of health and fertility have been investigated in this research, the information regarding socioeconomic circumstances in depth is required. Therefore, the Turkish Demographic and Health Survey is superior to this as it supplies broader information regarding socioeconomic characteristics. It also provides more detailed information in health and especially fertility. This is critical since the research evaluates health and fertility related policies in Turkey. Furthermore, TDHS has higher frequency than the Turkish National Burden of Disease Study. Hence it allows one to identify variations over time. As a result, TDHS has been used in this research, rather than the Turkish National Burden of Disease Study.

A second alternative was the collection of Turkish Health Interview Surveys carried out by the Turkish Statistical Institute. It is a cross-sectional survey performed in 2008, 2010 and 2012 respectively. It provides information about infants, children and adults across a range of characteristics including health, healthcare and health related behaviours. It also provides information about socioeconomic characteristics such as age, gender, neighbourhood and social security. However, it is believed that, the TDHS is superior to this since it offers not only these, but also the detailed information regarding wealth, education, employment and ethnicity. The TDHS is also superior as it provides broader information in health and especially fertility. Furthermore, more importantly, it provides a great opportunity to evaluate health-related policies because there are waves of data collected

before and after in the introduction of the health insurance reforms. The other data are not collected at a time that would allow the analyses conducted in this thesis. Therefore, since the research examines the socioeconomic variations in health and fertility and the impacts of health and fertility related policies the TDHS has been selected for use, rather than the Turkish Health Interview Surveys.

Apart from these, another important advantage of TDHS is that it has the highest frequency as TDHS is repeated every five years since 1968. Hence it allows to analyse a broader time period. In this respect, further studies can be linked to the investigations of this research by using the later waves of the survey. As for this research, unfortunately, the latest wave (TDHS – 2013) could not be included in the analyses as it has not been published at the time of empirical analyses.

The socioeconomic characteristics of ever-married women at reproductive age have been measured by various measures during the analyses. The following parts will explain the measures used in the empirical analyses.

The age of ever-married women has been measured by their current age and their age at first marriages. In addition, a squared function of respondents' current age has been employed in the models with the aim of detecting non-linear relationships between age and outcome of interest. In the analyses, different effects of age, beyond those are linear, are expected at older ages. Therefore, using a squared function of age facilitates detecting different effects of age at older ages, rather than assuming that the effects are linear. Since only the linear relationships between age at first marriage and selected outcomes are expected, a squared function is not employed for age at first marriage. It is important to note that age variables are limited to within 15-49 years, inclusive, as the survey focuses only on the women at reproductive age.

The education of ever-married women has been measured by several measures. Initially, four different dummy variables indicating different levels of education (varying from no education to higher education) have been used. The duration of educational stages (primary, secondary and

higher education) being modified in 1997 and 2012 respectively, the measures have been determined according to the regulations prior to the 1997 modification. The reason for such an application is that most of the individuals in the datasets have been educated according to the regulations prior to the 1997 modification. It is beneficial to keep in mind that compulsory education was the first five years of education and the children at or over 80 months of age were obliged to start schooling prior to the 1997 modification. Accordingly, no education indicates having no education at all. Primary education refers to the first five years of education while secondary education covers the following six years of education. Finally, higher education indicates twelve or more years of education which implies a university degree or higher qualifications.

The last empirical work of this research exploits an educational policy that extends compulsory education from five to eight years. Therefore, lastly, dummies for having more than five years of education and having eight or more years of education are used to indicate educational attainment in the relevant work.

Parental education has been measured by the levels of mothers' and fathers' education. The levels of education have been indicated by four different dummies varying from no education to higher education. Accordingly, no education denotes having no education at all. Primary education indicates the first five years of education and secondary education refers to the following six years of education. Finally, higher education covers twelve or more years of education.

The ethnicity of ever-married women has been measured by four different dummy variables indicating being Turkish, Kurdish, Arabic and from other ethnic backgrounds respectively. There were higher numbers of ethnic groups in former waves of the TDHS (1998 and 2003), however the number of individuals from some ethnic minorities was very small. In contrast, the number of ethnic groups is lower in the ninth wave (2008) as the ethnic minorities with fewer individuals have been combined under "other ethnic backgrounds". The classification of the ninth wave (2008) has been used in order to obtain more precise estimations. Accordingly,

the ethnic variables in former datasets have been modified according to the classification of the latter one.

The neighbourhood of ever-married women has been measured by living in different regions of Turkey. Additionally, it has also been measured by whether living in either urban or rural area. There are officially seven different regions; Aegean, Black Sea, Central, Eastern and South-eastern Anatolia, Marmara and Mediterranean, and 21 sub-regions of Turkey which are constructed by considering geographic, demographic and economic characteristics. The TDHS supplies information on provincial and sub-regional basis. As for regional basis, it classifies the individuals as living in eastern, western, northern, southern and central Turkey. Such a classification has been exploited in the research and a dummy referring to each part of Turkey has been used in the analyses.

The wealth of ever-married women has been measured by a wealth score formed by the TDHS rather than by income itself as it was not sufficient in former waves. The wealth score is derived for each household considering ownership of assets (such as car, computer etc.) and housing characteristics (such as building material, source of water etc.) (TDHS, 1998, 2003, 2008). To calculate the wealth scores, the asset indicators, which are almost all household assets (e.g. car, computer, television, bicycle), housing characteristics (e.g. number of rooms, type of building material and type of toilet facilities) and utility services (e.g. gas, electricity) including country specific items, have been determined and separated into dichotomous variables with the aim of determining indicator weights (Filmer and Pritchett, 2001; Rutstein and Johnson, 2004; Rutstein, 2008). Then the factor coefficient scores (indicator weights) are calculated using principal components analysis (Filmer and Pritchett, 2001; Rutstein and Johnson, 2004). Principal components analysis is a procedure that extracts from a set of variables those few orthogonal linear combinations of the variables that are the most successful in capturing common information (Filmer and Pritchett, 2001). In particular, the first principal component of a set of variables is the linear index of all variables which captures the most information that

is common to all of the variables (Filmer and Pritchett, 2001). This procedure, firstly, standardizes the indicator variables by their means and standard deviations, then calculates factor coefficient scores (indicator weights) by expressing the indicators (previously converted to dichotomous variables) as linear combinations of a set of underlying components for each household (ibid.). Finally, the indicator values are multiplied by the factor scores and summed for each household with the aim of producing household's index value (Filmer and Pritchett, 2001; Rutstein and Johnson, 2004). In this process the first principal component is used to represent the wealth score of the households (ibid.). The higher values of wealth score indicate more affluent households and vice versa. This score has also been employed in the classification of wealth groups by the TDHS. Accordingly, there are five wealth groups in the datasets. Thus, a dummy has been used for each wealth group ranging from the poorest to the richest.

The current marital status of ever-married women has been described as being married, divorced or widowed. It is important to note that, all the women who participated in the analyses had married at least once in their lives.

Although the social security system has been modified recently, there were previously five different public social security schemes: (i) The *Social Insurance Organisation* (SIO) was premium-based and used to cover blue collar workers and private sector employees; (ii) The *Social Insurance Agency of Merchants, Artisans and the Self-employed* (BAG-KUR) was also a premium-based organisation and used to cover self-employed people and their dependants, unemployed people (those who could pay their premiums), housewives, and agricultural workers; (iii) The *Government Employees' Retirement Fund* (GERF) was sponsored by the State and used to cover retired civil servants and their dependants, retired military personnel and retired parliamentarians; (iv) The *Active Civil Servants Scheme* was premium-based and used to cover civil servants, military personnel and parliamentarians who are currently working; finally, (v) the *GreenCard* was a state-sponsored scheme and used to cover all those

who cannot afford healthcare services, the conditions being that the applicant must: (i) be a citizen of the Republic of Turkey, (ii) be uncovered by any of the other insurance schemes; (iii) earn less than one third of the minimum wage (after tax) per month. The social security status of the women has been measured in terms of possessing any of these or a private scheme or having no insurance at all. It is important to note that, the Active Civil Servants Scheme has been incorporated along with the Government Employees' Retirement Fund by the nature of the survey. It has been widely suggested that GERF was the most privileged social security group, while GreenCard was the least one (Liu et al., 2005; Bugra and Keyder, 2006; Tatar et al., 2007; Yardim et al., 2010; Erus and Aktakke, 2012). In addition, although benefits of BAG-KUR and SIO were limited (compared to those provided by GERF), they were more beneficial than GreenCard (when the coverage and quality of care are considered) (Bugra and Keyder, 2006; Erus and Aktakke, 2012).

Labour force status has been measured by whether they are currently working or not. Occupation has been measured by the sector they are currently working in.

Health has been indicated by obesity and child mortality in the analyses. There is growing concern about obesity as its prevalence in developed countries has increased dramatically over the last twenty years (Cutler et al., 2003). It is a chronic disease that occurs because of an imbalance between caloric intake and expenditure (Cutler et al., 2003). The link between excess weight and chronic diseases is well established (Manson et al. 2002; Moreira and Padrao, 2004; Robert and Reither, 2004). Accordingly, obesity is associated with not only lower levels of self-rated health (Okosun et al., 2001) but also chronic diseases like type-2 diabetes, cardiovascular diseases, hypertension, osteo-arthritis and various cancers (Manson et al. 2002; Moreira and Padrao, 2004; Robert and Reither, 2004, Greene et al., 2008). Therefore obesity has been selected as a measure of health as it is highly correlated with chronic diseases and general health status of individuals (Okosun et al., 2001; Manson et al. 2002; Moreira and Padrao, 2004; Robert and Reither,

2004). The obesity of women has been measured by Body Mass Index (BMI) and being obese. BMI scores of the individuals have been calculated by the TDHS. On the other hand, being obese refers to having a BMI score equivalent to 30 or more. Additionally, child mortality has been preferred as a measure of health since (i) it is one of the outcomes most sensitive to material deprivation (Marmot, 2005) and (ii) it is conducive to measurement and aggregation as the deaths are definitive events (Mosley and Chen, 1984). Furthermore, using child mortality as a measure is advantageous since the policies examined by the research deal with child mortality in Turkey. In the research, child mortality has been measured by the number of children who died and whether having a child died or not.

Fertility has been measured by the number of children, contraception and abortion. The number of children has been measured by the number of children born in a five years period lasts at the time of survey. It has also been measured by four different dummies indicating the number of children ranging from 0 to 3 or a greater number of children. Contraception has been measured by the experiment of a contraceptive method covering modern methods (such as female and male sterilisations, contraceptive pills including emergency, interuterine contraceptive devices, injectables, implants, female and male condoms, a diaphragm, contraceptive foam and jelly, lactational amenorrhea methods, country specific modern methods and other modern methods mentioned by the respondent like cervical cap, contraceptive sponge), traditional methods (such as periodic abstinence, withdrawal and country specific traditional methods with proven effectiveness) and folk methods (locally described and/or spiritual methods of unproven effectiveness such as herbs, amulets and gris – gris)(Rutstein and Rojas, 2006)[1]. Abortion has been measured by whether or not an induced

[1] There is no missing value for the variable indicating contraception. The women expressed that they are not using a contraceptive method have also been asked for the reason of not using. The reason could not be identified for around 1% of the total individuals (for both 2003 and 2008). The estimations have also been performed excluding these individuals and there was almost no difference in the coefficients of socioeconomic determinants (for both 2003 and 2008).

abortion has occurred and by the number of induced abortions. Descriptive statistics of the variables used in the analyses can be seen in Table 3.2 below.

Variable	2003				2008			
	Obs.	Mean	Min	Max	Obs.	Mean	Min	Max
Respondents' Age At The Time Of Survey	8075	33,69	15	49	7405	34,08	15	49
Squared Function Of Respondent's Age	8075	1206,3	225	2401	7405	1231,9	225	2401
Respondents' Age At First Marriage	8075	19,28	10	45	7405	19,89	7	48
Having No Education At All	8075	0,19	0	1	7405	0,18	0	1
Being Graduated From Primary Education	8075	0,54	0	1	7405	0,53	0	1
Being Graduated From Secondary Education	8075	0,2	0	1	7405	0,22	0	1
Being Graduated From Higher Education	8075	0,06	0	1	7405	0,07	0	1
Having More Than Five Years Of Education	2560	0,35	0	1	2560	0,35	0	1
Having Eight Or More Years Of Education	2560	0,33	0	1	2560	0,33	0	1
Respondent's Mother Has No Education At All	5382	0,7	0	1	6127	0,7	0	1
Respondent's Mother Has Primary Education	5382	0,24	0	1	6127	0,25	0	1
Respondent's Mother Has Secondary Education	5382	0,01	0	1	6127	0,02	0	1
Respondent's Mother Has Higher Education	5382	0,03	0	1	6127	0,02	0	1
Respondent's Father Has No Education At All	5382	0,34	0	1	6127	0,34	0	1
Respondent's Father Has Primary Education	5382	0,46	0	1	6127	0,47	0	1
Respondent's Father Has Secondary Education	5382	0,05	0	1	6127	0,05	0	1
Respondent's Father Has Higher Education	5382	0,13	0	1	6127	0,12	0	1

Table 3.2: Descriptive statistics

Variable	2003				2008			
	Obs.	Mean	Min	Max	Obs.	Mean	Min	Max
Being From Turkish Background	8075	0,77	0	1	7405	0,77	0	1
Being From Kurdish Background	8075	0,18	0	1	7405	0,20	0	1
Being From Arabic Background	8075	0,02	0	1	7405	0,02	0	1
Being From Other Non-Turkish Backgrounds	8075	0,01	0	1	7405	0,01	0	1
Living In Eastern Turkey	8075	0,27	0	1	7405	0,30	0	1
Living In Western Turkey	8075	0,28	0	1	7405	0,25	0	1
Living In Northern Turkey	8075	0,11	0	1	7405	0,12	0	1
Living In Southern Turkey	8075	0,13	0	1	7405	0,14	0	1
Living In Central Turkey	8075	0,18	0	1	7405	0,20	0	1
Living In Urban Turkey	8075	0,74	0	1	7405	0,73	0	1
Living In Rural Turkey	8075	0,25	0	1	7405	0,27	0	1
Being In The Poorest Wealth Category	8075	0,16	0	1	7405	0,21	0	1
Being In Poorer Wealth Category	8075	0,18	0	1	7405	0,21	0	1
Being In Middle Wealth Category	8075	0,2	0	1	7405	0,21	0	1
Being In Richer Wealth Category	8075	0,22	0	1	7405	0,20	0	1
Being In The Richest Wealth Category	8075	0,22	0	1	7405	0,17	0	1
Being Married	8075	0,95	0	1	7405	0,95	0	1
Being Divorced	8075	0,02	0	1	7405	0,03	0	1
Being Widowed	8075	0,02	0	1	7405	0,02	0	1
Having No Social Security At All	8075	0,32	0	1	7405	0,16	0	1
Being Insured By Social Insurance Organisation	8075	0,31	0	1	7405	0,43	0	1
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	8075	0,11	0	1	7405	0,12	0	1
Being Insured By the Government Employees' Retirement Fund	8075	0,13	0	1	7405	0,10	0	1
Being Insured By GreenCard	8075	0,1	0	1	7405	0,17	0	1
Being Insured By Private Organisations	8075	0,01	0	1	7405	0,01	0	1
Not Working	-	-	-	-	7405	0,70	0	1
Working In Agriculture Sector	-	-	-	-	7405	0,14	0	1
Working In Service Sector	-	-	-	-	7405	0,14	0	1
Working In Industry Sector	-	-	-	-	7405	0,01	0	1

Table 3.2 - continued: Descriptive statistics

Variable	2003				2008			
	Obs.	Mean	Min	Max	Obs.	Mean	Min	Max
Body Mass Index Of Respondent	7862	28,17	15,47	57,76	6736	28,17	15,67	57,4
Whether Respondent Is Obese Or Not	7862	0,33	0	1	6736	0,34	0	1
Number Of Children Died	8066	0,22	0	5	7400	0,17	0	5
Whether Respondent Have A Child Died	8066	0,15	0	1	7400	0,12	0	1
Number Of Children Born	8075	2,77	0	17	7405	2,65	0	15
Whether Respondent Experienced A Contraceptive Method Or Not	8075	0,88	0	1	7405	0,88	0	1
Number Of Abortion	8075	0,38	0	18	7399	0,29	0	10
Whether Respondent Experienced An Abortion Or Not	8075	0,22	0	1	7402	0,19	0	1

Table 3.2 - continued: Descriptive statistics

Chapter 4:

Socioeconomic Determinants of Health and Fertility in Turkey

4.1. Introduction

In this chapter socioeconomic determinants of health and fertility in Turkey will be identified. Specifically, estimations will be done for different aspects of health; child mortality and obesity, and fertility; number of children, abortion and contraception, using the latest two waves (2003 and 2008) of the Turkish Demographic and Health Survey. Exploring the factors affecting health and fertility is crucial to reduce the inequalities in health and fertility, and therefore, to achieve better health and fertility outcomes (Woodward and Kawachi, 2000; Marmot, 2010).

Using ordinary least square estimations, the findings suggest that women with lower socioeconomic characteristics (such as lower levels of wealth and education and poorer neighbourhood) have relatively high child mortality and number of children. In contrast, they have lower rates of abortion and contraception. In addition, augmentation effects of increasing age and mitigating effects of increasing age at first marriage have been observed on almost all health and fertility indicators. Finally, being Kurdish is associated with having a relatively high number of children and child mortality. In contrast, it is related to lower probability of induced abortion and contraception use.

The remainder of the chapter is organised as follows. Section 4.2 reviews the existing literature about health and fertility. Section 4.3 provides a brief description of the data used in this study and describes the estimation strategy employed. Section 4.4 presents the results and Section 4.5 discusses the results and concludes.

4.2. Literature Review

There is a long tradition of investigating the determinants of health. It has been strongly accepted that health is a multidimensional concept affected by various factors such as social and economic circumstances, environment and lifestyle (Black et al., 1982; Acheson, 1998). The extent to which it is differentiated due to social and economic variations has always been a concern for researchers (Van Doorslaer et al., 1997; Kakwani et al., 1997; Birch, 1999; Ecob and Davey Smith, 1999; Lynch and Kaplan, 2000; Humphries and van Doorslaer, 2000; van Doorslaer and Koolman, 2004; Marmot, 2004; Fiscella and Williams, 2004; Subramarinian and Kawachi, 2004; Lynch et al., 2004; Lauridsen et al., 2007; Jones and Wildman, 2008; Allanson and Gerdtham, 2010; Athina and Theodossiou, 2011). It is widely suggested that there is a positive and strong correlation between health and socioeconomic factors; that is higher socioeconomic circumstances (such as higher levels of education and wealth, better occupation and better neighbourhood) are associated with better health status (Van Doorslaer et al., 1997; Ecob and Davey Smith, 1999; Humphries and van Doorslaer, 2000; Marmot, 2004; Subramarinian and Kawachi, 2004).

Health has been indicated by the existence of morbidity (obesity) and mortality (child mortality) in this research. Unfortunately, self-assessed health indicators could not be employed in the analyses due to their limited availability in the data sets. Therefore, obesity (as morbidity) has been selected to indicate health status in the research. It attracts a great deal of concern since it has almost doubled in a twenty years period (Cutler et al., 2003). The obesity rates in Turkey are similar to those in most of the developed western countries (see Figures 2.27 & 2.29) and its importance keeps growing as its prevalence has been increasing notably year by year (see Figure 2.28). While examining the effects of socioeconomic factors on health, employing obesity as a health indicator is interesting since its associations with socioeconomic circumstances are different in the societies with different levels of development. Namely, it increases with increasing level of socioeconomic status in undeveloped

societies but it tends to decrease with increasing level of socioeconomic status in developed societies (McLaren, 2007). Studies reveal that higher socioeconomic circumstances such as higher income, higher education and better neighbourhood are associated with lower obesity rates in developed countries (Moore et al., 1962; Goldblatt et al., 1965; Sobal and Stunkard, 1989, Cutler et al., 2003). Cutler et al. (2003) and Robert and Reither (2004) and MacFarlane et al. (2009) investigate obesity in the United States and Australia respectively and indicate that lower socioeconomic status is associated with higher obesity rates. Wamala et al. (1997), Kleiser et al. (2009) and Roskam et al. (2010) analyse obesity in Sweden, Germany, and nineteen European countries respectively. They detect mitigating effects of increasing levels of income and education on obesity. Additionally, studies (Wamala et al., 1997; MacFarlane et al., 2009) observe augmentation effects of reproductive history (Wamala et al., 1997), being married and increasing age (MacFarlane et al., 2009) on obesity.

On the contrary, it is widely suggested that higher standards of living (e.g., higher levels of income and education, better neighbourhood) are associated with higher obesity rates in developing countries (Goldblatt et al., 1965; Sobal and Stunkard, 1989; Kain et al., 2003; McLaren, 2007; Chhabra and Chhabra, 2007; Fernald, 2007; Steyn et al., 2011). Chhabra and Chhabra (2007) and Fernald (2007) investigate obesity in India and in Mexico respectively, and indicate that people with higher socioeconomic status have higher obesity rates. Steyn et al. (2011), Dake et al. (2010) and Khan and Kraemer (2009) analyse obesity in Kenya and in Ghana and in Bangladesh respectively, and all confirm that people with higher scoioeconomic characteristics (such as higher income and higher education) have higher obesity rates than their less-well-off counterparts. Furthermore, Chhabbra and Chhabbra (2007) observe a positive age and urbanisation effect on obesity. Kain et al. (2003) and Filozof et al. (2001) identify the obesity determinants in Latin American countries and confirm the positive effects of increasing age and urbanisation on obesity. Zhang (2012) and Ma (2012) examine obesity determinants in China, and detect that older, married and urban

individuals have relatively higher obesity rates. Additionally, Dake et al. (2010) and Khan and Kraemer (2009) confirm the positive effects of age, being married and reproductive history on obesity in Ghana and in Bangladesh.

In addition, child mortality has also been employed as a health indicator as (i) it is the most sensitive outcome to the effects of material deprivation (Marmot, 2005) and (ii) it is conducive to measurement and aggregation as the deaths are definitive events (Mosley and Chen, 1984). Therefore, it is believed that measuring health by child mortality is critical when analysing socioeconomic determinants of health. Child mortality is one of the issues that the entire world campaigns to alleviate (Black et al., 2003). The World Summit for Children (1990) aimed at reducing child mortality worldwide by 2000 (UNICEF, 2001; Black et al., 2003). Further, 189 countries signed the United Nations (UN)-Millennium Development Declaration in 2000 to reduce their child mortality rates by 2015 as one of the 2000 Millennium Development Goals (UN, 2000; Black et al., 2003; Lozano et al., 2011).

Still, globally almost ten million children younger than 5 years of age die each year (Black et al., 2003; Black et al., 2010; You et al., 2010; Lozano et al., 2011; Liu et al., 2012) and 90% of deaths in children are from the undeveloped world (Murray and Lopez, 1997; Black et al., 2003; Black et al., 2010; Liu et al., 2012). The under-five child deaths are generally the results of various risk factors including environmental issues (such as unhygienic environments and unsafe water), health related issues (such as birth spacing), nutrition related issues (such as breastfeeding, being underweight and vitamin deficiencies) and healthcare related issues (such as limited accessibility) (Mosley and Chen, 1984; Black et al., 2003; Jones et al., 2003; Bryce et al., 2003; Marmot, 2005; Black et al., 2008; Bhutta et al., 2008). These imply that the risk factors of child mortality are generally associated with the development levels of societies (Mosley and Chen, 1984; Bryce et al., 2003; Marmot, 2005; Black et al., 2008). Studies (Murray and Lopez, 1997; Bryce et al., 2005; Marmot; 2005; Murray et al., 2007; Black et al., 2010; Gakidou et al., 2010; You et al.,

2010; Klaauw and Wang, 2011; Lozano et al., 2011) confirm that more developed regions have lower child mortality than less developed regions. Also, the gradient is well-evidenced in the literature that child mortality increases with worsening socioeconomic status and vice versa (Black et al., 1982; Mosley and Chen, 1984; Murray and Lopez, 1997; Marmot, 2005; You et al., 2010; Black et al., 2010). Black et al. (1982) and Mosley & Chen (1984) indicate that higher characteristics at the individual level (such as education and healthy behaviour) and the household level (such as income and/or wealth) are associated with lower child mortality. Murray & Lopez (1997) and Black et al. (2010) investigate the determinants of child deaths in eight different regions of the world and 193 countries respectively. They also confirm the gradient that child mortality decreases with improving socioeconomic circumstances (such as higher levels of income and education, and better neighbourhood). Black et al. (2008), Victora et al. (2008) and Bhutta et al. (2008) examine the determinants of undernutrition and survival in children living in low income and middle income countries. They suggest that better socioeconomic characteristics (like education, income and/or wealth) are strongly associated with lower rates of undernutrition and child mortality. In addition, Wolfe and Behrman (1982), Clealand and Ginneken (1988), Gakidou et al., (2010) and Klaauw and Wang (2011) highlight the mitigating of increasing level of education on child mortality.

Economists have also devoted a great deal of attention to fertility. Modern economic theories of fertility explain the demand for children as a function of not only benefits of children (Liebenstein, 1957; Schultz, 1973) but also direct and opportunity costs of children (Becker, 1960; Mincer, 1963; Willis, 1973; Bongaarts, 1978; Becker, 1992). Direct costs of children include the costs of childcare and childrearing while opportunity costs imply the loss of socioeconomic opportunities such as income (Becker, 1960; Mincer, 1963; Willis, 1973; Becker, 1992). Since the labour market opportunities of women are higher in modern economies, the opportunity costs of children are greater; and therefore, higher costs of children lead to the reductions in fertility in modern societies (Willis, 1973; Becker, 1992).

Bongaarts and Watkins (1996) argued that as society modernises, economic and social changes lead to declines not only in mortality but also in fertility as the costs of children increase. They also suggest that developed societies have lower fertility than less developed societies (Bongaarts and Watkins, 1996). This may be explained by the quality – quantity model of Becker and Lewis (1973) as they suggest a trade-off between the quantity and quality of children. Specifically, the higher labour market opportunities for women (i.e. higher costs of children) have positive effects on the quality of children and negative effects on the quantity of children. Since it is well-evidenced that women enjoy higher labour market opportunities in developed societies (Adsera, 2005), higher costs of children may direct people to improve the quality of children rather than increasing their quantity. Schultz (1973) confirms the fact that developing societies prefer to increase the quantity of children instead of their quality. He also proposes that lower costs of children and their contributions to family income are two underlying motivations of higher fertility in developing societies (ibid.).

As it has been shown in Chapter 2, although fertility in Turkey has been declining steadily for approximately the last twenty years, Turkey is one of the countries dealing with higher fertility rates than developed western societies (see Figure 2.21). This chapter investigates the extent to which factors determine the fertility of a society in socioeconomic transition. To do this, estimations have been performed not only for the number of children but also for induced abortion and contraception since Bongaarts (1978) identifies their variations as the primary reasons for fertility differences among populations. Other fertility measures such as lactation, stillbirth and miscarriages would also have been desirable in the research, but unfortunately the data regarding any other indicators was not sufficient in the dataset.

Abortion is completely banned (not even for saving a mother's life) in most of the countries with considerably low fertility rates (such as Andorra, Malta and San Marino) (Singh et al., 2009). On the contrary it is allowed with the aim of protecting the mother's health in many countries (such

as Spain, New Zealand, South Korea and Mexico) (ibid.). In addition to the reasons regarding the mother's health, it is also allowed in cases of fetal impairment (Great Britain), incest (Iceland) and rape (Finland and Luxembourg) (ibid.). Most countries apply gestational limits which is mostly in the first 12 weeks of gestation (ibid.). Accordingly, abortion is allowed without restriction as to reason before the limit and it is allowed upon meeting certain conditions (such as health, social and economic issues) in late-pregnancies (ibid.). As for Turkey, abortion is allowed upon obtaining parental (for adolescents) and spousal consent up to the first 10 weeks of gestation (Koc, 2000; Singh et al., 2009). It is permitted under certain conditions regarding the mother's health (such as saving her life and in cases of foetal impairment) during the following weeks of pregnancy (Koc, 2000; Singh et al., 2009).

Abortion, can be an option for people experiencing unintended pregnancy (Bankole et al., 1998; Lara et al., 2006; Font-Ribera et al., 2008; Gill-Lacruz, 2012). It occurs in almost all countries (Bongaarts et al., 2012), however collecting information about abortion is difficult since it is prohibited in some countries and/or requires asking sensitive questions even if it is allowed. Therefore, it raises moral and ethical issues (Barreto et al., 1992; Bankole et al., 1998) which may cause underreporting of abortion (Bankole et al., 1999). One common strategy to overcome such a problem is to check the confidence of the data by comparing other data sets (such as national statistics) even though they also bear risk of underreporting (Bankole et al., 1999). However, for this study, there is no external data set against which data from the TDHS can be compared.

Although empirical research on abortion is still limited due to scarcity of data on abortion (Bankole et al., 1998; Bankole et al., 1999; Gill-Lacruz., 2012), it seems that abortion is related with lower socioeconomic characteristics (e.g., lower levels of education, employment and income) in developed countries (Addor et al., 2003; Helstrom et al., 2006; Font-Ribera et al., 2008; Gill-Lacruz; 2012) and higher socioeconomic characteristics in developing countries (Henshaw, 1990; Lara et al., 2006; Agrawal, 2008). It has been suggested that the variations in abortion are

related to the variations in the level of unintended pregnancies, and the intention to choose abortion (as a family planning option) if unintended pregnancy occurs (Bankole et al., 1998; Bankole et al., 1999).

Beyond these, opportunity costs of children, moral and religious reasons, patterns of contraceptive use and accessibility of family planning services are the factors predominantly playing a role in the variations of abortion in a society (Bankole et al., 1999; Singh et al., 2009). Namely, if the opportunity costs of children are lower and/or if the opinions towards abortion are hostile and/or if the contraceptive use is more prevalent and/or if the accessibility is lower, (induced) abortion is less likely to occur among a subgroup (Bankole et al., 1998; Bankole et al., 1999; Singh et al., 2009).

Addor et al. (2003) investigate abortion among reproductive women (between 14-49 years of age) in Switzerland and indicate that lower levels of education and employment are associated with higher rates of abortion. They also observe higher abortion rates of foreign women in the Swiss region (Addor et al., 2003). In addition, Helstrom et al. (2006) examine abortion and contraceptive use among Swedish adolescents and confirm relatively higher abortion rates of foreign adolescents. Font-Ribera et al. (2008) analyse abortion among women at reproductive age (15-49) in Spain and indicate that lower socioeconomic characteristics (e.g., lower income, lower education) are associated with higher numbers of unintended pregnancies, as well as higher (induced) abortion rates (if the unintended pregnancy occurs). Gill-Lacruz et al. (2012) also investigate abortion in Spain, and detect lower abortion rates in developed regions. In addition they observe the indirect effects of education on abortion through health and fertility related behaviours. They report that better educated women are more likely to be against abortion.

Uria and Mosquera (1999) also investigate abortion among women at reproductive age (15-49) in Spain and observe contrasting results with Font-Ribera (2008) and Gill-Lacruz et al. (2012). They (Uria and Mosquera, 1999) indicate that higher levels of education and employment

are associated with higher rates of (induced) abortion. It is suggested that relatively higher opportunity costs of children and better accessibility of abortion services for those women may lead to such results (ibid.). Ananat et al. (2006) analyse accessibility of abortion among 21-31 year old women in the United States. They highlight that better socioeconomic opportunities (better employment, higher education and income) have increasing effects on abortion among young adults and therefore are associated with better maternal and child health. Lara et al. (2006) investigate abortion among Mexican women at 15-55 years of age and detect the augmentation effect of living in urban areas on abortion. Finally, Agrawal (2008) examines abortion among Indian women at reproductive age (15-49) and confirms that urban women and those with better socioeconomic circumstances (such as better education, better employment and higher income) have higher abortion rates.

In recent years, there have been declines in abortion and unintended pregnancies worldwide and such declines are related to the increases in the use of contraception (Uygur and Erkaya, 2001; Singh et al., 2009, Darroch et al., 2013). The objectives of contraception are explained as providing (i) ideal number of children and (ii) ideal spacing of pregnancies (Barman, 2013). Economists have revealed that higher socioeconomic characteristics (such as higher levels of income and education, better occupation and neighbourhood etc.) are associated with higher contraception use (Castro, 1995; Jejeebhoy, 1995; Darroch et al., 2001; Darroch et al., 2013). Mavroforou et al. (2004), Helstrom et al. (2006), Addor et al. (2003) and Darroch et al. (2001) investigate contraception in Greece, Sweden and five different developed countries (including the United States and the United Kingdom). They all confirm that higher socioeconomic status is related to higher contraceptive use. Saleem & Bobek (2005), Mc Nay et al. (2003), Sahoo (2007), Blunch (2011) and Okezie et al. (2010) investigate contraception use in Pakistan, India, Ghana and Nigeria respectively and indicate that higher levels of income and education have augmentation effects on contraception use. Finally, Koc (2000) examines contraception use in Turkey and states that increases in contraceptive use are associated with higher education. This

study is differentiated from Koc (2000) as it focuses on the socioeconomic determinants of contraception use rather than its methods.

4.3. Data & Estimation Strategy

In this paper, secondary data have been used to identify the determinants and the inequalities of Turkish health. The data were taken from the latest two waves (eighth & ninth) of the Turkish Demographic and Health Survey. This survey is a representative cross-sectional survey countrywide and it has been repeated every five years since 1968.

The Eighth wave of the survey, which was performed in 2003, was conducted in 10,836 households (response rate: 92.9%) and it contains 8,075 individual interviews with ever-married women within those households (TDHS, 2003). As for the ninth wave of the survey, which was carried out in 2008, it was performed in 10,525 households (response rate: 88.4%) and it contains 7,405 individual interviews with ever-married women within selected households (TDHS, 2008).

Age variables are related to women at reproductive age (15-49). Although the dummy variables have been created to illustrate age groups, continuous age variables fitted better in the models. Accordingly, respondents' age and a squared function of respondents' age have been employed, referring to that non-linear relationship between age and outcome of interest are detected. In addition, a variable to indicate respondents' ages at first marriage was used in models as its effect is also expected on health and fertility in the light of existing literature (Kirdar et al., 2011; Gunes, 2013a).

Four different dummy variables have been generated to indicate the education levels which vary from no education to higher education. The duration of educational stages (primary, secondary and higher education) was modified in 1997 and 2012 respectively, the duration of educational variables have been coded according to the regulations prior to the 1997 modification. Therefore, the no education variable indicates the women

with no education at all. Primary education indicates up to the first five years of education. Secondary education refers to the next six years of education after primary education. It will be the base category in the models. Finally higher education denotes twelve years or more in education.

A dummy variable was used to indicate for each ethnic background (four dummies in total) including Turkish, Kurdish, Arabic and other ethnic minorities. Being Turkish will be the base category in the models.

All the observations in the models are ever-married women samples. Hence three dummy variables (married, divorced and widowed) have been generated to indicate the current marital status of observations. Divorced individuals will be the reference in the estimations.

There are seven regions (officially) in Turkey and observations were classified within five different region groups by TDHS (2003, 2008). Accordingly, five region dummies have been generated, namely regarding northern, southern, western, eastern and central Turkey. Eastern Turkey will be the reference variable in the models.

It was the intention to use income in the analyses however there were insufficient observations in the eighth wave (2003). Alternatively a variable related to the wealth of the family has been used instead. Each observation has a wealth score which is derived considering ownership of assets (such as car, computer etc.) and housing characteristics (such as building material, source of water etc.) (TDHS, 1998, 2003, 2008). The higher values of the wealth score indicate more affluent households and vice versa. It is important to note that the wealth scores are calculated for households, and therefore each member in a family has the same score. This may raise allocation issues within a household; however scarcity of the data regarding allocation does not allow this to be tested. The observations are classified into five wealth groups according to their wealth scores. The determination of the wealth score and the classification were made by TDHS (2003, 2008). Thus five different wealth dummies relevant to wealth groups ranging from the poorest to the

richest have been used. The middle-wealth group will be the base category in the models.

At the time of the survey, five different public social security schemes were operating in Turkey. The *Social Insurance Organisation* (SIO) covers blue collar workers and private sector employees. The *Social Insurance Agency of Merchants, Artisans and the Self-employed* (BAG-KUR) covers self-employed people and their dependants, unemployed people (those who could pay their premiums), housewives, and agricultural workers. The *Government Employees' Retirement Fund* (GERF) covers retired civil servants and their dependants, retired military personnel and retired parliamentarians. The *Active Civil Servants Scheme* covers civil servants, military personnel and parliamentarians who are currently working. In the data, the Active Civil Servants Scheme has been incorporated along with the Government Employees' Retirement Fund by the nature of the survey. Finally, the *GreenCard* covers all those who cannot afford healthcare services, with the conditions being that the applicant must: (i) be a citizen of the Republic of Turkey, (ii) be uncovered by any of the other insurance schemes; (iii) earn less than one third of the minimum wage (after tax) per month.

It is important to keep in mind that GERF was the most privileged social security group, while GreenCard was the least beneficial one (Liu et al., 2005, Bugra and Keyder, 2006; Tatar et al., 2007; Yardim et al., 2010; Erus and Aktakke, 2012). Additionally, BAG-KUR and SIO were more beneficial than GreenCard (when the coverage and quality of care are considered) even though their benefits were limited (compared to those provided by GERF) (Bugra and Keyder, 2006; Erus and Aktakke, 2012). The individuals covered by the *Government Employees' Retirement Fund* are the base category, and dummy variables are generated for each of the insurance schemes. In addition, two dummy variables have been created to identify individuals with private insurance and no insurance at all.

As for outcome variables child mortality and obesity have been used to indicate health while abortion, contraception and the number of children were fertility indicators.

Child mortality has been measured by two variables: (i) a bounded variable, whether or not having had a child died and (ii) an unbounded variable, the number of children who died. The related question is “Have you ever given birth to a boy/girl who was born alive but died later” for the unbounded child mortality variable. “In all, how many boys have died?” and “In all, how many girls have died?” are the questions related to the bounded child mortality variable. Total number of children who died is obtained by summing the numbers of boys and girls who passed away.

Obesity has been measured by Body Mass Index (BMI). The calculations of BMI have already been made by TDHS and it ranges from 15.00 to 57.96. This index has also been used to group obesity categories used elsewhere in the research according to WHO guidelines. Using a continuous index to measure obesity may be more robust since it is revealed that converting BMI into categories is inappropriate for the individuals at the margin (Greene et al., 2008; Greene et al., 2014).

Abortion has also been measured by an unbounded variable, the number of induced abortions, and a bounded variable, whether or not having an induced abortion. The question related to the bounded abortion variable is “Have you ever had a pregnancy that ended in an induced abortion?” while the continuous abortion variable relates to “In all, how many induced abortion have you had?”.

Contraception has been measured by a bounded variable, the experiment of contraception. The related question is “Have you ever used a contraceptive method?”.

Finally, the number of children has been measured by the number of children born within the five year period preceding to the time of the last survey.

In this paper OLS estimations have been used to determine the relationship between several socioeconomic factors and health and fertility since OLS estimator is the best (minimum variance) linear unbiased estimator under the classical assumptions (i.e., (i) linearity in

parameters, correct specification and additive error, (ii) random sampling and nonstochastic independent variables, (iii) zero conditional mean of errors and uncorrelated error term and independent variables, (iv) no perfect collinearity and variability of regressors, and (v) homoscedasticity and normally distributed error terms). Therefore socioeconomic models have been regressed on two different indicators of health, i.e., child mortality and obesity, and three different indicators of fertility, i.e., number of children, contraception and abortion, using Eq. 4.1 below:

$$\boldsymbol{y} = \boldsymbol{a} + \sum_{\boldsymbol{k}} \boldsymbol{\beta}_{\boldsymbol{k}} \boldsymbol{x}_{\boldsymbol{k}} + \boldsymbol{\varepsilon} \qquad (4.1)$$

where y is the the variable of interest (child mortality, obesity, number of children, abortion and contraception for this study), x_k variables are the explanatory variables (k regressors), a is the constant and ε is the error term.

4.4. Results

In this chapter, the socioeconomic determinants of health and fertility have been identified. Specifically, estimations have been performed for health (child mortality & obesity) and fertility (the number of children, abortion & contraception) indicators for 2003 and 2008 respectively. The results are presented in Table 4.1 – 4.5.

CHILD MORTALITY				
	2003		2008	
	The number of children who died	Ever had a child died	The number of children who died	Ever had a child died
Respondents' Age At The Time Of Survey	0.023***	0.016***	0.016***	0.014***
Squared Function Of Respondent's Age	0.000	0.000	0.000	0.000
Having No Education At All	0.128***	0.078***	0.15***	0.101***
Being Graduated From Primary Education	-0.01	0.003	-0.018*	-0.006
Being Graduated From Higher Education	0.073***	0.036***	0.052***	0.023**
Being From Kurdish Background	0.145***	0.074***	0.062***	0.033**
Being From Arabic Background	0.046	0.035	0.084*	0.043
Being From Other Non-Turkish Backgrounds	-0.068**	-0.036	0.013	0.03
Being Married	0.046	0.034	0.026	0.023
Being Widowed	0.079	0.063*	0.033	0.026
Respondents' Age At First Marriage	-0.029***	-0.017***	-0.016***	-0.001***
Living In Southern Turkey	-0.05**	-0.025*	-0.035*	-0.018
Living In Central Turkey	-0.021	-0.009	0.03	0.021*
Living In Northern Turkey	-0.049**	-0.016	-0.03	-0.017
Living In Western Turkey	-0.042**	-0.02*	-0.011	-0.009
Living In Urban Turkey	-0.044**	-0.02**	-0.022	-0.005
Being In The Poorest Wealth Category	0.116***	0.074***	0.073***	0.045***
Being In Poorer Wealth Category	0.031	0.037***	-0.006	0.000
Being In Richer Wealth Category	-0.003	0.006	-0.039***	-0.035***
Being In The Richest Wealth Category	-0.059***	-0.034***	-0.083***	-0.064***
Having No Social Security At All	0.037*	0.02	0.029	0.011
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.008	0.005	0.025	0.007
Being Insured By Social Insurance Organisation	0.02	0.012	0.016	0.002
Being Insured By GreenCard	0.051*	0.04**	0.082***	0.042**
Being Insured By Private Organisations	0.02	0.004	0.057	0.01
_cons	0.009	-0.037	-0.099	-0.119**
R^2	0.166	0.164	0.139	0.14
Num of obs	8066	8066	7400	7400

Table 4.1: Child mortality estimations – 2003 & 2008

4.4.1. Child Mortality

The results for both 2003 and 2008 are introduced in Table 4.1. There seems to be no major difference between 2003 and 2008. Findings suggest that age, education, ethnicity, neighbourhood (for 2003), wealth and social security are associated with child mortality. Accordingly, child mortality slightly increases with the increasing age of respondents. On the other hand it slightly decreases with increasing age at first marriage. These findings were expected as the probability of having children increases (decreases) with increasing age (age at first marriage) for the women at reproductive age (15-49) (see Figure 4.1 below).

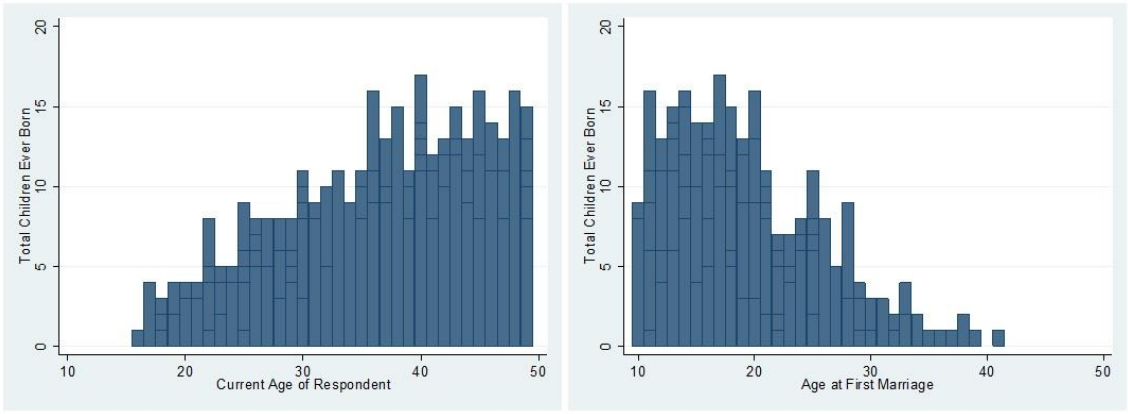


Figure 4.1: Number of children according to age and age at first marriage

As expected the women with no education have notably higher child mortality than their counterparts. However, surprisingly, the highly-educated women have higher child mortality than the women with relatively less education. This may be related to the higher ages at first births of highly educated women (See Figure 4.2).

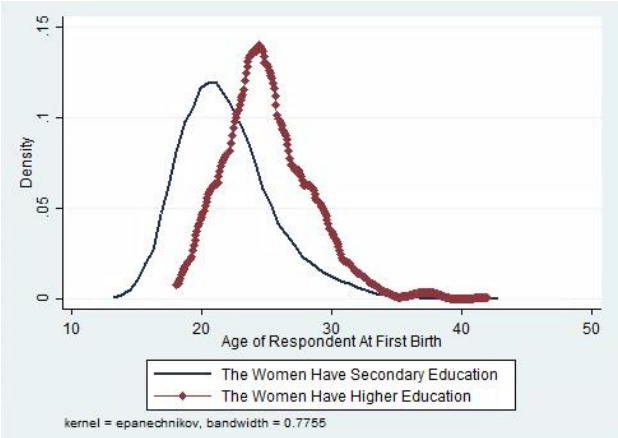


Figure 4.2: Age at first birth: Higher education and secondary education graduates

Kurdish women have higher child mortality than Turkish women, as expected. Higher number of children – on average - among Kurdish families may be the underlying reason (See Figures 4.3 & 4.4). As they have higher numbers of children - on average - than Turkish individuals, they may have a higher possibility of child mortality

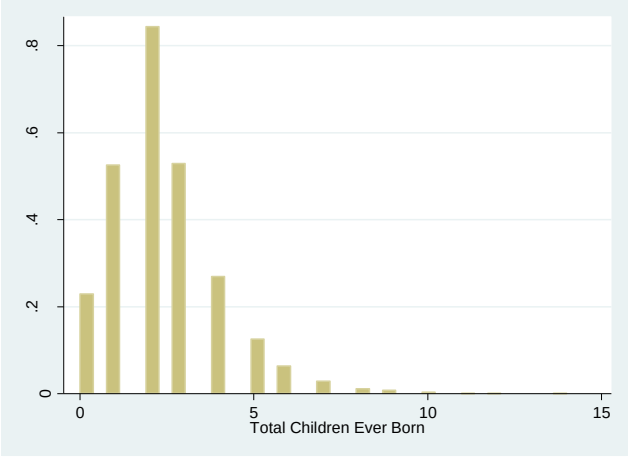


Figure 4.3: The distribution of the number of children: Turkish samples

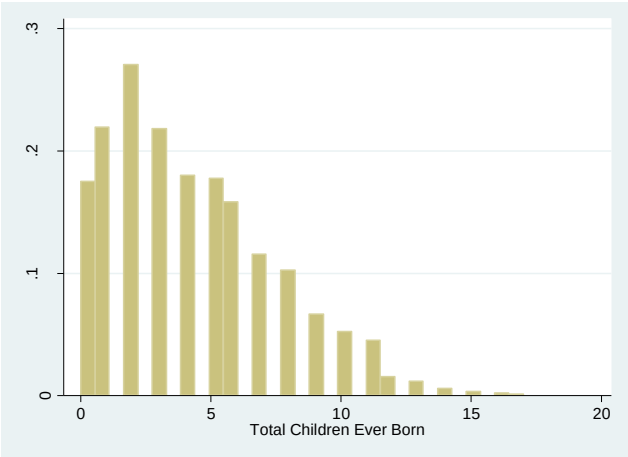


Figure 4.4: The distribution of the number of children: Kurdish Samples

As for regional disparities, their effects have only been detected for 2003. Child mortality differences may be no longer related to regional disparities over time and this may be the underlying factor of observing the effects only for 2003. Accordingly eastern women have higher child mortality than the women living in the rest of Turkey. In addition the women living in rural Turkey have higher child mortality than their counterparts living in urban areas. These findings were expected since the accessibility of healthcare is relatively low in rural Turkey especially in the eastern part (Iseri and Aslan, 2008; Turkkan and Aytekin, 2009; Aksan and Ergin, 2010). The results confirm the literature evidencing that developed regions (Murray and Lopez, 1997; Klaauw and Wang, 2011) and the people with higher socioeconomic status have lower child mortality (Marmot, 2005; You et al., 2010). Additionally, there is a clear gradient in both years; that is, child mortality decreases with increasing wealth of households, as expected. In addition, it is obvious that the least beneficial social security group (GreenCard) (Liu et al., 2005; Bugra and Keyder, 2006; Tatar et al., 2007; Yardim et al., 2010; Erus and Aktakke, 2012) has higher child mortality than the most privileged group – which is the base category.

OBESITY		
	2003	2008
	BMI	BMI
Respondents' Age At The Time Of Survey	0.525***	0.428***
Squared Function Of Respondent's Age	-0.004***	-0.002***
Having No Education At All	1.948***	1.814***
Being Graduated From Primary Education	1.769***	1.384***
Being Graduated From Higher Education	-0.792***	-0.726***
Being From Kurdish Background	-0.525***	-1.059***
Being From Arabic Background	-0.501	0.287
Being From Other Non-Turkish Backgrounds	0.202	-2.008***
Being Married	1.283***	1.712***
Being Widowed	0.898	1.389**
Respondents' Age At First Marriage	-0.146***	-0.153***
Living In Southern Turkey	0.178	-0.153
Living In Central Turkey	0.57***	0.003
Living In Northern Turkey	0.904***	-0.135
Living In Western Turkey	-0.21	-0.38**
Living In Urban Turkey	0.407***	0.397**
Being In The Poorest Wealth Category	-0.872***	-0.956***
Being In Poorer Wealth Category	-0.057	-0.474**
Being In Richer Wealth Category	0.133	-0.665***
Being In The Richest Wealth Category	-0.416**	-1.089***
Having No Social Security At All	-0.34*	-0.933***
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.182	-0.349
Being Insured By Social Insurance Organisation	0.181	-0.31
Being Insured By GreenCard	-0.819***	-0.931***
Being Insured By Private Organisations	-0.87*	-1.678***
_cons	15.483***	17.97***
R^2	0.224	0.231
Num of obs	7862	6736

Table 4.2: Obesity estimations – 2003 & 2008

4.4.2. Obesity

The results are presented in Table 4.2. Findings suggest that age, education, ethnicity, marital status, neighbourhood, wealth and social security are associated with obesity. Accordingly, obesity increases with increasing age even though its impact reduces slightly at older ages. In contrast, it decreases with increasing age at first marriage. The positive association between age and obesity was expected in the light of literature suggesting ageing effects on obesity (Khan and Kraemer, 2009; Dake et al., 2010). Furthermore, mitigating effects of increasing age at first marriage were expected in the light of literature suggesting lower obesity rates of single people (compared to married ones) (Hardy and Conway, 1978; Biddle, 1979, 1986; Verbrugge, 1979; Stuart and Jacobson, 1987; Sobal et al., 1992).

Accordingly unmarried people have lower obesity rates as they may have not only poorer dietary habits (Verbrugge, 1979) but also more physical activity (with the aim of attracting a mate) (Stuart and Jacobson, 1987). However, their obesity rates tend to increase once they get married which may be because of reduced importance of weight control (Stuart and Jacobson, 1987; Verbrugge, 1979). Hence, a postponement of marriage may lead to reductions in obesity. There is a clear gradient that obesity decreases with increasing education. The higher educated have relatively low BMI scores while lesser educated women have relatively high BMI scores. These results confirm the literature from developed countries suggesting that obesity tends to decrease with increasing level of education (Wamala et al., 1997; Kleiser et al., 2009; Roskam et al., 2010).

Surprisingly, being Kurdish is associated with reductions in BMI scores. This was unexpected as the literature suggests increasing impacts of higher reproductive history on obesity (Wamala et al., 1997). Since Kurdish women have higher fertility rates than Turkish women, higher obesity was expected among Kurdish women. Furthermore, the women from other ethnic backgrounds have notably lower scores than Turkish women in 2008. Additionally, married and widowed women (only in 2008) have higher obesity than their divorced counterparts.

Regional disparities have a variety of impacts on obesity in 2003 even though some of them are not statistically significant. In contrast they are almost ineffective in 2008. Accordingly northern and central women have higher obesity than their eastern counterparts in 2003. On the contrary, western women have lower obesity than eastern women in 2008.

In addition, urban women have higher obesity than their rural counterparts. The effects of wealth on obesity are somewhat complicated. Accordingly, better-off women have lower obesity than the middle wealth group, - which is the base category. This confirms the literature from the developed world (Robert and Reither, 2004; Kleiser et al., 2009; MacFarlane et al., 2009; Roskam et al., 2010). On the contrary, less well-off women also have lower obesity than the reference group. This confirms the literature from the developing world (Fernald, 2007; Chhabra and Chhabra, 2007; Steyn et al., 2011; Zhang, 2012; Ma; 2012). As for social security, the women holding the least beneficial scheme (GreenCard) and no social insurance have lower obesity than their counterpars in the most beneficial category (GERF) – which is the reference in the model. This confirms the literature from the developing world again.

ABORTION				
	2003		2008	
	The number of induced abortions	Ever had an induced abortion	The number of induced abortions	Ever had an induced abortion
Respondents' Age At The Time Of Survey	0.02**	0.026***	0.003	0.011***
Squared Function Of Respondent's Age	0.000	-0.000**	0.000**	0.000
Having No Education At All	-0.107***	-0.065***	-0.01	-0.016
Being Graduated From Primary Education	0.009	-0.005	0.021	0.0169
Being Graduated From Higher Education	0.099**	0.03	0.019	0.024
Being From Kurdish Background	-0.062**	-0.037**	-0.02	-0.007
Being From Arabic Background	-0.099*	-0.075***	-0.079*	-0.06**
Being From Other Non-Turkish Backgrounds	-0.174**	-0.089**	0.091	0.036
Being Married	-0.23***	-0.083***	-0.099*	-0.055*
Being Widowed	-0.156	-0.109**	-0.23***	-0.117**
Respondents' Age At First Marriage	-0.037***	-0.017***	-0.019***	-0.012***
Living In Southern Turkey	0.03	0.032**	0.002	0.008
Living In Central Turkey	0.138***	0.048***	0.041	0.017
Living In Northern Turkey	0.006	0.004	0.046	0.037**
Living In Western Turkey	0.069**	0.038***	0.071***	0.045***
Living In Urban Turkey	0.085***	0.038***	0.026	0.011
Being In The Poorest Wealth Category	-0.12***	-0.056***	-0.055**	-0.041**
Being In Poorer Wealth Category	-0.038	-0.007	-0.031	-0.021
Being In Richer Wealth Category	-0.002	0.004	0.028	0.014
Being In The Richest Wealth Category	0.069*	0.048***	0.093***	0.054***
Having No Social Security At All	-0.073*	-0.038**	0.113***	0.06***
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	-0.066	-0.025	-0.001	0.001
Being Insured By Social Insurance Organisation	-0.063*	-0.031*	0.027	0.024
Being Insured By GreenCard	-0.05	-0.032*	0.06	0.044**
Being Insured By Private Organisations	0.035	-0.018	0.198**	0.114**
_cons	0.43**	-0.041	0.181	-0.008***
R^2	0.125	0.141	0.097	0.105
Num of obs	8073	8073	7399	7402

Table 4.3: Abortion estimations – 2003 & 2008

4.4.3. Abortion

The results can be seen in Table 4.3. It is important to keep in mind that although the abortion is allowed in Turkey (under certain conditions), the data about abortion still bears the risk of underreporting as it requires asking sensitive questions (Barreto et al., 1992; Bankole et al., 1998; Bankole et al., 1999). However it is observed that age, education (only for 2003), ethnicity (only for 2003), marital status, neighbourhood, wealth and social security have associations with abortion. Accordingly, increases in abortion are associated with the increases in respondents' age (at the time of survey) and the decreases in their age at first marriage. In other words, late-married women are less likely to have an abortion. This may be related to preferences. Late married women may be more likely to plan for children, while early married women may be satisfied with their number of children. This confirms the arguments suggested by Sahoo (2007) and Sousa et al. (2010) implying that achieving the ideal number of children may play a role in decisions about having abortion.

For education, the effects have only been observed for 2003. Accordingly, increases in abortion have associations with the increases in educational level, i.e., highly educated women have higher abortion than less educated ones. The findings show similarities with the literature indicating that better educated women have higher abortion (Uria and Mosquera, 1999). This may be related with higher knowledge about family planning of better educated individuals. If the knowledge of family planning has increased over time (even for non-educated women), abortion may be no more associated with education. This may be potential explanation behind detecting no significant association between education and abortion in 2008.

As for ethnicity, Turkish women have higher abortion compared to the women from all other ethnic backgrounds. This was expected especially for Kurdish women since their fertility rates are higher (Koc, 2000; Adato et al., 2011) (also see Figures 4.3 & 4.4). Additionally, divorced women have higher abortion than their married or widowed counterparts. This may be related to fertility preferences. If the divorced individuals do not

want to have children, they may be more likely to have an abortion. This confirms the findings (Uria and Mosquera, 1999) suggesting higher abortion rates among divorced/separated individuals than married women.

Slightly different impacts have been observed for regional disparities, however, what seems obvious is that western women have higher abortion rates than eastern women. Furthermore, rural women have fewer abortions than urban ones in 2003. These results confirm the literature (Lara et al., 2006) indicating higher abortion among the women from developed regions, which may be because of the better accessibility of abortion services. If the accessibility of abortion services has been improved over time, the differences in abortion may be no longer related to urban-rural disparities. This may be the potential scenario behind observing the effects only for 2003. As for wealth, there is a clear gradient such that decreases in abortion are associated with worsening level of wealth. The results show similarities with the literature suggesting higher abortion among the people with higher socioeconomic status (Bankole et al., 1999; Ananat et al., 2006; Agrawal, 2008).

The women holding SIO, GreenCard (the least privileged social security scheme) and no social security have fewer abortions than the most beneficial group (GERF) in 2003. These findings may be related to the accessibility of family planning services. Since there were limited accessibility of healthcare services especially for deprived parts of the population (Adato, Roopnaraine, et al., 2011), lower abortion may be observed among rural women, poorer women and the women from disadvantaged social security schemes. Contrastingly, the two least advantaged groups have higher abortion than the most advantaged one in 2008. This may be associated with their access to family planning services if it is enhanced somehow (may be via the implemented healthcare reforms at post-2003 period) over the years.

CONTRACEPTION		
	2003	**2008**
	Ever used a contraceptive method	**Ever used a contraceptive method**
Respondents' Age At The Time Of Survey	0.05***	0.056***
Squared Function Of Respondent's Age	-0.001***	-0.001***
Having No Education At All	-0.098***	-0.098***
Being Graduated From Primary Education	-0.031***	-0.021**
Being Graduated From Higher Education	0.041***	0.018
Being From Kurdish Background	-0.1***	-0.04***
Being From Arabic Background	-0.028	-0.161***
Being From Other Non-Turkish Backgrounds	-0.005	-0.03
Being Married	0.1***	0.114***
Being Widowed	-0.023	-0.133***
Respondents' Age At First Marriage	-0.012***	-0.012***
Living In Southern Turkey	0.053***	0.023*
Living In Central Turkey	0.037***	0.041***
Living In Northern Turkey	0.04***	0.05***
Living In Western Turkey	0.046***	0.046***
Living In Urban Turkey	0.038***	0.028***
Being In The Poorest Wealth Category	-0.074***	-0.042***
Being In Poorer Wealth Category	-0.01	0.004
Being In Richer Wealth Category	0.019**	-0.005
Being In The Richest Wealth Category	0.007	0.01
Having No Social Security At All	-0.013	-0.039***
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.012	-0.014
Being Insured By Social Insurance Organisation	0.006	-0.004
Being Insured By GreenCard	0.027*	-0.025
Being Insured By Private Organisations	-0.038	-0.011
_cons	0.166**	0.047
R^2	0.13	0.126
Num of obs	8075	7405

Table 4.4: Contraception estimations – 2003 & 2008

4.4.4. Contraception

The results are summarised in Table 4.4. The findings for 2003 and 2008 show similarities, even though there are minor differences for wealth and social security. Accordingly, age, education, ethnicity, marital status, neighbourhood and wealth (for only 2003) are associated with contraception. The contraceptive use increases with increasing age of respondent while it slightly decreases with increasing age at first marriage. These may be related to reproductive preferences. The women may tend to be more likely to use a contraceptive method with increasing age if they are satisfied with their number of children. On the other hand, late-married women may avoid using a method if they desire to have a child.

The results show that experimenting with contraception increases with increasing level of education as the highly educated women are more likely to use contraceptive methods. This confirms the literature suggesting that better educated women have higher contraception use (Koc, 2000; Mc Nay et al., 2003). Kurdish and Arabic (for only 2008) women are less likely to use a contraceptive method than Turkish women. In addition married women are more likely to use a contraceptive method than their divorced counterparts. This may be related to moral reasons. Since the divorced women may be less likely to have sexual intercourse, they are less likely to use a contraceptive method.

Further, it is observed that widowed women are less likely to use a contraceptive method than divorced women in 2008. In addition, eastern women, whose number of children is the highest on average (see Figure 4.5 below), are less likely to use a method than their counterparts living in the rest of Turkey. Also, the tendency to use a method is lower among rural woman than urban ones. These results may be related to the knowledge about family planning as those people have limited knowledge about contraception (Adato et al., 2011). On the other hand the experiment of contraception slightly increases with increasing level of wealth in 2003. This has similarities with the literature indicating increasing usage of contraception with increasing income (Addor et al.,

2003; Mavroforou et al., 2004; Saleem and Bobek, 2005; Helstrom et al., 2006; Sahoo, 2007; Blunch 2011, Okezei et al., 2010). Unfortunately, the gradient is not clear in 2008; however it seems that the poorest women are less familiar with contraception than the base category – which is the middle wealth group.

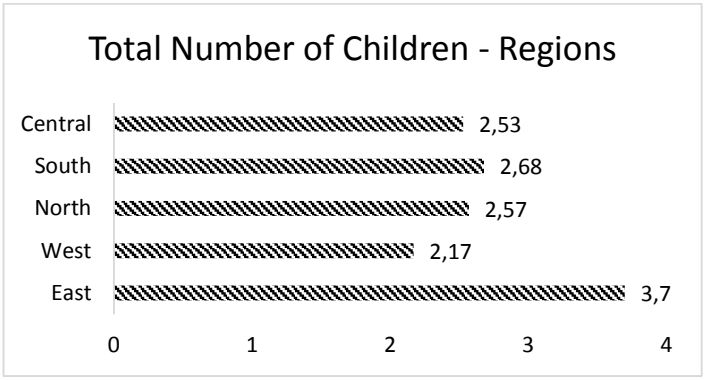


Figure 4.5: Average number of children ever born by region

NUMBER OF CHILDREN		
	2003	**2008**
	Number of children born	**Number of children born**
Respondents' Age At The Time Of Survey	0.0163**	0.011
Squared Function Of Respondent's Age	-0.001***	-0.001***
Having No Education At All	0.137***	0.091***
Being Graduated From Primary Education	0.029	0.057***
Being Graduated From Higher Education	-0.061**	0.006
Being From Kurdish Background	0.214***	0.153***
Being From Arabic Background	0.246***	0.295***
Being From Other Non-Turkish Backgrounds	-0.022	-0.005
Being Married	0.27***	0.279***
Being Widowed	0.058	0.146***
Respondents' Age At First Marriage	0.013***	0.013***
Living In Southern Turkey	-0.152***	-0.119***
Living In Central Turkey	-0.152***	-0.084***
Living In Northern Turkey	-0.128***	-0.101***
Living In Western Turkey	-0.171***	-0.141***
Living In Urban Turkey	-0.026	0.011
Being In The Poorest Wealth Category	0.252***	0.177***
Being In Poorer Wealth Category	0.05**	0.057***
Being In Richer Wealth Category	0.014	-0.025
Being In The Richest Wealth Category	0.006	-0.012
Having No Social Security At All	0.035	-0.017
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.039	0.028
Being Insured By Social Insurance Organisation	0.012	-0.007
Being Insured By GreenCard	0.128***	0.098***
Being Insured By Private Organisations	-0.045	-0.016
_cons	0.441***	0.446***
R^2	0.314	0.295
Num of obs	8075	7405

Table 4.5: Number of children estimations – 2003 & 2008

4.4.5. Number of children

The results are illustrated in Table 4.5. It is important to note that the outcome indicates the number of children born in the five years period prior to the survey. The results for 2003 and 2008 are mostly similar, although there are minor differences regarding wealth, education and social security. Findings suggest that age, education, ethnicity, marital status, neighbourhood and wealth are associated with the number of children.

The number of children slightly increases with increasing age. Surprisingly, it also tends to increase slightly with increasing age at first marriage. This may be the case if early-married women are satisfied with their number of children (Sahoo, 2007; Sousa et al., 2010) and using birth control while late married women desire to have children. As for education, the number of children reduces with increasing level of education; however the impacts of higher education could not be observed for 2008. Turkish women have fewer children than their Kurdish and Arabic counterparts. Additionally, married and widowed (for only 2008) women have higher numbers of children than their divorced counterparts, as expected.

Regional disparities have various effects on fertility. It is clear that eastern women (base category) have higher number of children than the women living in the rest of Turkey. This was expected since the number of children –on average- is higher in eastern Turkey compared to the rest of Turkey (see Figure 4.5 above). As for wealth, the results show that worse-off women have a relatively high number of children. Finally, the least beneficial social security group (GreenCard) has higher number of children than the most advantageous one - which is the base category. These findings are consistent with the literature indicating the higher fertility of the people with lower socioeconomic status (Schultz, 1973; Bongaarts and Watkins, 1996; Adsera 2005).

4.5. Discussion

In this chapter, the socioeconomic determinants of health and fertility in Turkey have been identified. Identification of the factors affecting health and fertility is crucial to reduce the inequalities in health and fertility, and therefore, to achieve better health and fertility outcomes (Woodward and Kawachi, 2000; Marmot, 2010). The latest two waves of TDHS, 2003 and 2008, have been employed in the analyses. Therefore, the determinants of health and fertility in 2003 and 2008 have been revealed separately. Two different aspects of health, child mortality and obesity, have been considered as health indicators. Also, abortion, contraception and the number of children have been used as fertility indicators.

Accordingly, augmentation effects of increasing age and mitigating effects of age at first marriage have been observed for child mortality. Furthermore being Kurdish also has increasing effects of child mortality. These results may be related to the number of children. Since Kurdish women and older women on average have a higher number of children, they have a higher possibility of experiencing child mortality. The women living in the developing parts of Turkey (like eastern Turkey and rural Turkey) have relatively higher child mortality. In addition, the women holding a disadvantageous social security scheme have higher child mortality.

Further, child mortality increases with the worsening wealth of household. These may all be related to health related development issues like the accessibility of healthcare services. Since eastern and rural Turkey are deprived parts of Turkey they probably have poorer access to healthcare. The women holding a disadvantageous social security scheme and relatively deprived individuals have higher child mortality which may also be because they have poorer access to healthcare as well. These findings all confirm the literature (Black et al., 1982; Mosley and Chen, 1984; Murray and Lopez, 1997; Marmot, 2005; Black et al., 2010; You et al., 2010) suggesting that people with lower socioeconomic status have relatively lower health status.

As for obesity, augmentation effects of increasing age have been observed on BMI scores. This was expected in the light of literature suggesting ageing effects of obesity (Wamala et al., 1997). Furthermore mitigating effects of increasing age at first marriage and augmentation effects of being married have been detected. These may be related with the marital causation model which suggests higher obesity rates of married individuals. Accordingly, unmarried individuals may have lower obesity rates as they may have not only poorer dietary habits (Verbrugge, 1979) but also more physical activity (with the aim of attracting a mate) (Stuart and Jacobson, 1987). However, their obesity rates tend to increase once they get married which may be because of (i) reduced physical activity due to their marital roles (Stuart and Jacobson, 1987) and, (ii) reduced importance of weight control (Stuart and Jacobson, 1987). Hence, a postponement of marriage may be associated with the reductions in obesity.

Surprisingly, Kurdish women and the women holding the most disadvantageous social security scheme have relatively lower scores. In the light of the literature about reproductive history, relatively higher scores were expected for Kurdish women due to their – on average - higher number of children. However, if they experience difficulties in accessing proper food, this may be the case, as in developing countries (Fernald, 2007; Kahn and Kraemer, 2009; Dake et al., 2010; Steyn et al., 2011). Relatively poor women have lower BMI scores compared to the middle wealth group. This also confirms the literature from developing countries (ibid.). By contrast, wealthier women have lower scores than the middle group. In addition, BMI scores tend to decrease with increasing levels of education. These findings confirm the results from developed countries (Wamala et al., 1997; Robert and Reither, 2004; Kleiser et al., 2009; Roskam et al., 2010). Therefore the results show the similarities with both the developed and developing world.

For abortion, the findings suggest that increasing age is associated with increases in both number and probability of abortion. On the contrary, increasing age at first marriage is related to decreases in both number

and probability of abortion. These may be related to fertility preferences. Namely, older women may have more chance to have children, and therefore, they may be more likely to be satisfied with their number of children (Sahoo, 2007; Sousa et al., 2010). If this is the case, they may be more likely to abort. In addition, late married women may be more likely to plan for children, while early married women may be satisfied with their number of children. Hence a women may be less likely to abort if married (for the first time) at older reproductive ages (15-49). The findings confirm the arguments suggested by Sahoo (2007) and Sousa et al. (2010) implying that achieving the ideal number of children may play a role in decisions about family planning.

In addition, being divorced has increasing impacts on abortion and it is believed that this may be related to the fertility preferences of divorced women. They may be less eager to have children after separation (Uria and Mosquera, 1999). Deprived women such as eastern women, rural women and Kurdish women (who live predominantly in eastern women) have relatively lower number and probability of abortion (than their counterparts). These may be related to their lower accessibility and knowledge of family planning (Adato et al., 2011).

By contrast, the number and the probability of abortion increases with increasing education and wealth. These may also be related to knowledge and accessibility of family planning. They may have better knowledge about family planning and better access to family planning services, and therefore, higher number of abortion. The women holding SIO, GreenCard (the least privileged social security scheme) and no social security have fewer abortions than the most beneficial group (GERF) in 2003 and they have relatively more abortions in 2008. These findings may also be related to the knowledge of and access to family planning services if they have been enhanced somehow (maybe via the implemented healthcare reforms of the post-2003 period) over the years.

For contraception use, age has augmentation effects while age at first marriage is associated with reductions in contraceptive use. These may be linked to reproductive preferences. Namely, the women may tend to

use a contraceptive method with increasing age if they are satisfied with their number of children. On the other hand, late-married women may avoid using a method if they desire to have a child. This confirms the argument suggested by Sahoo (2007) implying that achieving the ideal number of children may play a role in decisions about family planning. In addition, divorced women are less likely to use a contraceptive method than married women. This may be related to moral reasons. Since divorced women may be less likely to have sexual intercourse, they may be less likely to use a contraceptive method. Kurdish and eastern women have a lower likelihood of using a contraceptive method than their counterparts. This may be related to knowledge about family planning as these people have limited knowledge about family planning (Adato et al., 2011). Additionally, contraceptive use increases with increasing level of education and wealth. These may be related to increased knowledge and accessibility of family planning with the increased levels of wealth and education.

As for the number of children, the findings suggest increasing age effects on the number of children. Surprisingly, augmentation effects of age at first marriage have also been observed. This may be the case if late-married women are more likely to have children, while early-married women are satisfied with their number of children. As expected, married women have higher numbers of children. Kurdish women, eastern women and the women holding the least advantageous social security scheme have higher numbers of children (than their counterparts). These may be related to knowledge and the accessibility of family planning services. Since their knowledge and accessibility of family planning services are relatively low (Adato et al., 2011), they may be more likely to have children. Finally, the number of children decreases with increasing levels of education and wealth which may be associated with increased knowledge and accessibility of family planning services.

Age effects (current age and age at first marriage) suggest important implications for fertility. Accordingly, being satisfied with the number of children plays a role in fertility decisions. It is associated with the

increases in abortion and contraception, and therefore, the reductions in higher numbers of children. This confirms the findings of Sahoo (2007) and Sousa et al. (2010). Further research about the factors determining the ideal number of children will be beneficial in reducing higher fertility and therefore improving maternal and child health (Gupta et al., 2011).

In addition, the findings highlight the roles of wealth and education in improving health and reducing higher fertility. Therefore, the policies increasing the level of wealth and education among Kurdish and deprived women (such as eastern women, rural women and the women holding the least beneficial social security scheme) may be beneficial in reducing child mortality. They may also help in reducing higher fertility. The results also reveal the importance of socioeconomic development (e.g., the accessibility of family planning services) for fertility. Thus, enhancing the accessibility of family planning services especially for deprived and Kurdish women may be worthwhile in reducing higher fertility.

Chapter 5

The investigation of Income Related Inequalities in Health and Fertility in Turkey

5.1. Introduction

In this chapter, socioeconomic variations in health and fertility will be analysed using the socioeconomic models constructed in the previous chapter. Specifically, income-related inequalities in health, i.e., obesity and child mortality, and fertility, i.e., abortion, contraception and number of children, among Turkish women at reproductive age (15-49) will be measured.

Afterwards, measured inequalities will be decomposed into their components to see how effective each component is in contributing income-related inequalities in health and fertility. Identifying the level of inequalities and the factors associated with them is critical for tackling the inequalities whose existence is the most serious challenge to improving population health (Whitehead and Dahlgren, 1991), as well as being unfair and unjust (Whitehead and Dahlgren, 1991; Gwatkin 2000; Woodward and Kawachi, 2000; Marmot, 2007, 2010). Although the inequalities in health and fertility have been widely investigated, studies on socioeconomic variations in Turkish health and fertility are still scarce. This study is a comprehensive investigation of health and fertility in Turkey. It employs concentration indices to measure inequalities and decomposition methods in order to discover the factors contributing to the inequalities among Turkish women at reproductive age (15-49).

The findings suggest that child mortality and number of children are more concentrated among deprived women while abortion and contraception are more concentrated among affluent women. Furthermore, income related inequalities in child mortality have been increasing during the period between 2003 and 2008. On the contrary,

inequalities in abortion and contraception have been decreasing over the years. As for the inequalities in the number of children, they have almost remained the same over time. In addition, decomposition analyses suggest that wealth, age and education are the most important contributors of income related inequalities in health indicators. Also, it appears that not only wealth, age and education, but also living in the developed parts of Turkey also significantly contributes to the inequalities in fertility indicators.

The remainder of the chapter is organised as follows. Section 5.2 provides a review of existing literature about income-related inequalities in health and fertility. Section 5.3 briefly describes the estimation strategy employed in this study. Section 5.4 presents the results and Section 5.5 discusses the results and concludes.

5.2. Literature Review

Some variations in health are unavoidable (Kawachi et al., 2002; Whitehead and Dahlgren, 2006). For instance, the variations due to genetic and constitutional characteristics or other biological factors (such as ageing) are not preventable (Whitehead and Dahlgren, 2006). However there are some variations in health across a population, which are generally avoidable (Kawachi et al., 2002; Whitehead and Dahlgren, 2006). Health inequality is a generic term to indicate avoidable variations in health achievements of individuals and/or groups (Kawachi et al., 2002). It became a concern after the International Conference on Primary Health Care held at Alma-Ata in 1978 with the movement of "Health for All" that highlighted the importance of equity in health and the need to identify socioeconomic determinants of health (Gwatkin, 2002; Whitehead and Dahlgren, 2006).

Health inequalities are systematic, socially produced and unfair distributions of health (Whitehead and Dahlgren, 1991, 1992, 2006). They stem from discriminations in social structures and show a consistent pattern across the population (e.g. deprived individuals have

poorer health compared to their well-off counterparts) (Whitehead and Dahlgren, 1991, 1992). More importantly, since everyone has the right to enjoy the highest attainable standard of health in their society (WHO, 1946), health inequalities are unfair and unjust (Marmot, 2005; Whitehead and Dahlgren, 2006). Their existence leads to higher costs both in human terms (loss of life or diminished lifespan) and economic terms (the costs of additional diseases as a result of the inequalities) (Woodward and Kawachi, 2000) as well as posing the most serious challenge to improve the health of a population (Whitehead and Dahlgren, 2006).

Two different definitions of health inequalities have been suggested by Wagstaff and van Doorslaer (2000): one is pure health inequalities, which focuses directly on the distribution of health within society. It employs the Gini coefficient and Lorenz curves to measure the health inequalities. The other is socioeconomic inequalities in health which predominantly focuses on the distribution of health among the people stratified on a social and economic basis (ibid.). It uses the concentration index and concentration curve to measure the level of inequality in health. This chapter is based on the latter definition of the inequalities as it analyses income-related inequalities in health and fertility among Turkish women at reproductive age.

It is widely suggested that child mortality increases with worsening levels of socioeconomic status and vice versa (Black et al., 1982; Mosley and Chen, 1984; Murray and Lopez, 1997; Marmot, 2005; You et al., 2010; Black et al., 2010). Marmot (2005) and You et al. (2010) also detect a gradient from the highest to the poorest quintiles showing that better off people are less likely to experience child mortality compared to those less-well-off. Murray & Lopez (1997) and Black et al. (2010) investigate child deaths in eight different regions of the world and 193 countries respectively. They also confirm the gradient that child mortality is more concentrated among poorer people. In addition, Black et al. (2008), Victora et al. (2008) and Bhutta et al. (2008) indicate a higher prevalence

of under-nutrition and child mortality among relatively deprived individuals in low income and middle income countries.

Studies about the income-related inequalities in obesity indicate a higher prevalence of obesity among those people with lower socioeconomic status in developed countries and those people with higher socioeconomic status in developing countries (Moore et al., 1962; Goldblatt et al., 1965; Brown and Konner, 1987; Sobal and Stunkard, 1989, Cutler et al., 2003; McLaren, 2007). Robert and Reither (2004) and MacFarlane et al. (2009) investigate obesity in the United States and Australia respectively. They both suggest that obesity is more concentrated among individuals with lower socio-economic status. Wamala et al. (1997), Kleiser et al. (2009) and Roskam et al. (2010) examine obesity prevalence in Sweden, Germany, and nineteen European countries respectively and detect higher prevalence of obesity among less-well-off. By contrast, Filozof et al. (2001) Kain et al. (2003) and Chhabra and Chhabra (2007) state that there is a higher concentration of obesity among relatively affluent people in Brasil and India respectively. In addition, Steyn et al. (2011), Dake et al. (2010) and Khan and Kraemer (2009) indicate that obesity is more concentrated among people with higher socioeconomic circumstances in Kenya, Ghana and Bangladesh respectively.

Even though there is a limited number of empirical studies (due to the scarcity of data on abortion), a higher prevalence of abortion among poorer individuals is indicated in developed countries (Rasch et al., 2007; Font-Ribera et al., 2008). By contrast, higher concentration of abortion among relatively affluent individuals is detected in developing countries (Lara et al., 2006; Diniz et al., 2012). Accordingly, lower prevalence of unintended pregnancies (or higher prevalence of contraceptive use) of people with higher socioeconomic status may be related to their relatively low abortion rates (compared to their poorer counterparts) in developed countries (Gillespie, 2007; Creanga et al., 2011).

On the other hand, limited availability of abortion services, and therefore, better accessibility of relatively affluent people may be associated with

their higher abortion rates (compared to their poorer counterparts) in developing countries (Uygur and Erkaya, 2001; Gakidou and Vayena, 2006; Bongaarts, 2011; Diniz et al., 2012). Diniz et al. (2012) investigate abortion in Brazil and highlight a higher prevalence of (safe) abortion among wealthier individuals (compared to their poorer counterparts). Lara et al. (2006) examine abortion in Mexico and confirm a higher concentration of abortion among relatively affluent people. On the contrary, Finer et al. (2006) investigate timing of abortion in the United States. They indicate a higher prevalence of abortion at late-pregnancy among relatively deprived individuals. Font-Ribera et al. (2008) analyse the variations of abortion among women at reproductive age (15-49) in Spain and state that women in lower socioeconomic positions are more likely to have not only unintended pregnancies but also induced abortions (if the unintended pregnancy occurs). Finally, Rasch et al. (2007) examine abortion in Denmark and indicate a higher prevalence of abortion among people with lower socioeconomic status.

Economists have revealed that contraception use is more concentrated among people with higher socioeconomic status (Castro, 1995; Jejeebhoy, 1995; Darroch et al., 2001; Darroch et al., 2013). Mavroforou et al. (2004), Helstrom et al. (2006), Addor et al. (2003) and Darroch et al. (2001) investigate contraception in Greece, Sweden and five different developed countries (including the United States and the United Kingdom) and detect that contraceptive use is more concentrated among relatively affluent individuals, with those of lower socioeconomic status having lower use of contraception than their better off counterparts.

Gillespie et al. (2007) and Gakidou and Vayena (2006) investigate contraceptive use in 41 and 55 different countries respectively. They both suggest higher prevalence of contraceptive use among wealthier individuals. Creanga et al. (2011) and Cleland et al. (2006) examine contraceptive use in Sub-Saharan and several low-income countries respectively. They confirm that contraceptive use is more prevalent among relatively affluent people. Saleem & Bobek (2005), Sahoo (2007), Blunch (2011), Asamoah et al. (2013) and Okezie et al. (2010) also

confirm that the prevalence of contraception use is higher among people with higher socioeconomic circumstances in Pakistan, India, Ghana and Nigeria respectively.

In addition, it has been widely suggested that a higher number of children is more concentrated among deprived people (Lutz et al., 2006; Ezeh et al., 2012). Cleland et al. (2006), Gillespie et al. (2007) and Skirbekk (2008) investigate the number of children in many countries and all indicate a higher number of children among people with lower socioeconomic status. Bongaarts (2011) examines the number of children in Sub-Saharan Africa and confirms a higher number of children among relatively poor individuals. Asamoah et al. (2013) investigate the number of children in Ghana and also confirm a higher number of children among deprived individuals.

5.3. Data & Estimation Strategy

In this chapter, the socioeconomic models, which constructed in Chapter 4, have been used to analyse income related inequalities in health (i.e., child mortality and obesity) and fertility (i.e., number of children, abortion and contraception). Since the data and the variables used in this study have already been described thoroughly in previous chapter, they will not be presented here again.

Concentration indices have been employed to measure income related inequalities in health and fertility. The concentration index is an indicator of health inequalities in relation to the socioeconomic position of individuals (Erreygers, 2009a). In this study, the socioeconomic position of individuals have been determined by their wealth scores which are calculated by TDHS (2003, 2008) rather than by income itself as it was not sufficient in former waves. The wealth score is derived for each household considering ownership of assets (such as car, computer etc.) and housing characteristics (such as building material, source of water etc.) (TDHS, 1998, 2003, 2008). The higher values of wealth score indicate more affluent households and vice versa.

Concentration index was introduced by Kakwani (1980) and Wagstaff et al. (1991). The value of the concentration index is twice the area between concentration curve and the diagonal (Wagstaff et al., 1991). The concentration curve can be obtained by plotting the cumulative proportions of the population, ranked by socioeconomic status beginning with the most advantaged (well-off) against the cumulative proportions of the health variable (Wagstaff et al., 1991). The concentration index takes values between $\frac{1-n}{n}$ to $\frac{n-1}{n}$ (where n is the number of observations) and $\frac{1-n}{n}$ and $\frac{n-1}{n}$ approach to -1 and 1 respectively when the number of observations increases (Wagstaff et al., 1991). The concentration index takes positive values when health inequalities favours the well-off (e.g. the variable of interest is more concentrated among the well-off) and vice versa (Wagstaff and van Doorslaer, 1997). If the value of the concentration index is 0, that means the health variable is equally distributed (Wagstaff et al., 1991; Wagstaff and van Doorslaer, 1997). The concentration index can be calculated using the formula below:

$$\boldsymbol{C(h) \equiv 1 - \frac{\sum_{i=1}^{n}(2\lambda_i \lambda - 1)h_i}{n^2 \mu_h}} \qquad (5.1)$$

where C(h) is the concentration index of the health variable, λ is rank of individual, h_i is health of individual, n is number of observations, μ_h is the mean of the health variable. As mentioned before, the value of the concentration index is bounded to -1 and 1 (Wagstaff et al., 1991). However, when the variable of interest is binary, the mean of the binary variable further bounds the value of the concentration index (Wagstaff, 2005). In this case the concentration index can take the values between $\mu - 1 + (1/n)$ and $1 - \mu + (1/n)$ instead of -1 and 1 (ibid.). As the mean of the variable of interest increases, the range of the values that the concentration index can take gets smaller (ibid.). To overcome this, Wagstaff (2005) suggests normalising the concentration index (Wagstaff et al., 1991) by dividing it by its upper bound $(1 - \mu + (1/n))$:

$$\boldsymbol{W(h) = \frac{2(b_h - a_h)}{n^2(b_h - \mu_h)(\mu_h - a_h)} \sum_{i=1}^{n} z_i h_i = C(h)/(1 - \mu)} \quad (5.2)$$

where b_h and a_h are the upper and lower bounds of the variable of interest, μ_h is the mean of the variable of interest, n is the number of observations, λ_i is the rank of individual i, $\boldsymbol{z_i}$ equals to $\boldsymbol{\frac{n+1}{2} - \lambda_i}$ for individual i and the expression $(1/n)$ approaches to zero when the number of observations increases.

This normalisation (Wagstaff, 2005) was specific to the case of the binary variable of interest (Wagstaff, 2009). However, Erreygers (2009a) generalises the normalisation and introduces a corrected concentration index which also facilitates to remedy the bounds issue (Erreygers, 2009a, b). Accordingly, the corrected concentration index can be written as:

$$\boldsymbol{E(h) = \frac{8}{n^2(b_h - a_h)} \sum_{i=1}^{n} z_i h_i} \quad (5.3)$$

where ;

$$\boldsymbol{z_i = \frac{n+1}{2} - \lambda_i} \quad (5.4)$$

where b_h and a_h are the upper and lower bounds of the variable of interest, μ_h is the mean of the variable of interest, n is the number of observations and λ_i is the rank of individual i.

Therefore the concentration index (Wagstaff et al., 1991) has been employed for unbounded outcome variables. Due to the existing bounds issue of concentration index, Wagstaff's normalisation (2005) and Erreygers's correction (2009a) have been preferred for bounded variables of interest which are binary child mortality variable, binary abortion variable and contraception variable.

The concentration indices (Wagstaff et al., 1991; Wagstaff, 2005; Erreygers, 2009a) are able to measure the level of inequalities; however

they are unable to highlight the individual factors leading the inequalities (O'Donnell et al., 2003; Wagstaff et al., 2003). Instead, decomposition methods provide the opportunity of unpacking the individual contributors of the socioeconomic inequalities in the outcomes of interest (Wagstaff et al., 2001; Wildman, 2003; Wagstaff et al., 2003; O'Donnell et al., 2006). Therefore, in this chapter, the decomposition of the income related inequalities for 2003 and 2008 has been performed using the methods of Wagstaff et al. (2003) in order to understand the factors leading the inequalities in health and fertility. Accordingly, for a linear regression model of selected outcome like:

$$\boldsymbol{y} = \boldsymbol{a} + \sum_{\boldsymbol{k}} \boldsymbol{\beta_k x_k} + \boldsymbol{\varepsilon} \tag{5.5}$$

the concentration index for y can be written as:

$$\boldsymbol{C} = \sum_{\boldsymbol{k}} \left(\frac{\boldsymbol{\beta_k \bar{x}_k}}{\boldsymbol{\mu}}\right) \boldsymbol{C_k} + \frac{\boldsymbol{GC_\varepsilon}}{\boldsymbol{\mu}} \tag{5.6}$$

where μ is the mean of the variable of interest (y), x_k variables are the explanatory variables (k regressors), $\bar{x}_k$ is the mean of x_k, C_k is the concentration index for x_k, ε is the error term and GC_ε is the generalised concentration index for the error term. Accordingly, observed inequalities in the outcome of interest (y) can be decomposed into explained and unexplained part (Wagstaff et al., 2001). The explained part is equal to the weighted sum of the concentration indices of explanatory variables (captured by the first term in equation 5.6), where the weight for each variable (x_k) is the elasticity of outcome (y) with respect to relevant variable (x_k) (Wagstaff et al., 2003; van Doorslaer and Koolman, 2004; O'Donnell et al., 2006). The unexplained part (captured by the last term in equation 5.6), which should approach to zero for a well-specified model, is the inequality in the outcome of interest that is not explained by the variations in its determinants (ibid.). Therefore, each contribution is produced by (i) the sensitivity of outcome with respect to related factor ($\beta_k(\bar{x}_k/\mu)$) and (ii) the degree of income-related inequality in related factor (C_k) (O'Donnell et al., 2006; Wagstaff et al., 2003). Hence the larger elasticity ($\beta_k(\bar{x}_k/\mu)$) and more unequally distributed x_k (across income

range) (i.e., larger C_k) lead to greater importance in explaining the inequalities in the outcome of interest (Wagstaff et al., 2001).

Then the changes in income related inequalities over time are decomposed using an approach proposed by Wagstaff et al. (2003). It has been derived by applying Oaxaca-type decomposition (Oaxaca, 1973) to the aforementioned technique that decomposes the concentration index (Wagstaff et al., 2003). The changes in the inequalities over time can be decomposed as:

$$\Delta \boldsymbol{C} = \sum_k \boldsymbol{\eta_k} (\boldsymbol{C_{kt}} - \boldsymbol{C_{kt-1}}) + \sum_k \boldsymbol{C_{kt-1}} (\boldsymbol{\eta_{kt}} - \boldsymbol{\eta_{kt-1}}) + (\frac{\boldsymbol{GC_{\varepsilon t}}}{\boldsymbol{\mu_t}}) \qquad (5.7)$$

where t is time (t=2008, $t-1$=2003 for this chapter) and Δ indicates the first difference, η_{kt} is the elasticity of y with respect to k regressor at time t, C_{kt} is the concentration index of the k regressor at time t and GC_{ε} is the generalised concentration index for the error term. Accordingly, the changes in the inequalities over time are separated out (i) the changes in inequality in the determinants of the outcome interest, and (ii) the changes in health and fertility effects of the determinants over time (Wagstaff, Doorslaer et al., 2003; O'Donnell, van Doorslaer et al., 2006). Therefore, the first part of the formula indicates the changes in concentration indices due to the differences in inequalities in the determinants of health and fertility. The second bit indicates the changes in the effects of health and fertility determinants and the last part captures the unexplained part of the changes. Hence, this allows one to understand the extent to which changes in income related health and fertility inequalities are due to changes in inequality in their determinants, rather than to changes in their elasticities and vice versa (Wagstaff et al., 2003).

5.4. Results

5.4.1. Concentration indices

To explain the income related inequalities in health and fertility, concentration indices have been calculated for 2003 and 2008 separately. Health has been measured using two outcome; child mortality and obesity. Fertility has been measured by three different indicators: abortion, contraception and the number of children born within the five years period before the time of the survey. Due to the bounds issue of the concentration index for binary outcome variables (Wagstaff, 2005) two recommended applications have been employed to overcome such problem. Accordingly, normalised (Wagstaff, 2005) and corrected (Erreygers, 2009a) concentration indices have been preferred for bounded outcome variables. The results can be seen in Table 5.1 & 5.2.

2003				
	Child Mortality		Obesity	
	Unbounded	Bounded		
CI	-0.273	-	0.026	
Wagstaff	-	-0.283	-	
Erreygers	-	-0.148	-	
	Abortion		Contraception	Number of children born
	Unbounded	Bounded		
CI	0.177	-	-	-0.195
Wagstaff	-	0.218	0.365	-
Erreygers	-	0.153	0.15	-

Table 5.1: Concentration indices – 2003

(i) Concentration indices for health -2003

The findings suggest that income related inequalities in obesity are relatively low compared to other indicators. However, it appears that there is a pro-rich distribution of BMI scores. Child mortality is measured by an unbounded indicator, the number of children who have died and a bounded indicator, whether experiencing child mortality. Concentration indices of both indicators suggesting that the inequalities in child mortality favour the better-off. In other words, child mortality is more concentrated among deprived women. For the number of children who have died, the calculated concentration index is -0.273 implying the pro-poor distribution of child mortality. As for the bounded child mortality variable, the normalised concentration index (Wagstaff, 2005) captures higher inequalities than the corrected one (Erreygers, 2009a). However, both suggest that child mortality is more concentrated among the less well-off.

(ii) Concentration indices for fertility -2003

The findings suggest that abortion and contraception are more concentrated among affluent women while there is pro-poor distribution of the number of children. Abortion is measured by an unbounded variable, the number of induced abortions and a bounded variable, whether experiencing an abortion. A normalised (Wagstaff, 2005) and a corrected (Erreygers, 2009a) concentration index have been calculated for the bounded abortion variable. Accordingly the normalised concentration index finds higher inequalities than the corrected one; however all indicate that there are pro-rich distributions of abortion. As for contraception, it is measured by a bounded indicator that is whether using a contraceptive method. Since it is measured by a bounded variable, two different indices have been calculated to measure income related inequalities in contraception. Accordingly the normalised index detects higher inequalities than the corrected one. Both indicate that there is pro-rich distribution of contraception. For the number of children

born, the calculated concentration index is -0.195; implying pro-poor distribution of the number of children.

2008				
	Child Mortality		Obesity	
	Unbounded	Bounded		
CI	-0.325	-	0.082	
Wagstaff	-	-0.319	-	
Erreygers	-	-0.144	-	

	Abortion		Contraception	Number of children born
	Unbounded	Bounded		
CI	0.124	-	-	-0.195
Wagstaff	-	0.15	0.347	-
Erreygers	-	0.093	0.139	-

Table 5.2: Concentration indices - 2008

(iii) Concentration indices for health - 2008

The findings suggest that like 2003, there is pro-rich distribution of BMI scores. Furthermore, income related obesity inequalities increased over time. As for child mortality, the results indicate that there is pro-poor distribution of child mortality. In other words, child mortality is more concentrated among deprived women. The normalised index (Wagstaff, 2005) detects higher inequalities in child mortality than the corrected one (Erreygers, 2009a). Further, the corrected index (ibid.) reports that income related inequalities in child mortality almost remained the same over the years. On the other hand, other indices suggest that the inequalities in child mortality increased in 2008.

(iv) Concentration indices for fertility - 2008

Findings indicate that, like in 2003, there are pro-rich distributions of abortion and contraception while the phenomenon of higher numbers of children is more concentrated among deprived women. Accordingly all calculated indices suggest that income related inequalities in abortion and contraception decreased over time. On the other hand, it appears that the inequalities in the number of children remained the same. Additionally, for the bounded indicators of abortion and contraception, the normalised concentration index captures higher inequalities than the corrected index. However, they both imply that the likelihood of experiencing an abortion and contraception are higher among wealthier samples.

5.4.2. Decomposition of Concentration indices

The decomposition gives detailed information about how effective health determinants are on income related inequalities (Wildman, 2003). In this chapter, income related inequalities in Turkish health and fertility have been decomposed into the contributions of socioeconomic covariates. As mentioned before, two different aspects of health namely child mortality and obesity have been used. On the other hand, fertility is measured by abortion, contraception use and the number of children born within the five years period preceding the time of the survey. It should be noted again that different concentration indices are calculated for the bounded and unbounded variables. The concentration index (Wagstaff et al., 1991) has been employed for unbounded indicators of child mortality, abortion, obesity and the number of children. On the contrary, Wagstaff normalisation (Wagstaff, 2005) and Erreygers correction (Erreygers, 2009a) of the concentration index have been preferred for bounded indicators of child mortality, abortion and contraception. The results for unbounded indicators are introduced first and the results for bounded indicators are presented afterwards – if there are any.

In addition, two different decomposition techniques have been applied in this chapter. Formerly, decomposition using the methods of Wagstaff et al. (2001) has been performed for the 2003 and 2008 data separately. The results are shown in Table 5.3 – 5.9. It is important to note that, since there seems no significant differences between the results of decomposing Wagstaff normalisation (2005) and Erreygers correction (2009a), the results for Erreygers correction (2009a) are presented in the appendix. The percentage contributions of covariates can be interpreted as follows: income related inequalities in the outcome of interest would be, ceteris paribus, that much lower (or higher) if the relevant covariate were equally distributed across income distribution, or it had zero elasticity. In some cases, the percentage contributions are high (even higher than 100%). This can be explained as the surpassed effect of the relevant covariate which is counterbalanced by the opposite contributions of other covariate.

Thereafter, the decomposition using the methods of Wagstaff et al. (2003) has been carried out to see the differences in the inequalities over time. The results of Oaxaca type decomposition are introduced in Table 5.10 – 5.16. The contribution of each covariate can be interpreted as follows: if the relevant variable were equally distributed on the income ranges in 2003 and 2008, or if it had zero elasticity, income related inequalities would be that much lower or higher. The difference in the inequalities over time is not considerable for some aspects of health and fertility such as obesity, contraception and the number of children. Since the first differences of concentration indices for these outcomes are relatively small, large contributions observed in percentages. In fact, the contributions are negligible as they are even smaller in absolute values. Hence only the results for child mortality and abortion will be interpreted.

Child Mortality						
The number of children who died						
	2003			**2008**		
	Elasticity	**CI**	**Cont.**	**Elasticity**	**CI**	**Cont.**
Respondents' Age At The Time Of Survey	3.409	0.018	-22.69%	3.088	0.018	-17.74%
Squared Function Of Respondent's Age	-0.28	0.033	3.41%	-0.066	0.031	0.66%
Having No Education At All	0.113	-0.438	18.27%	0.156	-0.491	24.62%
Being Graduated From Primary Education	-0.022	-0.054	-0.45%	-0.055	-0.065	-1.15%
Being Graduated From Higher Education	0.02	0.688	-5.21%	0.021	0.708	-4.87%
Being From Kurdish Background	0.123	-0.416	18.90%	0.071	-0.486	11.06%
Being From Arabic Background	0.005	-0.246	0.43%	0.012	-0.439	1.69%
Being From Other Non-Turkish Backgrounds	-0.004	0.129	0.20%	0.001	0.047	-0.01%
Being Married	0.193	0.002	-0.13%	0.145	-0.001	0.07%
Being Widowed	0.008	-0.116	0.34%	0.004	-0.067	0.08%
Respondents' Age At First Marriage	-2.483	0.022	20.67%	-1.799	0.028	16.00%
Living In Southern Turkey	-0.031	-0.057	-0.66%	-0.027	-0.136	-1.21%
Living In Central Turkey	-0.017	0.04	0.26%	0.034	0.128	-1.41%
Living In Northern Turkey	-0.024	0.098	0.88%	-0.02	0.145	0.95%
Living In Western Turkey	-0.053	0.175	3.45%	-0.016	0.279	1.45%
Living In Urban Turkey	-0.146	0.12	6.49%	-0.095	0.175	5.38%
Being In The Poorest Wealth Category	0.083	-0.839	25.85%	0.088	-0.79	22.38%
Being In Poorer Wealth Category	0.026	-0.492	4.73%	-0.007	-0.379	-0.84%
Being In Richer Wealth Category	-0.003	0.324	0.32%	-0.046	0.458	6.72%
Being In The Richest Wealth Category	-0.059	0.776	17.03%	-0.082	0.827	21.81%
Having No Social Security At All	0.053	-0.291	5.75%	0.027	-0.267	2.29%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.004	0.274	-0.36%	0.018	0.176	-1.00%
Being Insured By Social Insurance Organisation	0.028	0.18	-1.86%	0.039	0.173	-2.20%
Being Insured By GreenCard	0.023	-0.519	4.51%	0.082	-0.59	15.47%
Being Insured By Private Organisations	0.001	0.293	-0.12%	0.004	0.174	-0.21%
Explained CI			-0.297			-0.311

Table 5.3: Decomposition of concentration index: Unbounded Child mortality variable – 2003 & 2008

Child Mortality						
Ever had a child who died						
	2003			2008		
	Elasticity	CI	Cont.	Elasticity	CI	Cont.
Respondents' Age At The Time Of Survey	3.337	0.072	-100.84%	3.606	0.073	-117.31%
Squared Function Of Respondent's Age	-0.402	0.074	12.44%	-0.489	0.071	15.63%
Having No Education At All	0.098	-0.545	22.46%	0.141	-0.599	37.66%
Being Graduated From Primary Education	0.009	-0.118	0.43%	-0.025	-0.138	-1.54%
Being Graduated From Higher Education	0.014	0.733	-4.36%	0.012	0.761	-4.22%
Being From Kurdish Background	0.09	-0.513	19.40%	0.05	-0.606	13.65%
Being From Arabic Background	0.005	-0.251	0.55%	0.008	-0.45	1.65%
Being From Other Non-Turkish Backgrounds	-0.003	0.131	0.17%	0.002	0.047	-0.04%
Being Married	0.207	0.037	-3.22%	0.167	-0.029	2.16%
Being Widowed	0.009	-0.119	0.45%	0.004	-0.068	0.12%
Respondents' Age At First Marriage	-2.121	0.064	56.56%	-1.528	0.062	42.55%
Living In Southern Turkey	-0.022	-0.067	-0.61%	-0.019	-0.158	-1.37%
Living In Central Turkey	-0.011	0.049	0.22%	0.032	0.159	-2.32%
Living In Northern Turkey	-0.012	0.11	0.53%	-0.016	0.164	1.15%
Living In Western Turkey	-0.038	0.246	3.91%	-0.018	0.374	3.06%
Living In Urban Turkey	-0.097	0.462	18.85%	-0.026	0.658	7.62%
Being In The Poorest Wealth Category	0.077	-1.000	32.27%	0.073	-0.996	32.36%
Being In Poorer Wealth Category	0.045	-0.605	11.38%	0.000	-0.479	0.01%
Being In Richer Wealth Category	0.01	0.419	-1.68%	-0.054	0.573	13.77%
Being In The Richest Wealth Category	-0.049	1.000	20.47%	-0.084	0.997	37.37%
Having No Social Security At All	0.041	-0.428	7.40%	0.014	-0.319	1.97%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.004	0.309	-0.51%	0.006	0.200	-0.57%
Being Insured By Social Insurance Organisation	0.024	0.264	-2.64%	0.008	0.304	-1.12%
Being Insured By GreenCard	0.026	-0.579	6.41%	0.056	-0.713	17.82%
Being Insured By Private Organisations	0.001	0.297	-0.05%	0.001	0.176	-0.07%
Explained CI			-0.238			-0.224

Table 5.4: Decomposition of concentration index: Bounded Child mortality variable – 2003 & 2008

(i) Child mortality - 2003

The decomposition results can be seen in Table 5.3 & 5.4. Child mortality has been measured by an unbounded indicator, the number of children that died, and a bounded indicator, whether or not child mortality has occurred. It appears that the major factors contributing to income related inequalities in child mortality are the current age of respondents, their age at first marriages and wealth followed by ethnicity and education.

Starting with the number of children who died, almost all the detected inequalities are explained as the explained part of the concentration index is -0.27 out of -0.273. Age, age at first marriage, having no education, being Kurdish and being in the poorest and the richest quintiles have the greatest impacts. Having no education and being Kurdish are crucial as they have augmentation effects on child mortality. Furthermore Kurdish women and the women with no education are highly concentrated at the lower end of income distribution. These lead to relatively large contributions to income related inequalities. On the other hand, although having higher education have some effects in decreasing income related inequalities, other educational and ethnic variables are not as effective. Additionally, marital status is not effective on income related inequality since related coefficients are not statistically significant. Regional variables also have negligible effects.

All wealth variables have effects on income related inequalities, with being in the poorest and the richest quintiles making the largest contributions. Obviously, the poorest women are highly represented at the lower end of income distribution while their richest counterparts are more concentrated at the upper end. These lead to considerable contributions to increasing income related inequalities. As for the contributions to social security groups, holding the least disadvantageous social security scheme (GreenCard) and having no social insurance have some impacts on increasing income inequality as they are over represented at the lower end of income distribution.

For the bounded child mortality variable, the normalised concentration index (Wagstaff, 2005) detects higher inequalities in covariates than the corrected one (Erreygers, 2009a). The explained part of the concentration indices are relatively high for the normalised concentration index (-0.238 out of -0.283) compared to the corrected one (-0.087 out of 0.148). It is important to note that, since there seems no significant difference between the results of decomposing Wagstaff normalisation (2005) and Erreygers correction (2009a), the results for Erreygers correction (2009a) are presented in the appendix. Both cases suggest that age, age at first marriage and wealth have the largest contributions while having no education, being Kurdish and living in urban Turkey are the next most important contributors. By contrast, marital status and regional variables have almost no effect on income related inequalities for both cases. Having no education, being Kurdish and having no social security are important indications since they are unevenly distributed along income distributions in any cases. They have augmentation effects on child mortality and are more concentrated among less well-off individuals. The variables representing wealth all contribute to increasing inequalities in child mortality. Being in either the poorest or the richest quintiles has the largest impacts as such cases are highly represented at the lower and upper ends respectively.

(ii) Child mortality - 2008

The decomposition results can be seen in Table 5.3 & 5.4. As mentioned before, child mortality has been measured by an unbounded indicator, the number of children who died, and a bounded indicator, whether or not child mortality has occurred. It seems that the largest contributors to income related inequalities in child mortality are wealth, age and education. The next most important contributors are ethnicity and social security. By contrast, marital status and neighbourhood have almost no impact on income related inequalities.

For the number of children who died, most of the detected inequalities are explained since the explained part of the concentration index is -0.311 out of -0.325. Accordingly relatively high income related inequalities in child mortality have been detected compared to the inequalities in 2003. Being in the poorest and the richest categories, having no education, current age of the respondents and their age at first marriages, holding the least disadvantaged social security scheme and being Kurdish have the largest impacts. Having no education, holding the least advantaged social security scheme and being Kurdish are traits highly concentrated at the lower bound of the income distribution. They are important as they have augmentation effects on child mortality. Hence they have notable impacts on income related inequalities in child mortality. On the other hand; other education, social security and ethnic background variables do not show such an impact. Being in the poorest and the richest wealth groups has large contributions on the inequalities. As expected, the poorest women are highly represented at the lower end of income distribution while their richest counterparts are more concentrated at the upper end. Being in the poorest category has increasing effects on child mortality while being in the richest one is associated with the reductions in child mortality. These lead to their considerable contributions to increasing income related inequalities.

For the bounded child mortality variable, the decompositions of both normalised (Wagstaff, 2005) and corrected (Erreygers, 2009a) concentration indices suggest that age, wealth and education make the largest contributions. Ethnicity and social security make the following most important contributions while marital status and region have almost no effect on income related inequalities in both cases. Being in the poorest category has increasing effects on child mortality whereas being in the richest group has reducing effects. Furthermore, as expected, they are highly concentrated at the lower and upper bound of income distribution respectively. If they were evenly distributed along the income range, income-related inequalities would be significantly lower. Additionally, having no education, being Kurdish and holding the least beneficial social security scheme (GreenCard) have the effect of increasing

child mortality. Since they are unevenly distributed along income distribution (more concentrated among the less well-off), they have notable role in increasing income related inequalities in child mortality.

Obesity						
BMI						
	2003			2008		
	Elasticity	CI	Cont.	Elasticity	CI	Cont.
Respondents' Age At The Time Of Survey	0.628	0.018	414.08%	0.518	0.018	614.22%
Squared Function Of Respondent's Age	-0.168	0.033	-203.09%	-0.099	0.031	-207.06%
Having No Education At All	0.014	-0.438	-218.03%	0.012	-0.491	-377.97%
Being Graduated From Primary Education	0.034	-0.054	-67.68%	0.026	-0.065	-112.36%
Being Graduated From Higher Education	-0.002	0.688	-43.57%	-0.002	0.708	-85.63%
Being From Kurdish Background	-0.004	-0.416	53.77%	-0.007	-0.486	240.31%
Being From Arabic Background	0.000	-0.246	3.69%	0.000	-0.439	-7.30%
Being From Other Non-Turkish Backgrounds	0.000	0.129	0.46%	-0.001	0.047	-1.74%
Being Married	0.043	0.002	2.84%	0.058	-0.001	-5.44%
Being Widowed	0.001	-0.116	-3.04%	0.001	-0.067	-4.31%
Respondents' Age At First Marriage	-0.100	0.022	-82.55%	-0.108	0.028	-198.82%
Living In Southern Turkey	0.001	-0.057	-1.83%	-0.001	-0.136	6.74%
Living In Central Turkey	0.004	0.040	5.44%	0.000	0.128	0.16%
Living In Northern Turkey	0.004	0.098	12.82%	-0.001	0.145	-5.43%
Living In Western Turkey	-0.002	0.175	-13.81%	-0.003	0.279	-63.35%
Living In Urban Turkey	0.011	0.120	47.09%	0.010	0.175	120.24%
Being In The Poorest Wealth Category	-0.005	-0.839	153.19%	-0.007	-0.790	367.59%
Being In Poorer Wealth Category	0.000	-0.492	6.78%	-0.004	-0.379	88.29%
Being In Richer Wealth Category	0.001	0.324	12.79%	-0.005	0.458	-144.02%
Being In The Richest Wealth Category	-0.003	0.776	-94.14%	-0.007	0.827	-361.80%
Having No Social Security At All	-0.004	-0.291	41.37%	-0.005	-0.267	94.74%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.001	0.274	7.23%	-0.002	0.176	-17.67%
Being Insured By Social Insurance Organisation	0.002	0.180	13.52%	-0.005	0.173	-54.42%
Being Insured By GreenCard	-0.003	-0.519	56.88%	-0.006	-0.590	222.92%
Being Insured By Private Organisations	0.000	0.293	-4.23%	-0.001	0.174	-7.90%
Explained CI			0.003			0.002

Table 5.5: Decomposition of concentration index: Obesity – 2003 & 2008

(iii) Obesity - 2003

The decomposition results can be seen in Table 5.5. Almost all the detected inequalities are explained even though the level of the concentration index is very low. The findings suggest that age, age at first marriage, having no education and being in the poorest quintiles have significant contributions. On the other hand, marital status and regional variables have almost no effect on income related inequalities in obesity. All educational variables have notable impacts in decreasing income related inequalities with having no education making the largest contribution. The income distribution of Kurdish women has a significant impact on increasing income related inequality while other ethnic backgrounds are not effective since they have zero elasticity. Additionally, urban women are more concentrated among the well-off and their income distribution has a notable impact on increasing income related inequality. As for wealth groups, the current distributions of the poorest and the richest quintiles have considerable effects on income related inequalities. On the one hand, the inequalities would be 153% lower if the poorest women were evenly distributed rather than concentrated at the lower bound of income distribution. On the other hand, interestingly, it would be 94% higher if the richest women were evenly distributed along the income distribution. Lastly, both having the least advantageous social insurance (GreenCard) and having no insurance at all are over-represented in poorer wealth quintiles hence; they have notable effects in increasing income related inequalities.

(iv) Obesity - 2008

The results are presented in Table 5.5. Detected income related inequalities in obesity are quite low. As the explained part of the concentration index is even lower, the contributions of covariates appear high in percentages while they are small in absolute values. Nevertheless, the findings suggest that income related inequalities in obesity are mainly driven by age, education and wealth effects. On the other hand, marital status and regional variables (excluding western Turkey) have almost no

effects on the inequalities. Respondents' age, having no education and being in the poorest and the richest categories have the largest contributions. The following largest contributors are being Kurdish, age at first marriage and holding the most disadvantaged social security scheme. All educational variables have considerable impacts in decreasing income related inequalities with having no education making the largest contribution. Being Kurdish and holding either of the least advantageous social security scheme or no social security are traits highly concentrated among deprived individuals. Their uneven distribution has a significant impact in increasing income related obesity inequalities. On the contrary, other ethnic backgrounds and other social security schemes have negligible effects. In addition, urban women are over-represented among the better-off and their income distribution notably contributes to increasing income related inequalities. All wealth groups, have decreasing effects on BMI scores. Additionally, as expected, less well-off individuals are more concentrated at the lower bound of income distributions while affluent individuals are highly concentrated at the upper bound. Wealthier categories are effective in decreasing income related obesity inequalities while deprived ones have decreasing impacts on the inequalities. If they were evenly distributed, income related inequalities would approximately be 50% lower.

Abortion						
The number of induced abortions						
	2003			2008		
	Elasticity	CI	Cont.	Elasticity	CI	Cont.
Respondents' Age At The Time Of Survey	1.745	0.018	17.72%	0.361	0.018	5.12%
Squared Function Of Respondent's Age	0.526	0.033	9.77%	1.295	0.031	32.24%
Having No Education At All	-0.054	-0.438	13.42%	-0.006	-0.491	2.49%
Being Graduated From Primary Education	0.013	-0.054	-0.40%	0.039	-0.065	-1.99%
Being Graduated From Higher Education	0.016	0.688	6.08%	0.005	0.708	2.67%
Being From Kurdish Background	-0.031	-0.416	7.19%	-0.016	-0.486	6.34%
Being From Arabic Background	-0.006	-0.246	0.82%	-0.007	-0.439	2.32%
Being From Other Non-Turkish Backgrounds	-0.006	0.129	-0.45%	0.002	0.047	0.09%
Being Married	-0.567	0.002	-0.57%	-0.324	-0.001	0.36%
Being Widowed	-0.009	-0.116	0.59%	-0.016	-0.067	0.83%
Respondents' Age At First Marriage	-1.859	0.022	-23.61%	-1.285	0.028	-28.20%
Living In Southern Turkey	0.011	-0.057	-0.34%	0.001	-0.136	-0.12%
Living In Central Turkey	0.066	0.040	1.48%	0.028	0.128	2.81%
Living In Northern Turkey	0.002	0.098	0.09%	0.018	0.145	2.12%
Living In Western Turkey	0.051	0.175	5.07%	0.061	0.279	13.60%
Living In Urban Turkey	0.163	0.120	11.09%	0.065	0.175	9.02%
Being In The Poorest Wealth Category	-0.050	-0.839	23.73%	-0.039	-0.790	24.35%
Being In Poorer Wealth Category	-0.018	-0.492	5.13%	-0.022	-0.379	6.61%
Being In Richer Wealth Category	-0.001	0.324	-0.18%	0.019	0.458	6.98%
Being In The Richest Wealth Category	0.040	0.776	17.48%	0.055	0.827	35.80%
Having No Social Security At All	-0.061	-0.291	9.99%	0.063	-0.267	-13.27%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	-0.019	0.274	-2.95%	0.000	0.176	-0.05%
Being Insured By Social Insurance Organisation	-0.052	0.180	-5.30%	0.039	0.173	5.42%
Being Insured By GreenCard	-0.013	-0.519	3.95%	0.035	-0.590	-16.60%
Being Insured By Private Organisations	0.001	0.293	0.19%	0.008	0.174	1.08%
Explained CI			0.177			0.126

Table 5.6: Decomposition of concentration index: Unbounded abortion variable – 2003 & 2008

Abortion						
Ever had an induced abortion						
	2003			2008		
	Elasticity	CI	Cont.	Elasticity	CI	Cont.
Respondents' Age At The Time Of Survey	3.840	0.072	80.46%	-0.215	0.073	58.46%
Squared Function Of Respondent's Age	-0.834	0.074	-17.86%	-0.023	0.071	6.24%
Having No Education At All	-0.057	-0.545	9.00%	0.002	-0.599	3.59%
Being Graduated From Primary Education	-0.011	-0.118	0.38%	-0.005	-0.138	-2.57%
Being Graduated From Higher Education	0.008	0.733	1.73%	-0.001	0.761	2.70%
Being From Kurdish Background	-0.031	-0.513	4.67%	0.001	-0.606	1.85%
Being From Arabic Background	-0.008	-0.251	0.56%	0.001	-0.450	1.36%
Being From Other Non-Turkish Backgrounds	-0.005	0.131	-0.21%	0.000	0.047	0.03%
Being Married	-0.348	0.037	-3.75%	0.029	-0.029	3.16%
Being Widowed	-0.011	-0.119	0.37%	0.001	-0.068	0.33%
Respondents' Age At First Marriage	-1.474	0.064	-27.26%	0.130	0.062	-30.33%
Living In Southern Turkey	0.019	-0.067	-0.37%	-0.001	-0.158	-0.35%
Living In Central Turkey	0.039	0.049	0.55%	-0.002	0.159	1.13%
Living In Northern Turkey	0.002	0.110	0.06%	-0.002	0.164	1.50%
Living In Western Turkey	0.048	0.246	3.47%	-0.006	0.374	8.73%
Living In Urban Turkey	0.123	0.462	16.57%	-0.004	0.658	10.56%
Being In The Poorest Wealth Category	-0.040	-1.000	11.59%	0.005	-0.996	17.37%
Being In Poorer Wealth Category	-0.006	-0.605	1.03%	0.002	-0.479	4.38%
Being In Richer Wealth Category	0.004	0.419	0.46%	-0.002	0.573	3.33%
Being In The Richest Wealth Category	0.048	1.000	13.90%	-0.005	0.997	19.17%
Having No Social Security At All	-0.055	-0.428	6.79%	-0.005	-0.319	-6.46%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	-0.012	0.309	-1.10%	0.000	0.200	0.08%
Being Insured By Social Insurance Organisation	-0.044	0.264	-3.40%	-0.006	0.304	6.44%
Being Insured By GreenCard	-0.015	-0.579	2.45%	-0.004	-0.713	-11.17%
Being Insured By Private Organisations	-0.001	0.297	-0.09%	-0.001	0.176	0.48%
Explained CI			0.344			0.027

Table 5.7: Decomposition of concentration index: Bounded abortion variable – 2003 & 2008

(v) Abortion - 2003

The results are presented in Table 5.6 & 5.7. Abortion has been measured by an unbounded indicator, the number of induced abortions, and a bounded indicator, whether or not an induced abortion has occurred. It is important to keep in mind that although the abortion is allowed in Turkey (under certain conditions), the data about abortion still bears the risk of underreporting as it requires asking sensitive questions (Barreto et al., 1992; Bankole et al., 1998; Bankole et al., 1999). It seems that the major contributors to income related inequalities in abortion are the current age of respondents and their age at first marriages. The following most important contributors are wealth (for the number of abortions) and living in an urban area (for whether having an induced abortion).

For the number of induced abortions, the explained concentration index is 0.176 out of 0.177 which means that almost the whole of the detected income related inequalities are explained. Age, age at first marriage, and being in the poorest and the richest quintiles are the most effective covariates. In contrast, marital status and regional variables have almost no effect on income related inequalities in abortion. Having no education is a trait more concentrated among less well-off individuals while having higher education is more common among the better-off. If they were evenly distributed, income related inequalities would be almost 20% lower. Furthermore, the income distribution of Kurdish women has a notable impact in increasing income related inequality as they are over represented at the lower bound of income distribution. If the poorest and the richest women were evenly distributed along the income range, income related inequalities in abortion would be 40% lower in total. Other income variables have negligible impacts since their coefficients are not statistically significant. Having no social security has some effects in increasing income related inequalities; however, the aggregate impact of social security are negligible.

As for the bounded abortion variable it is important to note that, only the results for Wagstaff normalisation (2005) are presented here since there seems no significant differences between the results of decomposing

Wagstaff normalisation (2005) and Erreygers correction (2009a) (the results for Erreygers correction (2009a) are presented in the appendix). Accordingly income related inequalities are mainly driven by age effects for both cases. In addition, living in urban areas and being in either the poorest or the richest category have some additional effects in increasing income related inequalities in abortion. On the other hand, marital status, region, social security (apart from having no social security) have almost no effects. Having no education and having no social security are traits more concentrated among poorer individuals. Their uneven distribution on the income range increases income related inequalities by approximately 15% in both cases. Although wealth is not effective as much as it was for the unbounded indicator, the uneven distribution of being in the poorest and the richest quintiles increases income related inequalities in both cases.

(vi) Abortion - 2008

The results are introduced in Table 5.6 & 5.7. Abortion has been measured by an unbounded indicator, the number of induced abortions, and a bounded indicator, whether an induced abortion has been experienced. It is important to keep in mind that although the abortion is allowed in Turkey (under certain conditions), the data about abortion still bears the risk of underreporting as it requires asking sensitive questions (Barreto et al., 1992; Bankole et al., 1998; Bankole et al., 1999).It appears that income related inequalities in abortion are mainly driven by age and wealth effects. The next largest contributors are living in western Turkey and living in urban areas. Additionally, findings suggest that education, ethnicity, marital status and region (excluding western Turkey) have negligible impacts on the income related inequalities in abortion.

For the number of induced abortions, the variables representing age, age at first marriage, being in the poorest and the richest quintiles have the largest impacts on income related inequalities in abortion. Education has no effects on the inequalities as education coefficients are statistically

insignificant. Also, being Kurdish are not as effective as expected even they have slight impacts in increasing the inequalities. In addition, marital status and regional variables (excluding western Turkey) have almost no effect on income related inequalities in abortion. Living in western Turkey and living in urban areas are characteristics more concentrated among the better-off and they have increasing impacts on abortion. They are important as they indicate the more developed parts of the Turkey. On the other hand being in the poorest category has the effect of decreasing on the number of abortions while being in the richest one has the effect of increasing them. Taking all these results into the consideration, it is highly possible that development issues (such as the accessibility of healthcare services, knowledge about family planning etc.) are the underlying determinants of the income related inequalities in abortion. Finally, holding two least beneficial social security scheme (GreenCard) and having no social insurance are associated with decreases in abortion. In addition they are more concentrated at the lower bound of income distribution. These may be associated with their appreciable contributions to income related inequalities.

As for the bounded abortion variable, the explained parts are small for both indices. However, the decompositions of both indices suggest that income related inequalities are mainly driven by age effects. In addition, being in the poorest and the richest categories, and living in urban areas have some additional effects in increasing income related inequalities in abortion. On the other hand, marital status and region (excluding western Turkey) have almost no effects. Living in western Turkey and living in urban areas are traits more concentrated among wealthier individuals. Additionally, they are associated with an increased likelihood of having an abortion. Their uneven distribution on the income range increases income related inequalities in both cases. In addition, being in the richest category has increasing impacts on the likelihood of having an induced abortion while being in the poorest group has decreasing effects. These findings again confirm that fertility related development issues (such as accessibility of healthcare services, knowledge about

family planning etc.) may be the underlying determinants of the income related inequalities in abortion.

Contraception						
Ever used a contraceptive method						
	2003			2008		
	Elasticity	CI	Cont.	Elasticity	CI	Cont.
Respondents' Age At The Time Of Survey	1.900	0.072	112.36 %	2.140	0.073	128.05 %
Squared Function Of Respondent's Age	-0.931	0.074	-56.29%	-1.035	0.071	-60.85%
Having No Education At All	-0.022	-0.545	9.77%	-0.020	-0.599	9.81%
Being Graduated From Primary Education	-0.019	-0.118	1.87%	-0.013	-0.138	1.42%
Being Graduated From Higher Education	0.003	0.733	1.71%	0.001	0.761	0.92%
Being From Kurdish Background	-0.022	-0.513	9.06%	-0.009	-0.606	4.51%
Being From Arabic Background	-0.001	-0.251	0.15%	-0.004	-0.450	1.65%
Being From Other Non-Turkish Backgrounds	0.000	0.131	-0.01%	0.000	0.047	-0.01%
Being Married	0.108	0.037	3.28%	0.122	-0.029	-2.91%
Being Widowed	-0.001	-0.119	0.06%	-0.003	-0.068	0.16%
Respondents' Age At First Marriage	-0.265	0.064	-13.84%	-0.265	0.062	-13.56%
Living In Southern Turkey	0.008	-0.067	-0.46%	0.004	-0.158	-0.46%
Living In Central Turkey	0.008	0.049	0.31%	0.009	0.159	1.21%
Living In Northern Turkey	0.005	0.110	0.46%	0.007	0.164	0.90%
Living In Western Turkey	0.015	0.246	3.06%	0.013	0.374	4.06%
Living In Urban Turkey	0.032	0.462	12.15%	0.023	0.658	12.59%
Being In The Poorest Wealth Category	-0.014	-1.000	11.11%	-0.010	-0.996	7.97%
Being In Poorer Wealth Category	-0.002	-0.605	1.05%	0.001	-0.479	-0.36%
Being In Richer Wealth Category	0.005	0.419	1.77%	-0.001	0.573	-0.53%
Being In The Richest Wealth Category	0.002	1.000	1.44%	0.002	0.997	1.56%
Having No Social Security At All	-0.005	-0.428	1.74%	-0.007	-0.319	1.86%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.002	0.309	0.38%	-0.002	0.200	-0.31%
Being Insured By Social Insurance Organisation	0.002	0.264	0.51%	-0.002	0.304	-0.48%
Being Insured By GreenCard	0.003	-0.579	-1.50%	-0.005	-0.713	2.83%
Being Insured By Private Organisations	-0.001	0.297	-0.13%	0.000	0.176	-0.02%
Explained CI			0.122			0.122

Table 5.8: Decomposition of concentration index: Contraception – 2003 & 2008

(vii) Contraception - 2003

The results of decomposition can be seen in Table 5.8. A bounded indicator, whether or not a contraceptive method has been experienced, has been used to measure contraception. Accordingly, both normalised (Wagstaff, 2005) and corrected (Erreygers, 2009a) concentration indices have been decomposed. Despite normalised concentration index detecting higher inequalities, the contributions appear pretty similar for these models therefore the results for Erreygers correction (2009a) are not presented here (but they are presented in the appendix). Both cases suggest that income related inequalities are mainly driven by age effects.

Living in urban areas, having no education and being Kurdish have the next largest effects in increasing income related inequalities. These findings are crucial as having no education and being Kurdish are more concentrated at the lower bound of income distribution while living in urban areas is over-represented at the upper bound. Marital status, region and social security have almost no effect on income related inequalities in contraception for both cases. On the other hand, income related inequalities could be lower, if the poorest women were evenly distributed along the income range. Other wealth variables are not as effective as the poorest category even though they have some impacts in increasing income related contraception inequalities.

(viii) Contraception - 2008

The results are introduced in Table 5.8. Contraception has been measured by a bounded indicator, whether or not a contraceptive method has been used. Accordingly, both the normalised (Wagstaff, 2005) and the corrected (Erreygers, 2009a) concentration indices have been decomposed respectively. The findings for both cases suggest that income related inequalities are mainly driven by age effects. Age at first marriage, living in urban areas, having no education and being in the poorest category have the following largest impacts to income related inequalities in contraception. Marital status, region and social security have almost

no effects on the inequalities for both cases. In addition ethnicity effects are negligible even there are slight impacts of being Kurdish. Further, wealth effects (except for being in the poorest category) are even imperceptible. Income related inequalities would be lower in any cases, if the poorest women were evenly distributed along the income range. Having no education is more concentrated at the lower bound of income distribution while living in urban areas is over-represented at the upper bound. The findings are interesting as having no education has decreasing impacts on the contraception while living in urban have increasing effects. The results again confirm that the fertility-related development issues (such as the accessibility of health care services, knowledge of family planning etc.) may be the underlying determinants of fertility decisions.

Number of children						
The number of children born in a five year period preceding to the time of survey						
	2003			2008		
	Elasticity	CI	Cont.	Elasticity	CI	Cont.
Respondents' Age At The Time Of Survey	0.98	0.018	-9.24%	0.692	0.018	-6.51%
Squared Function Of Respondent's Age	-1.76	0.033	30.36%	-1.693	0.031	27.99%
Having No Education At All	0.048	-0.438	10.99%	0.031	-0.491	8.13%
Being Graduated From Primary Education	0.028	-0.054	0.79%	0.058	-0.065	1.98%
Being Graduated From Higher Education	-0.007	0.688	2.40%	0.001	0.708	-0.30%
Being From Kurdish Background	0.072	-0.416	15.72%	0.058	-0.486	14.87%
Being From Arabic Background	0.01	-0.246	1.30%	0.014	-0.439	3.21%
Being From Other Non-Turkish Backgrounds	-0.001	0.129	0.04%	0.000	0.047	0.00%
Being Married	0.459	0.002	-0.43%	0.509	-0.001	0.38%
Being Widowed	0.002	-0.116	0.14%	0.006	-0.067	0.19%
Respondents' Age At First Marriage	0.465	0.022	-5.48%	0.502	0.028	-7.31%
Living In Southern Turkey	-0.037	-0.057	-1.12%	-0.031	-0.136	-2.24%
Living In Central Turkey	-0.05	0.04	1.04%	-0.032	0.128	2.14%
Living In Northern Turkey	-0.025	0.098	1.30%	-0.023	0.145	1.73%
Living In Western Turkey	-0.088	0.175	8.08%	-0.068	0.279	10.05%
Living In Urban Turkey	-0.035	0.12	2.19%	0.015	0.175	-1.37%
Being In The Poorest Wealth Category	0.072	-0.839	31.72%	0.070	-0.790	29.18%
Being In Poorer Wealth Category	0.017	-0.492	4.30%	0.023	-0.379	4.59%
Being In Richer Wealth Category	0.006	0.324	-0.97%	-0.009	0.458	2.29%
Being In The Richest Wealth Category	0.002	0.776	-0.99%	-0.004	0.827	1.68%
Having No Social Security At All	0.02	-0.291	3.10%	-0.005	-0.267	-0.74%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.008	0.274	-1.12%	0.007	0.176	-0.61%
Being Insured By Social Insurance Organisation	0.007	0.18	-0.64%	-0.006	0.173	0.57%
Being Insured By GreenCard	0.023	-0.519	6.36%	0.032	-0.590	10.03%
Being Insured By Private Organisations	-0.001	0.293	0.16%	0.000	0.174	0.03%
Explained CI			-0.191			-0.190

Table 5.9: Decomposition of concentration index: The number of children – 2003 & 2008

(ix) Number of children -2003

The results are introduced in Table 5.9. Almost all the detected inequalities are explained as the explained concentration index is -0.19 out of -0.195. Being in the poorest category has the largest effect followed by the effects of ethnicity, education and age. Being Kurdish, having no education, and holding the most disadvantaged social security scheme have considerable contributions in increasing income related inequalities. They are important since they are associated with an increased the number of children and they are highly concentrated at the lower bound of income distribution. On the contrary, marital status, region (excluding western Turkey), social security (except for the least advantaged scheme) and urbanisation are almost ineffective. The income distribution of western Turkey has some effects in increasing income related inequalities in the number of children. Finally, unsurprisingly the poorest women are unevenly distributed. In other words, they are over represented at the lower end of income distribution. If they were evenly distributed along the income range, income-related inequalities in the number of children would be approximately 30% lower.

(x) Number of children - 2008

The results are presented in Table 5.9. The findings suggest that wealth has the largest contribution followed by the effects of age, ethnicity and education. In contrast, marital status, region (excluding western Turkey), social security (apart from the most disadvantageous scheme) and urbanisation are almost ineffective. Being Kurdish, holding the most disadvantageous social security scheme, living in western Turkey and having no education have important effects on increasing income related inequalities. Living in western Turkey is characteristic more concentrated among wealthier individuals while the rest are over represented among deprived individuals. They attract attention as they (excluding living in western Turkey) have an augmentation effect on the number of children. The poorest women are represented at the lower end of income distribution whilst income-related inequalities in the number of children

would be approximately 30% lower if they were evenly distributed along the income range.

5.4.3. Decomposing the differences in the inequalities over time

Changes over time			
Child Mortality Number of children who died			
	Contr.	**Dif in CI**	**Dif in Ela**
Respondents' Age At The Time Of Survey	14.85%	0.78%	14.07%
Squared Function Of Respondent's Age	-17.45%	-0.24%	-17.21%
Having No Education At All	66.42%	20.33%	46.08%
Being Graduated From Primary Education	-5.77%	-1.43%	-4.35%
Being Graduated From Higher Education	-2.64%	-1.04%	-1.59%
Being From Kurdish Background	-40.55%	12.24%	-52.79%
Being From Arabic Background	10.02%	5.65%	4.37%
Being From Other Non-Turkish Backgrounds	-1.36%	0.12%	-1.48%
Being Married	1.34%	1.13%	0.21%
Being Widowed	-1.62%	-0.45%	-1.17%
Respondents' Age At First Marriage	-14.73%	22.76%	-37.49%
Living In Southern Turkey	-4.82%	-5.30%	0.48%
Living In Central Turkey	-12.41%	-7.38%	-5.03%
Living In Northern Turkey	1.38%	2.36%	-0.98%
Living In Western Turkey	-11.71%	4.12%	-15.83%
Living In Urban Turkey	-1.91%	12.90%	-14.81%
Being In The Poorest Wealth Category	-0.53%	-10.49%	9.96%
Being In Poorer Wealth Category	-37.49%	1.89%	-39.38%
Being In Richer Wealth Category	48.85%	14.97%	33.88%
Being In The Richest Wealth Category	53.32%	10.16%	43.16%
Having No Social Security At All	-20.44%	-1.52%	-18.91%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	-5.23%	4.27%	-9.51%
Being Insured By Social Insurance Organisation	-4.41%	0.60%	-5.01%
Being Insured By GreenCard	87.70%	14.12%	73.58%
Being Insured By Private Organisations	-0.80%	1.09%	-1.89%
Explained CI			0.041

Table 5.10: Decomposing the differences in the inequalities over time: Unbounded Child Mortality variable

Changes over time						
Child mortality						
Ever had a child who died						
	Wagstaff			Erreygers		
	Contr.	Dif in CI	Dif in Ela	Contr.	Dif in CI	Dif in Ela
Respondents' Age At The Time Of Survey	150.46%	18.62%	131.84%	157.95%	10.70%	147.25%
Squared Function Of Respondent's Age	-36.32%	7.23%	-43.56%	-41.68%	6.99%	-48.67%
Having No Education At All	-209.39%	-52.11%	-157.28%	-122.63%	-10.60%	-112.03%
Being Graduated From Primary Education	30.55%	3.40%	27.15%	34.32%	3.89%	30.43%
Being Graduated From Higher Education	-6.49%	2.44%	-8.93%	0.67%	2.99%	-2.32%
Being From Kurdish Background	107.07%	-32.24%	139.31%	69.28%	-27.22%	96.50%
Being From Arabic Background	-16.20%	-11.08%	-5.12%	-1.81%	-1.29%	-0.52%
Being From Other Non-Turkish Backgrounds	3.39%	-1.04%	4.43%	0.19%	-0.08%	0.27%
Being Married	-85.29%	-75.12%	-10.17%	-17.76%	-15.66%	-2.10%
Being Widowed	5.46%	1.38%	4.08%	0.56%	0.16%	0.40%
Respondents' Age At First Marriage	270.37%	13.36%	257.01%	59.10%	-133.92%	193.02%
Living In Southern Turkey	10.90%	12.06%	-1.16%	5.78%	6.40%	-0.62%
Living In Central Turkey	38.93%	24.50%	14.43%	27.67%	17.91%	9.77%
Living In Northern Turkey	-8.97%	-5.84%	-3.13%	-4.36%	-2.96%	-1.40%
Living In Western Turkey	16.94%	-15.98%	32.92%	19.11%	-11.40%	30.51%
Living In Urban Turkey	190.14%	-34.62%	224.77%	163.35%	-31.78%	195.13%
Being In The Poorest Wealth Category	30.92%	1.93%	28.99%	-45.67%	-63.32%	17.65%
Being In Poorer Wealth Category	184.85%	0.04%	184.81%	126.62%	0.02%	126.60%
Being In Richer Wealth Category	-237.45%	-56.42%	-181.03%	-173.74%	-29.89%	-143.85%
Being In The Richest Wealth Category	-237.33%	1.96%	-239.29%	-102.79%	85.01%	-187.79%
Having No Social Security At All	90.33%	10.30%	80.02%	100.02%	21.34%	78.68%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.31%	-4.68%	4.99%	0.47%	-1.75%	2.22%
Being Insured By Social Insurance Organisation	-25.80%	2.25%	-28.05%	-23.16%	4.35%	-27.50%
Being Insured By GreenCard	-167.75%	-51.20%	-116.55%	-131.51%	-83.05%	-48.46%
Being Insured By Private Organisations	0.38%	-0.78%	1.16%	0.02%	-0.05%	0.07%
Explained CI			0.015			0.013

Table 5.11: Decomposing the differences in the inequalities over time: Bounded Child Mortality variable

(i) Child Mortality

Table 5.10 & 5.11 decompose the differences in income related child mortality inequalities between 2003 and 2008 into the percentage contributions of covariates. As mentioned before, child mortality is measured by an unbounded indicator, the number of children that died, and a bounded indicator, whether or not having a child who passed away. Due to the bounds issue of the concentration index (Wagstaff, 2005), the normalised (Wagstaff, 2005) and the corrected (Erreygers, 2009a) concentration indices have been decomposed for the bounded child mortality variable.

Accordingly, the differences in the income related inequalities over time are small. In general, elasticity differences over time dominate inequality differences suggesting that the different partial associations of covariates and child mortality over time matter more, rather than the differences in their inequalities.

For the number of children that died, holding the most disadvantaged social security scheme and having no education have the largest impact on the differences in the inequalities over the years. After that, being in either of the two wealthier categories and being Kurdish have the next most significant contributions to excess inequalities. On the contrary, age, age at first marriage, marital status, neighbourhood and social security (apart from holding the least advantaged social security scheme) have minor effects. Having no education notably increases income related inequalities and such a rise is attributable to the differences in the impacts of having no education on child mortality over time. The inequality difference of being Kurdish has an augmentation effect which is counterbalanced by the contribution of the elasticity difference. In sum, being Kurdish has considerable impacts in reducing the inequalities that is attributable to the changes in its elasticity. As for wealth, the wealthier categories are notably effective in increasing income related inequalities while deprived ones are effective in decreasing the inequalities. For all wealth groups, excluding the poorest one, excess elasticities are more influential than excess inequality indicating that the

differences between partial associations of income and child mortality are more important than the differences between income inequalities. In addition, the differences in the distributions of the least beneficial social security scheme (GreenCard) holders by income significantly contribute to increasing income related inequalities. Again, elasticity differences have greater effects than inequality differences, implying that the differences in the partial associations of holding this scheme and child mortality are more effective in increasing income related inequalities in child mortality.

For the bounded child mortality variable, decompositions of the first differences in both indices indicate that income related inequalities are driven by wealth, education and age effects. Social security, ethnicity and urbanisation make additive contributions to the changes in the inequalities over time. On the contrary marital status and region are minor contributors. Additionally, elasticity differences dominate inequality differences for almost all cases. The differences in the distributions of age and age at first marriage by income increased income related inequalities. Such increases are attributable to the differences in the partial effects of age variables on child mortality.

Unlike the previous indicator of child mortality, having no education and having the least beneficial social security scheme have the effect of decreasing on income related inequalities in child mortality. Both elasticity differences and inequality differences play a role in their contributions, though elasticity differences are more influential. Being Kurdish and living in urban areas contribute to an increase in income related inequalities. Their inequality differences make some decreasing contributions which are eliminated by the surpassing contributions of elasticity differences. Finally, all wealth variables (apart from the poorest category) have significantly large impacts as wealth contributes more than 200% -overall- to decreasing income related inequalities in child mortality. The contribution is predominantly due to the differences in the partial associations between wealth and child mortality rather than the differences in income inequalities.

Changes over time			
Abortion			
Number of induced abortions			
	Contr.	**Dif in CI**	**Dif in Ela**
Respondents' Age At The Time Of Survey	48.92%	0.07%	48.85%
Squared Function Of Respondent's Age	-45.88%	3.82%	-49.70%
Having No Education At All	40.48%	-0.67%	41.15%
Being Graduated From Primary Education	3.53%	0.80%	2.73%
Being Graduated From Higher Education	14.52%	-0.19%	14.71%
Being From Kurdish Background	9.28%	-2.29%	11.57%
Being From Arabic Background	-2.88%	-2.53%	-0.36%
Being From Other Non-Turkish Backgrounds	-1.78%	0.40%	-2.18%
Being Married	-2.89%	-2.04%	-0.85%
Being Widowed	0.02%	1.51%	-1.49%
Respondents' Age At First Marriage	-12.26%	13.09%	-25.35%
Living In Southern Turkey	-0.89%	0.17%	-1.07%
Living In Central Turkey	-1.81%	-4.79%	2.98%
Living In Northern Turkey	-4.92%	-1.72%	-3.20%
Living In Western Turkey	-16.04%	-12.58%	-3.46%
Living In Urban Turkey	16.20%	-7.05%	23.26%
Being In The Poorest Wealth Category	22.21%	3.72%	18.48%
Being In Poorer Wealth Category	1.48%	4.87%	-3.39%
Being In Richer Wealth Category	-17.92%	-5.08%	-12.84%
Being In The Richest Wealth Category	-27.87%	-5.44%	-22.42%
Having No Social Security At All	67.60%	-2.88%	70.48%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	-10.12%	-0.07%	-10.05%
Being Insured By Social Insurance Organisation	-31.84%	0.48%	-32.32%
Being Insured By GreenCard	54.85%	4.94%	49.90%
Being Insured By Private Organisations	-2.00%	1.82%	-3.83%
Explained CI			-0.051

Table 5.12: Decomposing the differences in the inequalities over time: Unbounded Abortion variable

Changes over time						
Abortion						
Ever had an induced abortion						
	Wagstaff			Erreygers		
	Contr.	Dif in CI	Dif in Ela	Contr.	Dif in CI	Dif in Ela
Respondents' Age At The Time Of Survey	78.87%	0.04%	78.83%	88.75%	0.03%	88.73%
Squared Function Of Respondent's Age	-16.13%	-0.01%	-16.11%	-18.16%	-0.01%	-18.14%
Having No Education At All	8.61%	0.02%	8.59%	6.17%	0.00%	6.17%
Being Graduated From Primary Education	0.17%	-0.03%	0.19%	0.19%	-0.03%	0.22%
Being Graduated From Higher Education	1.80%	0.01%	1.79%	0.48%	0.01%	0.47%
Being From Kurdish Background	4.47%	0.02%	4.45%	3.12%	0.02%	3.10%
Being From Arabic Background	0.62%	0.04%	0.58%	0.06%	0.01%	0.06%
Being From Other Non-Turkish Backgrounds	-0.19%	0.00%	-0.18%	-0.01%	0.00%	-0.01%
Being Married	-3.25%	0.52%	-3.77%	-0.68%	0.11%	-0.79%
Being Widowed	0.37%	-0.02%	0.39%	0.04%	0.00%	0.04%
Respondents' Age At First Marriage	-27.48%	0.05%	-27.52%	-21.29%	-0.45%	-20.83%
Living In Southern Turkey	-0.37%	-0.01%	-0.36%	-0.20%	-0.01%	-0.19%
Living In Central Turkey	0.59%	0.06%	0.54%	0.41%	0.04%	0.37%
Living In Northern Turkey	0.16%	0.04%	0.13%	0.08%	0.02%	0.06%
Living In Western Turkey	3.85%	0.22%	3.63%	3.55%	0.16%	3.39%
Living In Urban Turkey	16.13%	0.23%	15.91%	14.13%	0.21%	13.92%
Being In The Poorest Wealth Category	12.01%	0.00%	12.02%	7.53%	0.16%	7.37%
Being In Poorer Wealth Category	1.27%	-0.08%	1.36%	0.90%	-0.04%	0.94%
Being In Richer Wealth Category	0.66%	0.06%	0.60%	0.51%	0.03%	0.48%
Being In The Richest Wealth Category	14.28%	0.00%	14.28%	11.09%	-0.21%	11.29%
Having No Social Security At All	5.84%	0.16%	5.68%	5.96%	0.33%	5.62%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	-1.02%	0.00%	-1.01%	-0.46%	0.00%	-0.45%
Being Insured By Social Insurance Organisation	-2.69%	0.06%	-2.75%	-2.60%	0.12%	-2.71%
Being Insured By GreenCard	1.46%	-0.15%	1.61%	0.43%	-0.25%	0.68%
Being Insured By Private Organisations	-0.05%	-0.02%	-0.02%	0.00%	0.00%	0.00%
Explained CI			-0.37			-0.326

Table 5.13: Decomposing the differences in the inequalities over time: Bounded Abortion variable

(ii) Abortion

Table 5.12 & 5.13 summarise the decomposition of differences in income related abortion inequalities over time. Abortion is measured by an unbounded indicator, the number of induced abortions, and a bounded indicator, whether an induced abortion has been had. It is important to keep in mind that although the abortion is allowed in Turkey (under certain conditions), the data about abortion still bears the risk of underreporting as it requires asking sensitive questions (Barreto et al., 1992; Bankole et al., 1998; Bankole et al., 1999). Due to the bounds issue of the concentration index (Wagstaff, 2005), the normalised (Wagstaff, 2005) and the corrected (Erreygers, 2009a) concentration indices have been decomposed for the bounded abortion variable.

In general, elasticity differences over time dominate inequality differences implying that the partial associations between covariates and abortion are more influential than income related inequalities of covariates.

For the number of abortions, social security and education are the greatest contributors to the differences in the inequalities over time. Further, living in urban and living in western Turkey also make notable contributions to the inequalities. Contrastingly, age, marital status, ethnicity and region (excluding living in western Turkey) make minor contributions. Having no education significantly increases income related inequalities and its contribution is attributable to the differences in its impacts on abortion. The inequality difference of living in urban areas and age at first marriage make some contributions to income related inequalities; however they are eliminated by the opposite contribution of elasticity difference. Overall, living in urban areas and age at first marriage have notable effects in the inequalities that are attributable to the changes in the elasticities. In addition, living in western Turkey contributes to decreasing income related inequalities and its contribution is attributable to inequality differences. Further, affluent categories are significantly effective in decreasing income related inequalities while deprived ones are effective in increasing the inequalities. However, on the whole, the aggregated wealth contribution has an impact in reducing

income related inequalities. In addition, social security variables make various contributions to income related inequalities with having the least advantageous social security scheme and having no insurance making the greatest two contributions. Accordingly, the distributions of having either of GreenCard or no insurance (by income) significantly contribute to increasing income related inequalities. Their elasticity differences over the years are more effective than inequality differences suggesting that the differences in the partial associations of holding these schemes and abortion are more effective in increasing income related inequalities in abortion.

For the bounded abortion variable, decompositions of the first differences in both indices suggest that age has the largest impacts on the change in income related inequalities. Wealth and living in urban areas also make notable contributions to the changes in the inequalities while education, ethnicity, marital status, region and social security have almost no effect on the differences in income related inequalities. In all cases elasticity differences dominate inequality differences. The differences in the distributions of age (age at first marriage) by income increased income related inequalities over time. Such contributions predominantly stem from the differences in the partial effects of age (age at first marriage) on abortion. Living in urban areas contributes in increasing income related inequalities and its contribution is attributable to the elasticity differences. Surprisingly, wealth variables are not as effective as expected, even though being in the poorest and the richest categories have some impacts in increasing income related inequalities in abortion. The contributions of wealth are predominantly driven by the differences in the partial associations between wealth and abortion rather than the differences in income inequalities.

Changes over time			
Obesity			
BMI			
	Contr.	Dif in CI	Dif in Ela
Respondents' Age At The Time Of Survey	167.04%	4.39%	162.64%
Squared Function Of Respondent's Age	-198.19%	-12.25%	-185.94%
Having No Education At All	-20.60%	50.79%	-71.39%
Being Graduated From Primary Education	-12.52%	22.64%	-35.16%
Being Graduated From Higher Education	8.36%	2.99%	5.37%
Being From Kurdish Background	-176.50%	-43.25%	-133.25%
Being From Arabic Background	17.26%	3.97%	13.29%
Being From Other Non-Turkish Backgrounds	3.18%	-3.77%	6.94%
Being Married	13.05%	15.16%	-2.11%
Being Widowed	-1.48%	-3.92%	2.44%
Respondents' Age At First Marriage	60.97%	46.01%	14.97%
Living In Southern Turkey	-12.42%	-4.82%	-7.60%
Living In Central Turkey	11.96%	-0.14%	12.09%
Living In Northern Turkey	35.35%	2.20%	33.16%
Living In Western Turkey	47.34%	29.21%	18.13%
Living In Urban Turkey	-43.20%	-46.87%	3.67%
Being In The Poorest Wealth Category	-111.46%	28.03%	-139.50%
Being In Poorer Wealth Category	-93.82%	32.41%	-126.23%
Being In Richer Wealth Category	206.36%	52.21%	154.15%
Being In The Richest Wealth Category	236.25%	27.42%	208.83%
Having No Social Security At All	-24.50%	10.24%	-34.74%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	37.98%	-12.22%	50.20%
Being Insured By Social Insurance Organisation	97.38%	-2.42%	99.80%
Being Insured By GreenCard	-148.07%	-33.08%	-114.99%
Being Insured By Private Organisations	0.29%	-6.66%	6.95%
Explained CI			-0.001

Table 5.14: Decomposing the differences in the inequalities over time: Obesity

Changes over time						
Contraception						
Ever used a contraceptive method						
	Wagstaff			Erreygers		
	Contr.	Dif in CI	Dif in Ela	Contr.	Dif in CI	Dif in Ela
Respondents' Age At The Time Of Survey	-11613.97%	-995.71%	-10618.26%	808.89%	37.20%	771.68%
Squared Function Of Respondent's Age	3354.86%	-1378.98%	4733.84%	-257.46%	86.70%	-344.16%
Having No Education At All	-16.85%	-664.85%	647.99%	-21.23%	8.80%	-30.03%
Being Graduated From Primary Education	333.44%	-153.78%	487.22%	-24.10%	11.44%	-35.54%
Being Graduated From Higher Education	595.08%	-25.94%	621.02%	-8.45%	2.07%	-10.51%
Being From Kurdish Background	3410.91%	-521.10%	3932.01%	-148.59%	28.63%	-177.22%
Being From Arabic Background	-1120.37%	-544.93%	-575.43%	7.94%	4.13%	3.80%
Being From Other Non-Turkish Backgrounds	0.84%	-13.72%	14.56%	0.01%	0.07%	-0.06%
Being Married	4630.24%	4962.11%	-331.87%	-62.83%	-67.30%	4.47%
Being Widowed	-79.84%	91.59%	-171.43%	0.42%	-0.68%	1.10%
Respondents' Age At First Marriage	-219.38%	-208.53%	-10.85%	-135.53%	-136.06%	0.53%
Living In Southern Turkey	6.84%	201.01%	-194.17%	-0.16%	-6.94%	6.78%
Living In Central Turkey	-672.64%	-627.42%	-45.22%	31.83%	29.84%	1.99%
Living In Northern Turkey	-328.89%	-223.28%	-105.61%	10.43%	7.36%	3.07%
Living In Western Turkey	-747.77%	-1039.33%	291.55%	30.67%	48.25%	-17.58%
Living In Urban Turkey	-321.47%	-2800.61%	2479.14%	27.19%	167.23%	-140.04%
Being In The Poorest Wealth Category	2364.74%	23.28%	2341.46%	-43.08%	49.67%	-92.75%
Being In Poorer Wealth Category	1054.93%	-70.95%	1125.88%	-48.06%	2.13%	-50.18%
Being In Richer Wealth Category	1721.57%	107.01%	1614.56%	-87.16%	-3.69%	-83.48%
Being In The Richest Wealth Category	-89.24%	4.00%	-93.24%	-6.54%	-11.30%	4.76%
Having No Social Security At All	-94.14%	477.89%	-572.02%	-27.80%	-64.39%	36.59%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	517.36%	-125.80%	643.16%	-15.58%	3.05%	-18.63%
Being Insured By Social Insurance Organisation	738.15%	46.80%	691.36%	-49.98%	-5.88%	-44.10%
Being Insured By GreenCard	-3238.90%	-397.93%	-2840.97%	118.85%	42.00%	76.85%
Being Insured By Private Organisations	-85.51%	-10.25%	-75.25%	0.32%	0.04%	0.28%
Explained CI			0			-0.002

Table 5.15: Decomposing the differences in the inequalities over time: Contraception use

Changes over time			
Number of children			
	Contr.	**Dif in CI**	**Dif in Ela**
Respondents' Age At The Time Of Survey	-697.80%	-9.54%	-688.25%
Squared Function Of Respondent's Age	631.60%	339.19%	292.41%
Having No Education At All	732.75%	-223.96%	956.72%
Being Graduated From Primary Education	-301.59%	-81.81%	-219.78%
Being Graduated From Higher Education	683.87%	2.11%	681.76%
Being From Kurdish Background	230.80%	-548.50%	779.29%
Being From Arabic Background	-482.76%	-358.01%	-124.75%
Being From Other Non-Turkish Backgrounds	8.74%	0.84%	7.90%
Being Married	-205.11%	-217.08%	11.96%
Being Widowed	-13.11%	36.25%	-49.36%
Respondents' Age At First Marriage	455.03%	346.43%	108.60%
Living In Southern Turkey	281.46%	327.94%	-46.48%
Living In Central Turkey	-276.23%	-371.89%	95.65%
Living In Northern Turkey	-108.28%	-143.65%	35.37%
Living In Western Turkey	-491.19%	-950.09%	458.90%
Living In Urban Turkey	901.64%	109.12%	792.51%
Being In The Poorest Wealth Category	672.33%	456.10%	216.24%
Being In Poorer Wealth Category	-68.44%	345.34%	-413.79%
Being In Richer Wealth Category	-824.88%	-170.22%	-654.67%
Being In The Richest Wealth Category	-676.80%	-26.15%	-650.65%
Having No Social Security At All	973.42%	-16.32%	989.74%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	-129.83%	-86.29%	-43.54%
Being Insured By Social Insurance Organisation	-305.50%	5.19%	-310.69%
Being Insured By GreenCard	-922.01%	-305.09%	-616.93%
Being Insured By Private Organisations	31.90%	5.76%	26.14%
Explained CI			0.001

Table 5.16: Decomposing the differences in the inequalities over time: Number of children

5.5. Discussion

In this chapter, the level of income related inequalities in health and fertility have been measured. Subsequently, detected inequalities have been decomposed into their components. Identifying the level of inequalities and the factors associated with them is critical for tackling the inequalities whose existence is the most serious challenge to improve population health (Whitehead and Dahlgren, 1991), as well as unfair and unjust (Whitehead and Dahlgren, 1991; Gwatkin 2000; Woodward and Kawachi, 2000; Marmot, 2007, 2010).

The latest two waves of TDHS, 2003 and 2008, have been employed in the analyses. Separate measurements of income related inequalities have been done for 2003 and 2008. Thus, at the first stage income related inequalities have been decomposed for two different periods separately. This has allowed identifying the factors associated with the increases (or decreases) in income related inequalities in health and fertility in different periods of time. At the second stage, the first difference in income related inequalities over time has been decomposed. Therefore, the factors related to increases (or decreases) in income related inequalities in health and fertility over time have been revealed. To do these, two different aspects of health, i.e., child mortality and obesity, and three different aspects of fertility, i.e., number of children, abortion and contraception, have been considered as health and fertility indicators. As a result, significant inequalities have been observed in all indicators, apart from obesity. Socioeconomic variations of obesity are not as notable as in other aspects of health and fertility. This may highlight indicating issues of obesity. It is believed that, although important inequalities in obesity could not be observed in this study, obesity can still be used as a proxy for health as the links between obesity (or being overweight more generally) and chronic diseases are well-established (Manson et al. 2002; Moreira and Padrao, 2004; Robert and Reither, 2004, Greene et al., 2008).

Accordingly, the inequality analyses of child mortality indicate that child mortality is more concentrated among poorer individuals. Furthermore,

income related inequalities in child mortality have increased over time. The decompositions of the inequalities suggest that wealth, age and age at first marriage have significant effects in increasing income related inequalities in child mortality. In addition, being Kurdish and having no education are traits more concentrated among the worse-off and they have increasing impacts on child mortality. These are associated with their increasing contributions in the inequalities. Additionally, education, wealth, social security and ethnicity make contributions to increasing the inequalities over time. In general, their elasticity differences over time dominate inequality differences suggesting that the different partial associations of covariates and child mortality over time matter more, rather than the differences in their inequalities.

In addition, the inequality analyses show that the inequalities in obesity are not as serious as in other aspects of health and fertility. Nevertheless, there are pro-rich distributions of obesity in both 2003 and 2008. Furthermore, the level of income related inequalities have increased over time (even though the difference is low). In addition, the decomposition of the inequalities suggests that education, wealth and age effects are the largest contributors to income related inequalities in obesity.

The inequality analyses of abortion suggest that abortion is more prevalent among wealthier individuals both in 2003 and 2008. It is understood that poorer individuals became more familiar to abortion over the years since income related inequalities in abortion have decreased over time. The decompositions of the inequalities suggest that wealth, age and living in developed parts of Turkey (like western Turkey and urban Turkey) significantly contribute to the income related inequalities. On the other hand, age and wealth (in addition to education and social security for the probability of having abortion) make important contributions to the decrease in the inequalities over time. In general, their elasticity differences over time dominate the inequality differences suggesting that the different partial associations of covariates and abortion over time matter more, rather than the differences in their inequalities.

For contraception, the inequality analyses indicate that contraceptive use is more concentrated among wealthier women both in 2003 and 2008. Furthermore, income related inequalities in contraceptive use have decreased over time, which may be because poorer individuals became more familiar to family planning over the years. The decompositions of the inequalities reveal that income related inequalities are driven by age effects. In addition, having no education and living in urban Turkey have slight impacts in increasing income related inequalities in contraception.

As for number of children, inequality analyses show that higher numbers of children are more concentrated among poorer women both in 2003 and 2008. It appears that income related inequalities remain almost the same over the years. In addition, the decomposition of the inequalities suggests that wealth, education, ethnicity and age effects are the greatest contributors to the income related inequalities in the number of children.

It is important to note that the findings of this study is only related to ever-married women at reproductive age in Turkey. There could be more robust studies if the data provided detailed information about men, however this was not possible by the nature of the survey. In addition, it is believed that more future studies may be more robust if TDHS supplies more detailed information about income, developmental level of residence and occupation (especially on positional basis).

To sum up, the findings suggest that age, wealth and education are the most important contributors of income related inequalities in health indicators. On the other hand, it appears that not only age, wealth and education, but also living in the developed parts of Turkey also significantly contributes to the inequalities in fertility indicators. Therefore, policies increasing the level of wealth and education among deprived women may be beneficial in reducing the inequalities in child mortality. They may also help in reducing the inequalities in fertility indicators. The results also highlight the importance of issues regarding socioeconomic development (e.g., the accessibility of family planning services) for income related inequalities in fertility. Thus, developing the deprived regions of Turkey and especially, enhancing the accessibility of

family planning services for deprived and/or rural women may be worthwhile in reducing income related inequalities in fertility.

Chapter 6

The socioeconomic determinants of obesity

6.1. Introduction

Socioeconomic variations of obesity have already been investigated in the previous chapter. Since the socioeconomic differences in obesity were not as significant as expected, they will be investigated in this chapter in detail. It is believed that pooling the individuals from different regions with different levels of development, given that western Turkey is substantially more developed than eastern part (Ersungur et al., 2007), caused to observe relatively less prominent results than expected. Hence, the focus of this study will be on regional variations of obesity, as well as socioeconomic variations of obesity. Using data from the latest wave of Turkish Demographic and Health Survey (instead of using the latest two waves) the effects of socio-economic factors on obesity in Turkey will first be explored. In the second step, the determinants of obesity in eastern and western Turkey will be examined separately. A separate treatment of these two regions is interesting, as there is a clear gap in the development of western and eastern Turkey (Ersungur et al., 2007), meaning that for the West one would expect results close to those usually obtained for developed countries, and for the East results close to those from developing countries. Third, income-related inequalities in obesity in Turkish society will be measured. Finally, the identified inequalities, and the obesity gap, between eastern and western Turkey will be decomposed in order to specify the association of each characteristics with inequalities between these regions.

Obesity attracts a great deal of attention since its prevalence dramatically increased in developed societies over the last twenty years period (Cutler et al., 2003; Moreira and Padrao, 2004; Robert and Reither, 2004; Kleiser et al., 2009). The obesity rates in Turkey are similar to those in most of

the developed western countries (see Figure 2.24) and its importance keeps growing as its prevalence has been increasing gradually over the years (see Figures 2.22 & 2.23). Obesity in Turkey is an interesting case as it reflects the characteristics of both developed and developing countries (MoH, 2010).

It is a chronic disease that occurs because of an imbalance between caloric intake and expenditure (Cutler et al., 2003). Concern about obesity has been growing since its prevalence worldwide has almost doubled over the last twenty years (Cutler et al., 2003; Moreira and Padrao, 2004; Robert and Reither, 2004; Kleiser et al., 2009). There are two reasons why the worldwide rise of obesity has triggered concerns: first, from an economic point of view, the increasing prevalence of obesity may increase social and economic costs that are generated by poor health among obese people (such as direct costs of healthcare, decreased productivity in labour market) (Ljungvall and Gerdtham, 2010). Second, from a health perspective, there is a link betweeen excess weight and chronic diseases such as type-2 diabetes, cardiovascular diseases, hypertension, osteo-arthritis and various cancers (Manson et al. 2002; Moreira and Padrao, 2004; Robert and Reither, 2004).

A large number of studies have investigated the causes of obesity. In particular, economists have focused on socio-economic status as a determinant of obesity, in both developed and developing countries, and have generally obtained quite different results (Wamala et al., 1997; Moreira and Padrao, 2004; McLaren, 2007; Kleiser et al., 2009; MacFarlane et al., 2009; Ljungvall and Gerdtham, 2010; Roskam et al., 2010; Steyn et al. 2011). Broadly speaking, obesity is more prevalent among lower socio-economic groups (than among their better-off counterparts) in developed countries, while in developing countries it is more prevalent among higher socio-economic groups (Moore et al., 1962; Goldblatt et al., 1965; Brown and Konner, 1987; Sobal and Stunkard, 1989; McLaren, 2007).

Mainly, two mechanisms have been suggested for the higher obesity rates of disadvantaged people in developed societies; poor dietary intake and

lack of physical activity (Sobal and Stunkard, 1989; WHO, 2000; Cutler et al., 2003; Robert and Reither, 2004; Moreira and Padrao, 2006). Accordingly, the people with lower socioeconomic status may lack of the resources to facilitate healthy diet (Sobal and Cassidy, 1987; Sobal and Stunkard, 1989; Yen and Kaplan, 1998; Robert and Reither, 2004; Moreira and Padrao, 2006). In addition, their food consumption may be increased due to lowered costs of food (cheaper and easier to prepare and/or access) after technological improvements (Cutler et al., 2003). Further, they may also present psyhcosocial and/or cultural context that encourage unhealthy diet (Ross, 2000; Robert and Reither, 2004). Besides, it has been suggested that they may have (i) lower opportunities to support physical activity (Sobal and Stunkard, 1989; WHO, 2000; Robert and Reither, 2004) and (ii) lesser knowledge about the benefits of exercise (Sobal and Stunkard, 1989). In addition, they may have relatively low physical activity at work due to technological increase (Cutler et al., 2003).

On the other hand, two mechanisms have been suggested for the higher obesity prevalence among affluent people in developing societies. Accordingly, their higher obesity may due to their better accessibility to obtain adequate foods (Sobal and Stunkard, 1989, Dake et al., 2010). Additionally, there may be cultural values favoring fatness; that is, obesity may be a sign of health, wealth, social prestige or sexual attractiveness in developing societies and therefore, people may demand more food as they get richer (Sobal and Stunkard, 1989).

Empirical studies in developed societies evidence that individuals with higher socio-economic conditions enjoy relatively low obesity rates. Robert and Reither (2004) investigated obesity in the United States and indicated that individuals with lower socio-economic status (SES) have higher rates of obesity. Wamala et al. (1997), Kleiser et al. (2009) and Roskam et al. (2010) investigated the prevalence of obesity in Sweden, Germany, and nineteen European countries respectively. They found that individuals with higher SES and higher educational attainment have lower obesity rates. In addition, Wamala et al. (1997) detected a positively

related reproductive effect on obesity. MacFarlane et al. (2009) examined obesity in Australia, and indicated that well-off individuals have lower obesity rates than their less-well-off counterparts. Further, they observed the positive effects of being married and increasing age on obesity (MacFarlane et al., 2009).

The observed results of obesity investigations within countries that are in economic transition and have characteristics potentially similar to those of Turkey are somewhat confounded. Zhang (2012) and Ma (2012) examined obesity determinants in China, and found that individuals with higher SES have higher obesity rates. They also found that older, married and urban individuals have obesity rates relatively higher than those of their counterparts (Ma, 2012; Zhang, 2012). Chhabra and Chhabra (2007) investigated obesity in India, and indicated that well-off individuals have higher obesity rates. They also obtained results showing a positive age and urbanisation effect on obesity. Kain et al. (2003) and Filozof et al. (2001) identified the obesity determinants in Latin American countries and observed the positive effects of increasing age and living in urban areas on obesity in Brazil. In addition, they indicated that less-well-off individuals in Brazil have higher obesity rates than their better-off counterparts (Filozof et al., 2001; Kain et al., 2003). Fernald (2007) analysed obesity in Mexico and found that the individuals with higher SES have higher obesity rates.

The results explored by empirical studies in underdeveloped countries are clear, and confirm that individuals experiencing lower socio-economic conditions have lower obesity rates (McLaren, 2007). Steyn et al. (2011), Dake et al. (2010) and Khan and Kraemer (2009) investigated obesity in Kenya and in Ghana and in Bangladesh respectively, and all found that individuals in higher SES groups have higher obesity rates than their less-well-off counterparts. Additionally, Dake et al. (2010) and Khan and Kraemer (2009) detected the positive effects of age, educational attainment, being married and reproductive history on obesity in Ghana and in Bangladesh. Finally, Iseri and Aslan (2008) have also investigated obesity in Turkey. Using a sample consisting of male and female adults,

they observed the significant impacts of age, gender and region on obesity.

This study on obesity is one of those that have been conducted outside of the developed Western world. Moreover, it is the only countrywide-representative study examining obesity determinants and obesity inequalities in Turkey. The study aims to explore the socio-economic determinants of obesity in Turkey, and to ascertain how unequal Turkish people are in terms of obesity. It also proposes to decompose the income-related obesity inequalities and the differences in terms of obesity between eastern and western Turkey into the contributions of obesity determinants. To do this, it uses OLS estimations at the first stage, and quantile regression techniques subsequently. To measure the level of inequality, the study calculates concentration indices using the approach of Kakwani et al. (1997). In order to decompose the income-related inequalities, it uses the approach of Wagstaff et al. (2001); that is the application of Oaxaca's technique (1973) to the decomposition of concentration index (Wagstaff et al., 1991). Additionally, the study employs Oaxaca's (1973) technique to decompose the obesity gap between eastern and western Turkey.

Accordingly, it is found that age, ethnicity, education, income, marital status and employment are significantly associated with obesity in Turkey. In addition, western Turkey is more likely to have characteristics close to those of developed countries, while eastern Turkey is closer to developing countries. As regards analysis of inequality, few income-related obesity inequalities in the whole Turkish population were detected. However, once the individuals are specified by regional disparities, it becomes obvious that obesity is more prevalent among higher socioeconomic groups in eastern Turkey, and among lower socioeconomic groups in western Turkey.

Also, wealth and ethnicity are the dominant contributors towards income-related obesity inequalities between these regions. Such inequalities may be attributable to the differences in the obesity determinants rather than to the inequality in these obesity determinants.

In addition, the differences between the obesity rates of eastern and western Turkey may be attributable to the differences in their characteristics (composition effects) rather than to the differences in coefficients (structural effect). Composition effect is predominantly driven by differences in the distributions of age, ethnicity and education level, while respondents' ages at the time of the survey and at first marriage, marital status, wealth and number of children make the largest contributions to the structural effect.

The next section of the study provides a brief description of the data used. Section 3 describes the empirical work of the study and Section 4 introduces the results. The study concludes with a summation of the findings.

6.2. Data

This chapter uses the latest available wave of the Turkish Demographic and Health Survey. This survey is a representative cross-sectional countrywide survey, which has been repeated every five years since 1968. The latest available wave of the survey, which was carried out in 2008, covers 10,525 households (88.4% response rate in total), with 7,405 individual interviews with ever-married women within the selected households (TDHS, 2008).

Obesity has been measured by Body Mass Index (BMI) and, separately, by respondents being obese. The first outcome variable, BMI, is equal to the weight of the individual (in kilograms) divided by the square of the height of the individual (in metres). It has been calculated using TDHS and ranges from 15.00 to 57.96 in the data. In general, underreporting becomes an issue when weight is self–reported. However, this is not an issue for this study since heights and weights of respondents are measured by interviewers. A dummy variable for being obese – defined as having a BMI score above 30 – is generated as the second outcome variable. Besides this, a range of determinants are considered in the models. A non-linear function of age is included in the models. Education

is measured by four different dummy variables. 'No education' refers to women with no education at all. 'Primary education' indicates the first five years of education, 'secondary education' the next six years. Secondary education will be used as the reference category in the models. Finally, a dummy for higher education is generated for women who have received at least twelve years' education. To control for ethnicity, dummies are included for being Kurdish, for being Arab, and for being of another non-Turkish background, with being Turkish as the base alternative. Marital status is measured by dummies for being married or widowed, with being divorced as the base alternative. The sample does not contain single, never-married women. A continuous variable to measure age at first marriage is also used in the models. Five regional dummies have been generated for northern, southern, western, eastern and central Turkey. Eastern Turkey is the reference category in the models. In addition, a dummy for living in an urban area has been generated, where urban refers to areas with a population of 10,000 or more.

The data set does not contain information on income, but includes a wealth score derived from household ownership of assets (such as a car, a TV, a computer) and housing characteristics (such as location of toilet, building materials, source of water, etc.) (TDHS, 2008). This score has been used in the classification of wealth groups by THDS (ibid.). There is information on five wealth groups in the data set, referring to the respective quintiles of the wealth score. The middle group is used as the reference group in the models.

At the time of the survey, five different public social security agencies were operating in Turkey. The *Social Insurance Organisation* (SIO), The *Social Insurance Agency of Merchants, Artisans and the Self-employed* (BAG-KUR), The *Government Employees' Retirement Fund* (GERF), The *Active Civil Servants Scheme* and *GreenCard.*. In the data, the Active Civil Servants Scheme has been incorporated along with the Government Employees' Retirement Fund by the nature of the survey. It is important to keep in mind that GERF was the most privileged social security group,

while GreenCard was the least beneficial one (Liu et al., 2005, Bugra and Keyder, 2006; Tatar et al., 2007; Yardim et al., 2010; Erus and Aktakke, 2012). Additionally, BAG-KUR and SIO were more beneficial than GreenCard even though their benefits were limited (compared to those provided by GERF) (Bugra and Keyder, 2006; Erus and Aktakke, 2012). Individuals covered by the *Government Employees' Retirement Fund* are the base category, and dummy variables are generated for each of the insurance agencies. In addition, two dummy variables have been created to identify individuals with private insurance and no insurance at all.

Labour force status and occupation are measured by four dummy variables, for non-working individuals, individuals working in agriculture, individuals working in industry, and individuals working in service sectors respectively. Not working is used as the reference category in the models. Finally, a continuous variable has been generated for number of children ever born, since there is a notable literature about reproductive history (Wamala et al., 1997; Khan and Kraemer, 2009; Dake et al., 2010).

Summary statistics		
Variables	**Mean Levels**	
	East	**West**
Respondents' Age At The Time Of Survey	32.652	35.203
Squared Function Of Respondent's Age	1134.56	1307.56
Having No Education At All	0.411	0.078
Being Graduated From Primary Education	0.429	0.562
Being Graduated From Higher Education	0.031	0.098
Being From Kurdish Background	0.563	0.064
Being From Arabic Background	0.036	0.001
Being From Other Non-Turkish Backgrounds	0.003	0.018
Being Married	0.963	0.938
Being Widowed	0.017	0.024
Respondents' Age At First Marriage	18.882	20.727
Living In Urban Turkey	0.644	0.828
Being In The Poorest Wealth Category	0.412	0.072
Being In Poorer Wealth Category	0.255	0.143
Being In Richer Wealth Category	0.107	0.28
Being In The Richest Wealth Category	0.063	0.288
Having No Social Security At All	0.202	0.153
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.07	0.122
Being Insured By Social Insurance Organisation	0.257	0.588
Being Insured By GreenCard	0.378	0.047
Being Insured By Private Organisations	0.009	0.015
Working in Agricultural Sector	0.125	0.099
Working in Industry Sector	0.005	0.044
Working in Service Sector	0.071	0.2
Total number of children ever born	3.615	2.037

Table 6.1: Summary statistics

6.3. Methods

As a first step, BMI and the dummy for being obese are regressed on the socio-economic variables. As always, OLS estimates give the *ceteris paribus* effects of the explanatory variables on the conditional mean (Binder and Coad, 2011). However, focusing only on average effects may hide important relationships between explanatory variables and

outcomes elsewhere in the distribution (ibid.). Instead, quantile regressions techniques are able to describe the relationship of explanatory variables on the entire conditional distribution of the outcome variable (rather than the mean) and provide the possibility of testing whether variables have a heterogeneous or a constant effect on the outcome.

The quantile function, introduced by Koenker and Basset (1978), can be shown as:

$$\boldsymbol{Q_\tau(Y_i|X_i) = F_y^{-1}(\tau|X_i)} \quad (6.1)$$

where y_i is the dependent variable (BMI in this chapter), X is a vector of regressors, τ is the quantile and $F_y(y|X_i)$ is the distribution function of Y_i at y conditional on X_i. The quantile function solves the following minimisation problem:

$$\boldsymbol{Q_\tau(Y_i|X_i) = \arg\min_{q(x)} \mathrm{E}\,[p_t(Y_i - q(X_i))]} \quad (6.2)$$

where p_t is an asymmetric weighting function. To get coefficients, a linear function $X_i'b$ for $q(X_i)$ will be subtracted:

$$\boldsymbol{\beta_t = \arg\min_{b} \mathrm{E}\,[p_t(Y_i - X_i'b)]} \quad (6.3)$$

Following this, concentration indices were employed using the outcome variables to identify income-related inequalities in health. The concentration index is an indicator of health inequality in relation to the socio-economic position of individuals (Erreygers, 2009a). It was introduced by Kakwani (1980) and Wagstaff et al. (1991). The value of the concentration index is twice the area between the diagonal and the concentration curve which can be obtained by plotting the cumulative proportions of the population, ranked by socio-economic status, beginning with the most advantaged (well-off), against the cumulative proportions of the health variable (Kakwani, 1980; Wagstaff et al., 1991).

The concentration index takes values between -1 to 1. It takes positive values when health favours the well-off, and vice versa (van Doorslaer et al., 1997). If the value of the concentration index is 0, this means that the health variable is equally distributed (ibid.). The concentration index can be calculated using the convenient regression approach of Kakwani et al. (1997), as shown below:

$$\mathbf{2}\boldsymbol{\sigma}_{\boldsymbol{R}}^{\mathbf{2}}\left[\frac{\boldsymbol{H_i}}{\boldsymbol{\mu}}\right] = \boldsymbol{\alpha} + \boldsymbol{cR_i} + \boldsymbol{\varepsilon_i} \tag{6.4}$$

where R_i is the relative rank, H_i is the outcome variable under consideration, μ is the mean of the outcome variable, α is the intercept term, and σ_R^2 is the variance of the relative rank (Kakwani et al., 1997). Relative rank is the proportion of income allocations and is constructed by sorting individuals according to income (in this paper, according to wealth score). The value of the concentration index is equal to c in equation 6.4.

Subsequently, income-related obesity inequalities have been decomposed using Wagstaff et al.'s (2001) approach (as shown below), which is an application of the Oaxaca (1973) decomposition technique to the concentration index formula suggested by Wagstaff et al. (1991):

$$\boldsymbol{y_g} = \boldsymbol{X_g\beta_g} + \boldsymbol{\varepsilon_g}\ , \quad \boldsymbol{where}\ \boldsymbol{E}(\boldsymbol{\epsilon_g}) = \mathbf{0}\ \boldsymbol{and}\ \boldsymbol{g}\ \boldsymbol{\epsilon}\ \{\boldsymbol{w}, \boldsymbol{e}\} \tag{6.5}$$

$$\Delta\boldsymbol{C} = \sum_{\boldsymbol{k}} \boldsymbol{\eta_{ke}}(\boldsymbol{C_{ke}} - \boldsymbol{C_{kw}}) + \sum_{\boldsymbol{k}} \boldsymbol{C_{kw}}(\boldsymbol{\eta_{ke}} - \boldsymbol{\eta_{kw}}) + \boldsymbol{\Delta}(\frac{\boldsymbol{GC_{\varepsilon t}}}{\boldsymbol{\mu}}) \tag{6.6}$$

where y denotes the outcome variable (in this paper, BMI or being obese), X is a vector of characteristics, β is a vector of slope parameters including the intercept, ε is the error term, Δ denotes the first differences, η_k is the elasticity of y with respect to k regressor for regarding group (w, e), C represents the concentration indices for k regressors (hence C_{ke} means the concentration indices of k regressors for the east of the country and C_{kw} those for the west), $GC_{\varepsilon t}$ is the generalised concentration index for the error term, and μ is the mean of the outcome variable.

In addition, the obesity differences between eastern and western Turkey have been decomposed using two different procedures. Firstly, mean based decomposition, Oaxaca-Blinder decomposition (Oaxaca, 1973, Blinder 1973), has been performed. Given that E(ε)=0, the total difference in the mean outcome can be decomposed as:

$$\boldsymbol{\Delta y = E(y_w) - E(y_e)}$$

$$\boldsymbol{= E(X_w)\beta_w - E(X_w)\beta_e + E(X_w)\beta_e - E(X_e)\beta_e} \quad (6.7)$$

where $\boldsymbol{E(X_w)\beta_e}$ is the unconditional counterfactual distribution of outcome at the mean. Hence the equation can be re-arranged as:

$$\boldsymbol{= E(X_w)[\beta_w - \beta_e] + \beta_e[E(X_w) - E(X_e)]}$$

$$\boldsymbol{= \hat{\Delta}_S^{\mu} + \hat{\Delta}_X^{\mu}} \quad (6.8)$$

where y is the outcome variable (in this paper, BMI or being obese), w denotes western Turkey, and e denotes eastern Turkey. Accordingly, the difference in obesity between eastern and western Turkey contains a part explained by group differences in the coefficients (including intercepts) – structural effect, $\hat{\Delta}_S^{\mu}$, – and a part explained by group differences in the distributions of characteristics – composition effect, $\hat{\Delta}_X^{\mu}$.[2] Because of the additive linearity assumption, structure and composition effects can be written in terms of sums over the explanatory variables (Firpo et al., 2009):

$$\hat{\Delta}_S^{\mu} = \left(\widehat{\boldsymbol{\beta}}_{w0} - \widehat{\boldsymbol{\beta}}_{e0}\right) + \sum_{k=1}^{P} \overline{\boldsymbol{X}}_{wk}\left(\widehat{\boldsymbol{\beta}}_{wk} - \widehat{\boldsymbol{\beta}}_{ek}\right) \quad (6.9)$$

$$\hat{\Delta}_X^{\mu} = \sum_{k=1}^{P} (\overline{\boldsymbol{X}}_{wk} - \overline{\boldsymbol{X}}_{ek})\,\widehat{\boldsymbol{\beta}}_{ek} \quad (6.10)$$

[2] These components are estimated using a specified STATA command called 'Oaxaca' (Jann, 2008).

where $(\widehat{\boldsymbol{\beta}}_{\boldsymbol{w0}} - \widehat{\boldsymbol{\beta}}_{\boldsymbol{e0}})$ indicates the omitted group effect, $\overline{\boldsymbol{X}}_{\boldsymbol{gk}}$ and $\widehat{\boldsymbol{\beta}}_{\boldsymbol{gk}}$ indicate the k^{th} element of $\overline{\boldsymbol{X}}_{\boldsymbol{g}}$ and $\widehat{\boldsymbol{\beta}}_{\boldsymbol{g}}$ respectively. $(\overline{\boldsymbol{X}}_{\boldsymbol{wk}} - \overline{\boldsymbol{X}}_{\boldsymbol{ek}})\widehat{\boldsymbol{\beta}}_{\boldsymbol{ek}}$ and $\overline{\boldsymbol{X}}_{\boldsymbol{wk}}(\widehat{\boldsymbol{\beta}}_{\boldsymbol{wk}} - \widehat{\boldsymbol{\beta}}_{\boldsymbol{ek}})$ are the respective contributions of the k^{th} covariate to composition and structure effect (Firpo et al., 2009).

Afterwards, Recentered Influence Function Regression (hereafter RIFR) decomposition method (Firpo et al., 2009) has been employed to understand the contributions of individual covariates at different quantiles. The RIFR estimates the marginal effects of a set of characteristics on an unconditional distributional statistic of an outcome variable (ibid.).

In this chapter, the models for eastern and western Turkey are estimated by regressing the RIFR of BMI on the vector of covariates for each quartile[3]:

$$\boldsymbol{q}_{\boldsymbol{r},\boldsymbol{\tau}} = \boldsymbol{E}_{\boldsymbol{X}}\left[\boldsymbol{E}\left[\widehat{\boldsymbol{RIF}}\left(\boldsymbol{BMI}_{\boldsymbol{r}}; \boldsymbol{q}_{\boldsymbol{r},\boldsymbol{\tau}}\right)|\boldsymbol{X}_{\boldsymbol{r}}\right]\right] = \boldsymbol{E}[\boldsymbol{X}_{\boldsymbol{r}}]\widehat{\boldsymbol{\delta}}_{\boldsymbol{r},\boldsymbol{\tau}}, \qquad \boldsymbol{r} \boldsymbol{\epsilon} \{\boldsymbol{West}, \boldsymbol{East}\} \qquad (6.11)$$

where

$$\boldsymbol{RIF}(\boldsymbol{BMI}; \boldsymbol{q}_{\boldsymbol{\tau}}) = \boldsymbol{q}_{\boldsymbol{\tau}} + \frac{\boldsymbol{\tau} - \boldsymbol{1}[\boldsymbol{BMI} \leq \boldsymbol{q}_{\boldsymbol{\tau}}]}{\boldsymbol{f}_{\boldsymbol{BMI}}(\boldsymbol{q}_{\boldsymbol{\tau}})} \qquad (6.12)$$

where q_τ is the quantile of BMI, $q_{r,\tau}$ is the unconditional quantile of BMI for eastern and western Turkey, $f_{BMI}(q_\tau)$ is the unconditional density of BMI at τth quantile, $1[BMI \leq q_\tau]$ is an indicator function for whether outcome variable is smaller or equal to the τth quantile, X is the vector of covariates and $\hat{\delta}_{r,\tau}$ is the coefficient of the RIF regression that captures the marginal effect of a change in distribution of characteristic on the unconditional quantile of BMI. Therefore the difference between eastern and western Turkey at the τth quantile of BMI can be decomposed into composition and structural effects as follows:

[3]The estimations are performed using the STATA "rifreg" command which is available for download as an RIF-regression STATA ado file from Firpo et al. (2009): http://faculty.arts.ubc.ca/nfortin/datahead.html.

$$\hat{\Delta}^{\tau}_{BMI} = \left[\widehat{RIF}\left(BMI_W; q_{W,\tau}\right) - \widehat{RIF}\left(BMI_E; q_{E,\tau}\right)\right] \quad (6.13)$$

$$= \bar{X}_E\left(\hat{\delta}_{W,\tau} - \hat{\delta}_{E,\tau}\right) + \left(\bar{X}_W - \bar{X}_E\right)\hat{\delta}_{E,\tau} \quad (6.14)$$

$$= \hat{\Delta}^{\tau}_{S} + \hat{\Delta}^{\tau}_{X} \quad (6.15)$$

then structural and composition effect can be written in terms of the sum of contribution of each covariate as:

$$\hat{\Delta}^{\tau}_{S} = \left(\hat{\delta}_{w0} - \hat{\delta}_{e0}\right) + \sum_{k=1}^{P} \bar{X}_{wk,\tau}\left(\hat{\delta}_{wk} - \hat{\delta}_{ek}\right) \quad (6.16)$$

$$\hat{\Delta}^{\tau}_{X} = \sum_{k=1}^{P} \left(\bar{X}_{wk} - \bar{X}_{ek}\right)\hat{\beta}_{ek,\tau} \quad (6.17)$$

where $\left(\hat{\beta}_{w0} - \hat{\beta}_{e0}\right)$ indicates the omitted group effect, $\bar{X}_{gk\tau}$ and $\hat{\beta}_{gk\tau}$ indicate the k^{th} element of $\bar{X}_g$ and $\hat{\beta}_g$ at τ quartile respectively. $\left(\bar{X}_{wk} - \bar{X}_{ek}\right)\hat{\beta}_{ek,\tau}$ and $\bar{X}_{wk,\tau}\left(\hat{\beta}_{wk} - \hat{\beta}_{ek}\right)$ are the respective contributions of the k^{th} covariate to composition and structure effect at τ quartile (Firpo et al., 2009).

6.4. Results

6.4.1. Determinants of obesity

Obesity				
	BMI		Being obese	
	coef.	Robust S.E	coef.	Robust S.E
Respondents' Age At The Time Of Survey	0.411***	0.063	0.017***	0.005
Squared Function Of Respondent's Age	-0.002**	0.001	0.000	0.000
Having No Education At All	1.720***	0.257	0.130***	0.022
Being Graduated From Primary Education	1.368***	0.174	0.092***	0.014
Being Graduated From Higher Education	-0.546**	0.274	-0.037	0.023
Being From Kurdish Background	-1.168***	0.209	-0.088***	0.019
Being From Arabic Background	0.223	0.391	0.016	0.035
Being From Other Non-Turkish Backgrounds	-1.965***	0.648	-0.113**	0.054
Being Married	1.542***	0.373	0.102***	0.031
Being Widowed	1.269**	0.635	0.066	0.052
Respondents' Age At First Marriage	-0.139***	0.018	-0.010***	0.002
Living In Southern Turkey	-0.081	0.219	-0.034*	0.02
Living In Central Turkey	0.036	0.211	-0.001	0.018
Living In Northern Turkey	0.008	0.258	-0.006	0.022
Living In Western Turkey	-0.238	0.208	-0.025	0.018
Living In Urban Turkey	0.321*	0.173	0.008	0.015
Being In The Poorest Wealth Category	-1.004***	0.237	-0.082***	0.021
Being In Poorer Wealth Category	-0.488**	0.193	-0.047***	0.017
Being In Richer Wealth Category	-0.663***	0.201	-0.047***	0.017
Being In The Richest Wealth Category	-1.062***	0.234	-0.072***	0.02
Having No Social Security At All	-0.940***	0.275	-0.058**	0.024
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	-0.375	0.274	0.000	0.024
Being Insured By Social Insurance Organisation	-0.339	0.236	-0.02	0.02
Being Insured By GreenCard	-0.988***	0.287	-0.065***	0.025
Being Insured By Private Organisations	-1.677***	0.59	-0.067	0.052
Working in Agricultural Sector	-0.362*	0.203	-0.013	0.018
Working in Industry Sector	-0.986**	0.439	-0.115***	0.039
Working in Service Sector	-0.547***	0.197	-0.058***	0.017
Total number of children ever born	0.102**	0.048	0.005	0.004
Cons	18.235***	1.075	-0.124	0.091
R-squared	0.23		0.15	
Num.of.obs	6796		6796	

Table 6.2: Results of the regressions for obesity

(i) Determinants of obesity: Entire population

The determinants of obesity have also been investigated in the fourth chapter using the latest two waves of TDHS. Instead, in this chapter, the determinants have been identified using only the last wave. The benefit of such application is to include occupational variables. They could not be reckoned in the previous analysis as they are not available in earlier waves of TDHS. In addition, the number of children has also been included in the model since the link between reproductive history and obesity is well-established in the literature (Wamala et al., 1997). It could not be incorporated in previous models as it was one of the outcomes under examination in the analysis.

The results are presented in Table 6.2. BMI and being obese are positively associated with age. Age-squared has statistically significant impact on BMI (while it has no effect on being obese), suggesting a positive non-linear relationship between age and BMI. There is a clear gradient with education; BMI scores and the prevalence of being obese tend to decrease with increasing years of education. Women with no (higher) education have higher (lower) obesity than reference category (secondary education graduates). This may be because education promotes healthy behaviour that reduces the risk of obesity (Sobal, 1991). The result confirms the findings of the literature for developed countries (McLaren, 2007; Roskam et al., 2010). BMI scores and obesity prevalence are lower among Non-Turkish women (apart from Arabic samples) than among Turkish women. Married women have higher BMI scores and higher obesity prevalence than their divorced counterparts, as observed in both developed and developing countries. In addition, early-married women have even slightly higher obesity rates. This may be related to the role theory–marital causation model (Hardy and Conway, 1978; Biddle, 1979, 1986; Sobal et al., 1992), which suggests that married people are more likely to be obese. According to the model, this may be because: single people may have poorer dietary intake and may control their weight so as to attract a mate, and once they get married

weight control may be less important to them (Verbrugge, 1979; Stuart and Jacobson, 1987).

Being in different regions has various effects on BMI and being obese, even if most of the coefficients are not statistically significant. Also, urban women have higher BMI scores and obesity prevalence than their counterparts in rural areas. This may be because both eating habits and physical activities. Hence it may be the case if urban women are more likely to have calorie intense food intake (i.e., a diet that is high in saturated fat such as fast-food) and/or rural women do not have proper food intake (Cutler et al., 2003). Additionally, it may also be possible if rural women have higher physical activity (by doing agricultural work which is labour intense) and urban women have relatively low physical activity (Cutler et al., 2003; Chhabra and Chhabra, 2007). This confirms the findings of the literature on developing countries (Filozof et al., 2001; Kain et al., 2003; Chhabra and Chhabra, 2007; Zhang, 2012), while rural women in developed countries have higher obesity rates (Jackson et al., 2005; Borders et al. 2006). BMI is also considerably affected by wealth; the gradient is U-shaped. For instance, the least advantaged groups have lower BMI scores and lower obesity prevalence than the reference category (middle wealth group). In other words, individuals with lower SES have lower obesity rates. On the other hand, the most advantaged groups also have lower BMI scores and lower obesity prevalence than the reference category; for example, individuals with higher socioeconomic status have lower obesity rates. These results depict the effects of wealth on obesity in developing and developed countries respectively.

All the social security categories have lower BMI scores than the most advantageous social security group (GERF-base alternative). In addition, the women with the least beneficial social security scheme (GreenCard) and no social security at all have a lower prevalence of obesity than the reference (the most privilege category-GERF). These results are close to those of the literature on developing countries. All the working women have lower BMI scores and lower obesity prevalence than non-working women, which shows the negative effects of occupation on obesity. This

may be because of the physical (in)activity of (non-) working women. Finally, number of children is positively associated with BMI (while it seems to have virtually no effect on being obese), which confirms the results observed for the impacts of reproductive history on obesity (Wamala et al., 1997).

In sum the findings mostly show similarities with the literature for the countries in economic transition (Filozof et al., 2001; Kain et al., 2003; Chhabra and Chhabra, 2007; Fernald, 2007; Ma, 2012; Zhang, 2012). Increasing effects of age and marital status on obesity confirm the existing literature for both developing and developed societies, since their effects do not vary upon development (Filozof et al., 2001; Kain et al., 2003; Chhabra and Chhabra, 2007; Khan and Kraemer, 2009; MacFarlane et al., 2009; Dake et al., 2010; Ma, 2012; Zhang, 2012). In addition to these, the findings for urbanisation (Filozof et al., 2001; Kain et al., 2003; Chhabra and Chhabra, 2007; Zhang, 2012) and social security (Fernald, 2007; Khan and Kraemer, 2009; Steyn et al., 2011) are in line with those obtained for developing societies, suggesting that urbanised and affluent women have relatively high obesity. Contrastingly, the findings for education confirm the literature from developed societies, that is better educated individuals have lower obesity (McLaren, 2007; Roskam et al., 2010). Interestingly, the effects of wealth confirming the findings not only from developing societies, but also from developed societies have been observed.

In addition, quantile regressions have been performed for BMI to ascertain the effects of obesity determinants in different quartiles. Since there is no significant differences from the results obtained from OLS estimations, the results of quantile regressions are presented by quantile regression diagrams for each explanatory variable in the appendix.

	BMI			
	East		West	
	coef.	Robust S.E	coef.	Robust S.E
Respondents' Age At The Time Of Survey	0.564***	0.106	0.446***	0.136
Squared Function Of Respondent's Age	-0.004**	0.002	-0.002	0.002
Having No Education At All	1.639***	0.391	1.177*	0.668
Being Graduated From Primary Education	1.204***	0.347	1.012***	0.341
Being Graduated From Higher Education	-0.183	0.684	-0.485	0.45
Being From Kurdish Background	-1.061***	0.271	-0.498	0.563
Being From Arabic Background	-0.429	0.656	-5.918***	0.692
Being From Other Non-Turkish Backgrounds	0.171	1.232	-1.664*	0.877
Being Married	0.907	0.81	1.812***	0.639
Being Widowed	1.193	1.381	0.652	1.072
Respondents' Age At First Marriage	-0.179***	0.032	-0.146***	0.036
Living In Urban Turkey	0.389	0.293	0.525	0.447
Being In The Poorest Wealth Category	-1.432***	0.381	0.106	0.648
Being In Poorer Wealth Category	-0.408	0.351	-0.655	0.427
Being In Richer Wealth Category	-0.698	0.453	-0.732**	0.367
Being In The Richest Wealth Category	-1.204**	0.567	-1.551***	0.399
Having No Social Security At All	-0.547	0.502	-0.773	0.597
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.66	0.587	-0.345	0.574
Being Insured By Social Insurance Organisation	0.457	0.466	-0.345	0.492
Being Insured By GreenCard	-0.257	0.491	-0.534	0.813
Being Insured By Private Organisations	-0.674	0.973	-0.711	1.271
Working in Agricultural Sector	-0.475	0.328	-0.213	0.538
Working in Industry Sector	-2.599**	1.029	-1.300**	0.543
Working in Service Sector	-0.382	0.501	-0.317	0.329
Total number of children ever born	0.002	0.07	0.15	0.131
Cons	17.295***	1.877	17.130***	2.284
R-squared	0.25		0.21	
Num.of.obs	1960		1752	

Table 6.3[4]: Estimations for BMI: East and West

[4] The average effects of social security variables are significantly different from those obtained for whole population (shown in Table 2); this is mainly because of their average effects in northern Turkey which are not presented in this study.

	Obese			
	East		West	
	coef.	Robust S.E	coef.	Robust S.E
Respondents' Age At The Time Of Survey	0.031***	0.01	0.007	0.011
Squared Function Of Respondent's Age	0.000	0.000	0.000	0.000
Having No Education At All	0.128***	0.036	0.092*	0.056
Being Graduated From Primary Education	0.088***	0.031	0.068**	0.027
Being Graduated From Higher Education	-0.017	0.062	-0.055	0.034
Being From Kurdish Background	-0.091***	0.026	-0.023	0.048
Being From Arabic Background	-0.031	0.056	-0.321***	0.081
Being From Other Non-Turkish Backgrounds	-0.021	0.131	-0.061	0.077
Being Married	0.048	0.076	0.166***	0.051
Being Widowed	0.098	0.116	0.049	0.089
Respondents' Age At First Marriage	-0.012***	0.003	-0.007***	0.003
Living In Urban Turkey	0.008	0.026	0.034	0.035
Being In The Poorest Wealth Category	-0.081**	0.036	-0.034	0.056
Being In Poorer Wealth Category	-0.032	0.033	-0.065*	0.038
Being In Richer Wealth Category	-0.027	0.04	-0.055*	0.032
Being In The Richest Wealth Category	-0.05	0.051	-0.098***	0.035
Having No Social Security At All	-0.016	0.047	-0.026	0.05
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.073	0.055	0.035	0.05
Being Insured By Social Insurance Organisation	0.044	0.044	-0.029	0.041
Being Insured By GreenCard	0.000	0.046	-0.037	0.072
Being Insured By Private Organisations	-0.031	0.107	0.049	0.1
Working in Agricultural Sector	-0.024	0.033	0.000	0.047
Working in Industry Sector	-0.182	0.131	-0.159***	0.043
Working in Service Sector	-0.061	0.042	-0.03	0.028
Total number of children ever born	-0.003	0.006	0.020*	0.011
Cons	-0.281	0.175	-0.118	0.187
R-squared	0.15		0.15	
Num.of.obs	1960		1752	

Table 6.4[5]: Estimations for being obese: East and West

[5] The average effects of social security variables are significantly different from those obtained for whole population (shown in Table 2); this is mainly because of their average effects in northern Turkey which are not presented in this study.

(ii) Determinants of obesity: East & West comparison

There is a clear gap between the developments of western and eastern Turkey. Ersungur et al. (2007) investigated the development of the regions of Turkey by generating a development index (using per capita GDP, banking, urbanisation, schooling, healthcare, investment, employment and export rates), and observed that western Turkey constitutes the most developed part of Turkey, whereas eastern Turkey forms the least developed part. Since OLS estimations detect the average effects of explanatory variables, combining the observations from these two regions of Turkey will be tricky. Pooling the observations from different areas may lead us to observe the characteristics of both developed and developing countries. Therefore, the models are split into two different sample sets: (i) eastern samples and (ii) western samples. One might expect that western Turkey would reflect characteristics close to those of developed countries whereas eastern Turkey might depict characteristics similar to those of developing countries.

The results are presented in Tables 6.3 & 6.4. Age is positively associated with obesity in both western and eastern Turkey, and has larger estimated marginal effect in the latter. Obesity is negatively correlated with years of education. Kurdish women living in western Turkey have relatively higher BMI scores and are more likely to be obese than their counterparts in eastern Turkey. Marital status has significant and positive impacts on obesity in both regions, and has even more effects in western Turkey. Obesity rates are higher among early-married samples, and the effects of age at first marriage on obesity are relatively higher in eastern Turkey. Less-well-off women in eastern Turkey have relatively lower obesity prevalence and lower BMI scores than their counterparts in western Turkey.

By contrast, better-off women in western Turkey have relatively lower obesity prevalence and lower BMI scores than their counterparts in eastern Turkey. This again evidences the similarity between western Turkey and developed countries, while eastern Turkey exhibits the characteristics of developing countries. In addition, all the working

categories in eastern Turkey have relatively lower obesity prevalence, and lower BMI scores, than their counterparts in western Turkey. Finally, the number of children ever born has positive and stronger effects on being obese in western Turkey than in the eastern part.

6.4.2. Inequality analyses

	BMI		OBESE	
	Con. Index	**Mean**	**Con. Index**	**Mean**
Combined	0.001	28.17	0.006	0.34
East	0.016***	27.80	0.087***	0.32
West	-0.012***	28.14	-0.073***	0.33

Table 6.5: Concentration Indices

(i) Concentration Indices

In additon to the identification of obesity determinants, concentration indices have been calculated to explain the income-related inequalities in obesity. Obesity has been measured by BMI and being obese, as in previous estimations. The results are presented in Table 6.5.

The calculated concentration indices are 0.001 and 0.006 for BMI and being obese, respectively. There is pro-rich distribution of obesity among ever-married women (even if there are not too many income-related obesity inequalities) since the signs of the indices are positive. However, the indices (for entire population) are not statistically significant, implying that they are not statistically different from zero.

Further, the concentration indices for BMI and being obese are, respectively, 0.016 and 0.087 in the east of the country and -0.012 and -0.073 in the west. It seems that obesity distribution also is pro-rich in eastern Turkey while it is pro-poor in western Turkey. In other words, obesity is more concentrated among wealthier individuals in eastern Turkey, while in western Turkey it is more concentrated among poorer individuals. These findings confirm that western Turkey is more likely to have the characteristics of developed countries, while the characteristics

of eastern Turkey are closer to those of developing countries. Since the value of the concentration index depends upon the mean of the outcome variable, it is difficult to make a direct comparison between concentration indices of the outcome variables with different means (Erreygers, 2009a). Hence, to eliminate the difficulty of directly comparing the concentration indices, the value of the concentration index will be multiplied by the mean of the outcome variable. Thereby, it can be understood that income-related inequality in obesity is higher in eastern Turkey than in western Turkey.

	Concentration Indices		Contributions					
	West	East	Obese			BMI		
			El. Dif.	CI Dif.	Total	El. Dif.	CI Dif.	Total
Age					**-0.42%**			**-4.83%**
Age	0.015	0.012	*23.54%*	*-6.49%*	17.05%	*4.57%*	*-7.18%*	-2.61%
Age-squared	0.024	0.021	*-18.99%*	*1.52%*	-17.47%	*-4.33%*	*2.11%*	-2.22%
Education					**0.93%**			**1.80%**
No education	-0.495	-0.272	*-48.63%*	*25.17%*	-23.46%	*-38.59%*	*20.09%*	-18.50%
Primary education	-0.157	0.075	*-0.37%*	*18.86%*	18.49%	*0.96%*	*16.05%*	17.01%
Higher Education	0.618	0.758	*6.05%*	*-0.16%*	5.89%	*3.39%*	*-0.11%*	3.29%
Ethnicity					**25.67%**			**17.58%**
Kurdish	-0.397	-0.239	*42.50%*	*-17.42%*	25.08%	*30.04%*	*-12.65%*	17.39%
Arabic	0.708	-0.33	*-1.14%*	*2.45%*	1.31%	*-0.82%*	*2.13%*	1.31%
Other races	-0.297	0.529	*-0.62%*	*-0.10%*	-0.72%	*-1.17%*	*0.05%*	-1.12%
Marital Status					**0.51%**			**0.53%**
Married	-0.001	0.003	*0.26%*	*0.46%*	0.72%	*0.13%*	*0.54%*	0.66%
Widowed	-0.098	-0.122	*-0.12%*	*-0.09%*	-0.21%	*-0.07%*	*-0.07%*	-0.14%
Age at first marriage	0.027	0.025	*-4.65%*	*0.83%*	**-3.83%**	*-1.39%*	*0.76%*	**-0.63%**
Urban	0.094	0.256	*-4.46%*	*1.82%*	**-2.64%**	*-2.24%*	*5.44%*	**3.19%**
Wealth					**56.46%**			**66.00%**
Poorest	-0.928	-0.587	*61.11%*	*-24.24%*	36.86%	*74.22%*	*-26.96%*	47.26%
Poorer	-0.71	0.08	*-0.96%*	*-13.84%*	-14.79%	*1.13%*	*-11.02%*	-9.89%
Richer	0.146	0.767	*3.70%*	*-3.90%*	-0.20%	*2.50%*	*-6.19%*	-3.70%
Richest	0.709	0.938	*36.13%*	*-1.55%*	34.59%	*34.63%*	*-2.31%*	32.32%
Soc. Security Status					**9.64%**			**10.31%**
No social security	-0.304	-0.175	*-0.43%*	*-0.90%*	-1.33%	*-0.27%*	*-1.90%*	-2.16%
Bag-Kur	0.106	0.448	*0.21%*	*3.72%*	3.94%	*1.24%*	*2.11%*	3.35%
SIO	0.053	0.32	*3.15%*	*6.55%*	9.71%	*2.25%*	*4.19%*	6.44%
GreenCard	-0.654	-0.329	*-2.00%*	*-0.18%*	-2.18%	*6.36%*	*-4.23%*	2.13%
Private insurance	0.345	-0.054	*-0.75%*	*0.25%*	-0.50%	*0.21%*	*0.33%*	0.54%
Employment Status					**2.76%**			**2.55%**
Agricultural Work	-0.576	-0.45	*3.85%*	*-0.82%*	3.02%	*2.97%*	*-1.00%*	1.96%
Indsutrial Work	-0.023	0.114	*-0.28%*	*-0.27%*	-0.55%	*-0.13%*	*-0.24%*	-0.38%
Service sector	0.241	0.292	*0.77%*	*-0.47%*	0.29%	*1.15%*	*-0.19%*	0.96%
Number of children	-0.082	-0.137	*9.29%*	*1.62%*	**10.92%**	*3.43%*	*0.07%*	**3.50%**

Table 6.6: Income related inequality between Eastern and Western Turkey

(ii) Decomposition of income related obesity inequalities

Table 6.6 decomposes the income-related obesity inequalities between eastern and western Turkey into the contributions of regressor variables (in percentages). Each variable's contribution can be interpreted as follows: if the distributions of related variable were equal in eastern and western Turkey, or if the related variable had zero elasticity, the income-related inequalities would be that much higher (or lower).

Accordingly, wealth and ethnicity are the dominant contributors to income-related obesity inequality. Respondents' ages (at the time of the survey) along with age at first marriage, urbanisation, marital status and employment status make minor contributions. In general, the elasticity differences between eastern and western Turkey dominate the inequality differences; that is, differences in obesity determinants, rather than differences in the inequality in obesity determinants, account for the rise of income-related inequalities in obesity between these regions.

Lower education is relatively more concentrated among the poor in the west than in the east. By contrast, higher education is relatively more concentrated among the rich in eastern Turkey than it is in western Turkey. Hence it can be said that higher education levels are more prevalent among western women than among their eastern counterparts. Even the contributions of educational variables on the inequalities are evident; they are offset by one another, and the total contributions are negligible. As regards ethnicity, only the contributions made by Kurdish ethnic origin are considerable, since other contributions are fairly small. Being Kurdish notably increases income-related obesity inequalities, such a rise being attributable to the differences in the distributions of Kurdish women in these regions. This was expected, since Kurdish women are more concentrated in the east (approximately 9% in the west, 85% in the east – also see Figure 6.2), and those living in the west have higher BMI levels (on average) than their counterparts in the east (Figure 6.1).

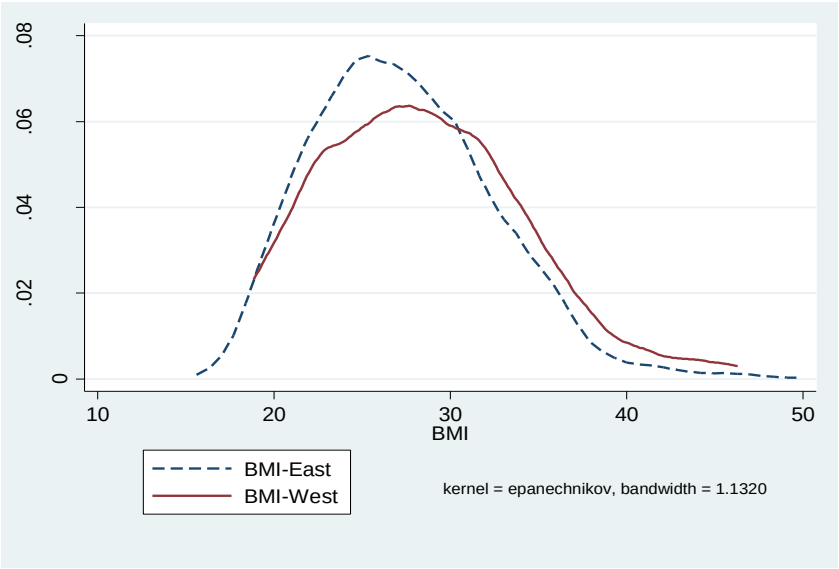


Figure 6.1: BMI distribution – East and West

In addition, wealth contributes more than 50 per cent to income-related obesity inequalities, and again the rise is predominantly due to the differences in the partial associations between wealth (as a determinant of obesity) and obesity rather than to the differences in income inequalities. This may be related to food intake, if it is the case that eastern women cannot afford food as well as western women. Social security status makes some contribution to the total; however, individual insurance schemes do not (apart from *Social Insurance Organisation*) make a notable contribution. The contribution of *Social Insurance Organisation* may be attributable to inequalities relating to being insured by *Social Insurance Organisation*, this being relatively more pro-rich in eastern Turkey. Finally, number of children contributes 10 per cent towards being obese, this contribution being formed by the differences in the impacts of number of children on obesity. This was expected, since there is a clear gap between the two regions in terms of number of children (Figure 6.2).

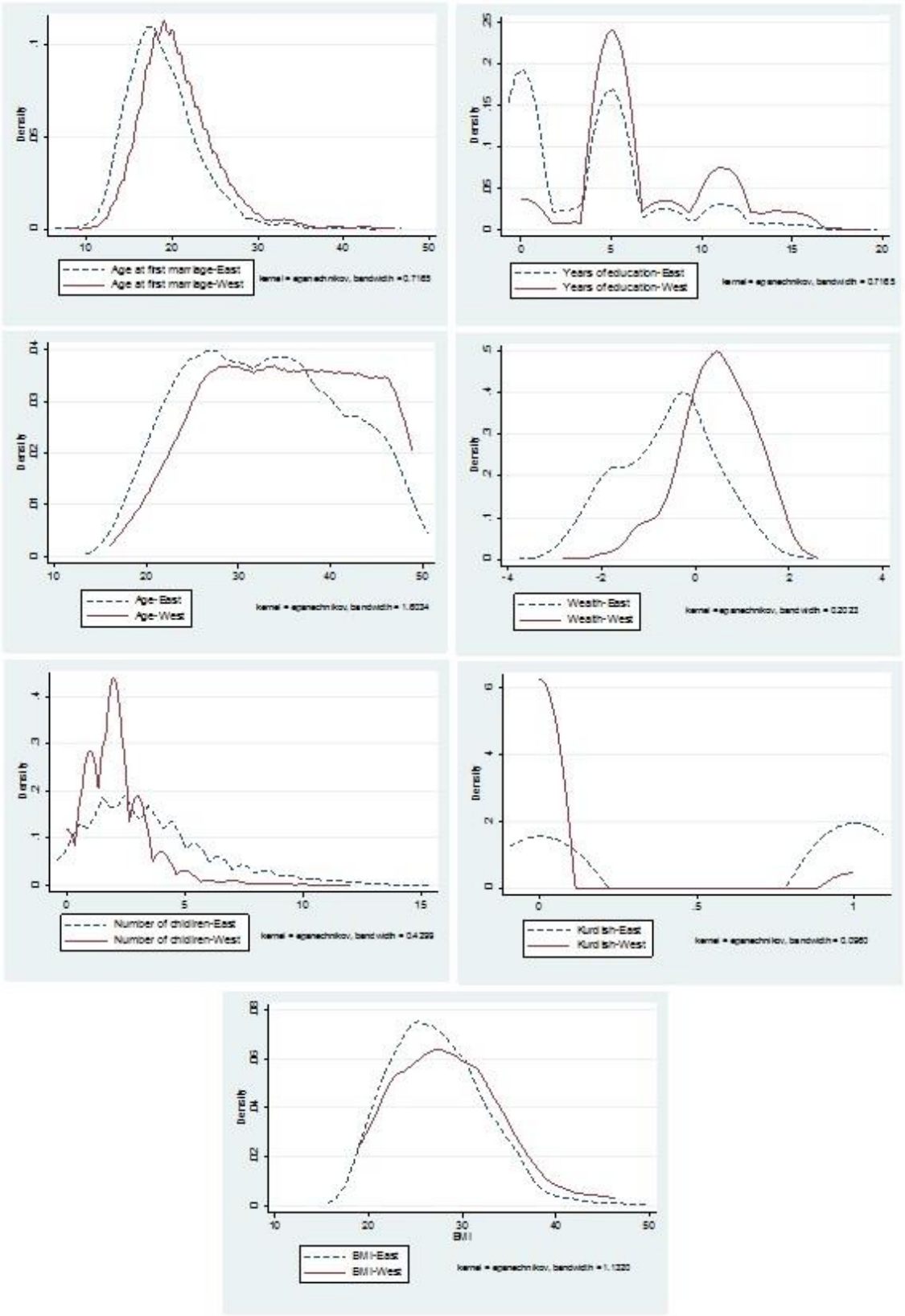


Figure 6.2: Differences in the distributions: East - West

Mean Levels		
	Obese	**BMI**
East	0.32	27.8
West	0.34	28.15

Table 6.7: Mean levels of being obese and BMI

Aggregate Decompositions of obesity differences

Oaxaca-Blinder Decomposition (Oaxaca, 1973)

Difference attributable to:	**BMI**		**Obese**	
	mean	**%change**	**mean**	**%change**
Characteristics	0.857	246.22%	0.065	412.80%
Coefficients	0.418	120.04%	0.038	239.08%
Interaction	-0.927	-266.26%	-0.087	-551.88%
Total Difference	0.348	100.00%	0.016	100.00%

RIFR Decomposition (Firpo et al., 2009)

Difference attributable to:	**BMI**					
	Q25	**%change**	**Q50**	**%change**	**Q75**	**%change**
Characteristics	0.568	808.80%	0.958	3152.11%	0.921	186.32%
Coefficients	0.208	295.84%	0.339	1116.12%	0.445	90.00%
Interaction	-0.705	-1004.64%	-1.266	-4168.23%	-0.872	-176.32%
Total Difference	0.07	100.00%	0.03	100.00%	0.494	100.00%

Table 6.8: Aggregate Decompositions of obesity differences

	Mean-based Decomposition							
	Obese				BMI			
	Endowments		Coefficients		Endowments		Coefficients	
Age	**0.047**	**72%**	**-0.407**	**-1074%**	**0.683**	**80%**	**-1.541**	**-369%**
Age	*0.079*	*121%*	*-0.758*	*-2002%*	*1.394*	*163%*	*-3.273*	*-783%*
Age-squared	*-0.032*	*-49%*	*0.351*	*928%*	*-0.711*	*-83%*	*1.732*	*415%*
Education	**-0.032**	**-49%**	**-0.025**	**-65%**	**-0.398**	**-46%**	**-0.281**	**-67%**
No education	*-0.043*	*-66%*	*-0.015*	*-40%*	*-0.546*	*-64%*	*-0.19*	*-45%*
Primary education	*0.012*	*18%*	*-0.008*	*-22%*	*0.16*	*19%*	*-0.082*	*-20%*
Higher Education	*-0.001*	*-2%*	*-0.001*	*-3%*	*-0.012*	*-1%*	*-0.009*	*-2%*
Ethnicity	**0.046**	**71%**	**0.028**	**74%**	**0.547**	**64%**	**0.116**	**28%**
Kurdish	*0.046*	*70%*	*0.039*	*102%*	*0.529*	*62%*	*0.317*	*76%*
Arabic	*0.001*	*2%*	*-0.01*	*-27%*	*0.015*	*2%*	*-0.196*	*-47%*
Other races	*0*	*0%*	*0*	*0%*	*0.003*	*0%*	*-0.005*	*-1%*
Marital Status	**-0.001**	**-1%**	**0.113**	**298%**	**-0.015**	**-2%**	**0.862**	**206%**
Married	*-0.001*	*-2%*	*0.114*	*300%*	*-0.023*	*-3%*	*0.871*	*209%*
Widowed	*0.001*	*1%*	*-0.001*	*-2%*	*0.008*	*1%*	*-0.009*	*-2%*
Age at first marriage	**-0.023**	**-35%**	**0.088**	**233%**	**-0.331**	**-39%**	**0.623**	**149%**
Urban	**0.002**	**2%**	**0.017**	**45%**	**0.072**	**8%**	**0.088**	**21%**
Wealth	**0.015**	**23%**	**0.004**	**12%**	**0.14**	**16%**	**0.546**	**131%**
Poorest	*0.027*	*42%*	*0.019*	*50%*	*0.487*	*57%*	*0.634*	*152%*
Poorer	*0.004*	*6%*	*-0.008*	*-22%*	*0.046*	*5%*	*-0.063*	*-15%*
Richer	*-0.005*	*-7%*	*-0.003*	*-8%*	*-0.121*	*-14%*	*-0.004*	*-1%*
Richest	*-0.011*	*-17%*	*-0.003*	*-8%*	*-0.271*	*-32%*	*-0.022*	*-5%*
Soc. Security Status	**0.019**	**30%**	**-0.037**	**-98%**	**0.294**	**34%**	**-0.427**	**-102%**
No social security	*0.001*	*1%*	*-0.002*	*-6%*	*0.027*	*3%*	*-0.046*	*-11%*
Bag-kur	*0.004*	*6%*	*-0.003*	*-7%*	*0.034*	*4%*	*-0.07*	*-17%*
SIO	*0.015*	*23%*	*-0.019*	*-50%*	*0.152*	*18%*	*-0.206*	*-49%*
GreenCard	*0*	*0%*	*-0.014*	*-37%*	*0.085*	*10%*	*-0.105*	*-25%*
Private insurance	*0*	*0%*	*0.001*	*2%*	*-0.004*	*0%*	*0*	*0%*
Employment Status	**-0.014**	**-22%**	**0.005**	**14%**	**-0.138**	**-16%**	**0.044**	**11%**
Agricultural Work	*0.001*	*1%*	*0.003*	*8%*	*0.012*	*1%*	*0.033*	*8%*
Indsutrial Work	*-0.007*	*-11%*	*0*	*0%*	*-0.101*	*-12%*	*0.007*	*2%*
Service sector	*-0.008*	*-12%*	*0.002*	*6%*	*-0.049*	*-6%*	*0.005*	*1%*
Number of children	**0.006**	**9%**	**0.087**	**229%**	**0.004**	**1%**	**0.553**	**132%**
Constant			**0.164**	**432%**			**-0.165**	**-39%**
Total	**0.065**	**100%**	**0.038**	**100%**	**0.857**	**100%**	**0.418**	**100%**

Table 6.9: Mean-based Decomposition: Being obese and BMI

RIFR Decomposition: BMI						
	Characteristics			Coefficients		
	0.25	0.5	0.75	0.25	0.5	0.75
Age	**95.08%**	**79.94%**	**90.32%**	**-2028.04%**	**-2793.45%**	**-827.91%**
Age	448.36%	220.34%	88.32%	-5360.12%	-5886.37%	-1461.74%
Age-squared	-353.28%	-140.40%	2.00%	3332.08%	3092.92%	633.82%
Education	**-42.17%**	**-44.05%**	**-70.88%**	**-10.87%**	**-63.89%**	**111.83%**
No education	-74.58%	-65.83%	-74.40%	-22.12%	-56.22%	75.54%
Primary education	27.82%	19.17%	15.12%	21.74%	-2.11%	31.40%
Higher Education	4.58%	2.61%	-11.59%	-10.50%	-5.56%	4.89%
Ethnicitiy	**64.43%**	**58.70%**	**95.57%**	**16.06%**	**133.60%**	**44.28%**
Kurdish	57.74%	55.65%	92.11%	209.59%	195.83%	80.43%
Arabic	2.02%	2.83%	1.62%	-188.05%	-61.24%	-35.02%
Other races	4.68%	0.22%	1.84%	-5.48%	-0.99%	-1.13%
Marital Status	**-2.72%**	**-3.90%**	**-0.42%**	**506.48%**	**447.96%**	**461.31%**
Married	-3.04%	-4.73%	-1.18%	502.22%	443.00%	461.57%
Widowed	0.32%	0.83%	0.76%	4.26%	4.96%	-0.26%
Age at first marriage	**-35.29%**	**-39.47%**	**-44.88%**	**-24.06%**	**399.45%**	**328.94%**
Urban	**25.02%**	**9.06%**	**-0.50%**	**-26.38%**	**96.80%**	**97.45%**
Wealth	**27.40%**	**17.38%**	**14.69%**	**426.92%**	**323.86%**	**-40.60%**
Poorest	90.93%	73.91%	46.98%	433.21%	313.13%	28.41%
Poorer	8.01%	5.34%	3.85%	-2.28%	8.45%	-55.45%
Richer	-12.18%	-17.16%	-13.34%	-9.28%	0.26%	1.10%
Richest	-59.35%	-44.71%	-22.79%	5.27%	2.01%	-14.67%
Social Security Status	**31.78%**	**35.16%**	**42.98%**	**154.60%**	**-48.09%**	**24.03%**
No social security	4.03%	4.60%	4.67%	-20.66%	-2.29%	24.44%
Bag-kur	-0.91%	4.11%	3.20%	10.67%	-21.13%	-0.68%
SIO	25.03%	6.42%	10.49%	-19.43%	-52.43%	-20.44%
GreenCard	2.40%	20.98%	26.29%	196.26%	28.67%	16.58%
Private insurance	1.23%	-0.94%	-1.67%	-12.24%	-0.90%	4.13%
Employment Status	**-17.45%**	**-17.02%**	**-36.64%**	**17.87%**	**24.80%**	**29.68%**
Agricultural Work	1.28%	1.45%	2.31%	-1.50%	25.99%	17.42%
Indsutrial Work	-5.05%	-11.94%	-24.42%	2.29%	1.83%	3.61%
Service sector	-13.67%	-6.53%	-14.53%	17.08%	-3.02%	8.65%
Number of children	**-46.09%**	**4.18%**	**9.75%**	**-281.11%**	**-10.52%**	**197.90%**
constant				**1348.55%**	**1589.48%**	**-326.89%**
Total-percentage	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total-absolute value	0.568	0.958	0.921	0.208	0.339	0.445

Table 6.10: RIFR Decomposition: BMI

(iii) Decomposition of obesity gap

Although there is no significant difference, western women are more likely to be obese than eastern women, as their probability of being obese, and their BMI scores, are relatively higher on average (mean levels are shown in Table 6.7).

The results of aggregate decomposition are introduced in Table 6.8. Accordingly, the Oaxaca-Blinder decomposition (Oaxaca, 1973; Blinder, 1973) suggests that the differences both in the mean characteristics (composition effect) and coefficients (structural effect) play role in the obesity difference between eastern and western women. However, these effects are counterbalanced by the interaction effect; that has an unambiguous interpretation as it counts not only the differences in residuals but also the interaction between differences in characteristics and coefficients. Eventually, the differences in the mean characteristics of eastern and western women are more important for their obesity difference. Similar to the mean, the interaction effect counterbalances the effects of characteristics' and coefficients' differences across all quartiles. However, the differences in the characteristics of eastern and western women explain higher proportion of total difference at all quartiles. Further, the effects are the relatively higher at higher quantiles, implying that the differences at higher quantiles of obesity distribution explain larger proportion of total obesity difference between eastern and western Turkey.

As for detailed decomposition, the results are presented in Table 6.9 for the mean and Table 6.10 for different quartiles. Each characteristic's/coefficient's contribution to the differences regarding outcome can be read as follows: the BMI score of eastern women or the probability of their being obese would be that much higher (or lower if the sign is negative) if they had the same characteristics/coefficients as their counterparts in western Turkey.

At the mean, the differences between the obesity rates of eastern and western women may be attributable to the differences in their

characteristics (composition effects) rather than to the differences in the coefficients (structural effect).

The composition effect (the endowments columns in Table 6.9 & 6.10) accounts for the differences in the distribution of characteristics and is predominantly driven by the differences in the distributions of age, ethnicity and education level. Such contributions of age and education are unsurprising, since there are clear gaps between the age and education levels of women in eastern and western Turkey (Table 6.1 shows the mean levels, and Figure 6.2 shows the distributions), according to the increasing effect of increasing age and the decreasing effect of education on obesity. As regards ethnicity, the total contribution stems almost entirely from the differences in the distributions of Kurdish people. The contribution of being Kurdish is unsurprising, since Kurdish people are more highly concentrated in eastern than in western Turkey (Figure 6.2 shows the distribution). Similar to their contributions at the mean, the differences in age, education and ethnicity distributions make the largest contributions at all quartiles. Their composition effects vary at different quartiles.

It is obvious that the effects of education and ethnicity are the highest at the last quartile implying that they explain more of the difference at higher BMI scores. Unexpectedly, the differences in the income distributions make a lower contribution (in total) both at the mean and different quartiles. This is due to the adverse effects of categorical income variables (i.e. some income variables are offset by one another). However, what seems obvious is that if eastern women had the same level of wealth as western women, their obesity would be slightly higher; by contrast, if they had the same level of education, their obesity rates would be remarkably lower. If the development gap between these two regions is taken into the consideration, these results again confirm that eastern Turkey has characteristics similar to those of developing countries while western Turkey is closer to developed countries.

Another issue is early marriage in eastern Turkey, which matters somewhat as regards obesity differences between eastern and western

Turkey (Table 6.1 shows the mean level, and Figure 6.2 shows the distribution). Eastern women marry approximately two years earlier, on average, than western women, and such a difference makes notable contributions to the overall composition effect. In addition, the effects of early marriage slightly increase at higher quantiles of obesity distribution. That number of children would make a notable contribution was expected, since there is a great deal in the literature about the increasing effect of reproductive history on obesity (Khan and Kraemer, 2009; Dake et al., 2010) and there is a clear gap in the number of children between the two regions (Figure 6.2). However, the expected contribution of number of children to the composition effect could not be observed either at the mean or different quartiles (apart from the first quartile).

As regards structural effect (the coefficient columns in Table 6.9 & 6.10), this accounts for the differences in the effects of determinants rather than for the distributions of determinants. Respondent's age (at the time of the survey), marital status, make the largest contributions to the structural effect. Further, age and marital status have the largest contributions at all quartiles. Their effects decrease at higher quantiles, referring that they explain more of the differences at the lower quantiles of obesity distribution. Besides, the differences in the coefficients of wealth (for BMI only), number of children, age at first marriage, social security, ethnicity and education variables between eastern and western Turkey also make notable contributions to the difference in obesity rates between the regions.

In addition, wealth and social security explain more of the differences at the lower quantiles of obesity, by contrast age at first marriage and education explain more of those at the higher quantiles. According to OLS estimations, respondent's age (at the time of the survey) and age at first marriage have a relatively greater effect on obesity in eastern Turkey – that is, one year of change in respondents' ages (age at first marriage) increases (decreases) obesity relatively more in eastern Turkey than in western. Thus, if the impacts of age (age at first marriage) on obesity for eastern women were the same as those for western women, the obesity

rates of eastern women would be significantly lower (higher). By contrast, marriage has a relatively greater effect on obesity in western Turkey – that is, in western Turkey married women have higher obesity rates relative to those of divorced women than do married women in the east. The difference in the coefficients of marriage contributes remarkably to the difference in obesity between these regions. A change in the number of children (ever born) increases obesity rates relatively more in the West than in the East. If obesity were equally affected in both regions by having one more child, eastern women would have significantly higher obesity rates.

In summary, respondent's age (at the time of the survey) makes important contributions to both composition and structure effect. In addition to age; ethnicity and education make the largest proportions of the composition effect, while marital status and number of children make up the larger portion of the structural effect. Categorical income variables make considerable contributions to both composition and structural effects; however, the total contributions made by wealth are not greatly significant, since wealth variables are offset by each other. Finally, urbanisation, social security status and employment status make minor contributions to both composition and structural effect.

6.5. Discussion

The aim of this study has been to investigate the determinants of obesity in Turkey and to measure the level of income-related obesity inequality. Investigating the inequalities in Turkey is novel for literature about the inequalities in developed and developing countries, since Turkey bears the characteristics of both developed and developing countries (MoH, 2010).

Age, ethnicity, education, income, marital status and employment are significantly associated with obesity in Turkey. Increasing age of respondents is associated with increases in obesity. As regards the effect of marital status, obesity rates are higher among married women, particularly so among early-married women. This may be related to the role theory–marital causation model (Hardy and Conway, 1978; Biddle, 1979, 1986; Sobal et al., 1992) suggesting lower obesity rates of single people which is related to their poorer dietary intake and weight control with the aim of attracting a mate (Verbrugge, 1979; Stuart and Jacobson, 1987). In addition, increasing educational attainment is associated with decreases in obesity, as in developed countries. This may be because the promotional effect of education on healthy behaviour reduces the risk of obesity. Urban women have higher obesity rates than their counterparts in rural areas. This may be related to dietary habits since urban women are more likely to have mass produced foods (which are high in saturated fat) (Cutler et al., 2003), and so they may have higher obesity than rural women. All working women have lower obesity rates than non-working women (potential housewives), probably because of physical (in)activity.

Additionally, two-way wealth effects on obesity are observed. That is, the results indicate that (i) lower socioeconomic groups have higher obesity rates, and that (ii) higher socioeconomic groups have higher obesity rates. This may be due to the pooling of individuals from different regions with different levels of development. In addition, regional effects on obesity were not clear. Hence, the individuals have been separated and different models have been constructed for eastern and western Turkey since they are referred to as the least and the most developed parts of Turkey

respectively (Ersungur et al., 2007). As a result, it is understood that higher socioeconomic characteristics are associated with higher obesity rates in eastern Turkey (the least developed part) while they are related to lower obesity rates in western Turkey (the most developed part). Therefore, it is shown that western Turkey has the characteristics close to developed countries whereas eastern Turkey resembles developing countries.

In addition, inequality analysis suggests that obesity is more concentrated among wealthier women in eastern women whereas it is more concentrated among poorer women in western Turkey. This confirms the fact that eastern Turkey reflects the characteristics with of developing countries while western Turkey is closer to developing countries in this respect. Decomposition of income related inequalities between eastern and western Turkey indicates that the inequalities are predominantly associated with wealth and ethnicity. Wealth effects (on income related inequalities in obesity) are mainly due to the differences in the partial associations between wealth and obesity. This may be related to food intake if it is the case that eastern women cannot afford food as easily as western women. Therefore it is believed that policies dealing with the nutritional issues of eastern women may be useful in reducing the inequalities between eastern and western Turkey.

Another interesting result is that differences in the partial associations of being Kurdish and having obesity between eastern and western Turkey have significant effects on income related inequalities between these regions. This may be related with their food intake again if it is the case that Kurdish women in western Turkey have calorie intense diets (such as fast food) and/or Kurdish women in eastern Turkey do not have a proper food intake. Accordingly, in addition to the policies dealing with the nutritional issues of eastern women, policies which encourage healthy behaviour of western women may also be helpful in reducing the inequalities in obesity.

Therefore the study indicates that designing specific policies for regions with different levels of development will be useful in reducing the inequalities between eastern and western Turkey.

In this study, the results of quantile regressions were similar to those obtained from OLS estimations. However, it is believed that investigating the differences between eastern and western Turkey by exploiting quantile regressions will be noteworthy. This study is restricted to obesity investigations, however investigating the differences in various aspects of health (such as children and maternal health) and fertility (such as timing of birth, number of birth and contraceptive use) will be quite interesting.

Chapter 7

The Effects of Health Reforms on Fertility and Child Mortality in Turkey

7.1. Introduction

In this chapter, recent Turkish healthcare reforms will be assessed. It has been widely suggested that these reforms have led to notable improvements in Turkish health status (Reig and Valverde, 2006; Mollahaliloglu et al., 2007; Akdağ, 2008, 2009; OECD, 2008; Baris et al., 2011; Tatar et al., 2011). However, empirical studies evaluating the recent healthcare reforms in Turkey are still rare. This study is one of those that evidence the effects of the reforms on Turkish health empirically. These reforms are worth investigating since they have considerably changed the structure of the Turkish healthcare system. They are also of interest because for some groups they have improved access to healthcare and to the benefits available from insurance schemes (Tatar et al., 2011).

Identifying the effects of some parameters is tricky as it needs variations in the variables whose effect of interest may be related to unobservable factors that jointly affect outcomes of interest (Meyer, 1995; Rosenzweig and Wolpin, 2000). In such a case, estimations will no longer be unbiased (Meyer, 1995; Rosenzweig and Wolpin, 2000; Angrist and Krueger, 2001). To overcome this issue, economists use experiments which allow to exploit exogenous variations in related endogenous explanatory variable (Meyer, 1995; Rosenzweig and Wolpin, 2000, Angrist and Krueger, 2001; Angrist and Piscke, 2008). Accordingly, the experiments measure the effects of interest by comparing treatment and control groups which are not randomly assigned but assigned according to exogenous variation (Meyer, 1995; Rosenzweig and Wolpin, 2000; Angrist and Krueger, 2001; Angrist and Piscke, 2008).

In this study, the effects of extended access to healthcare on child mortality and fertility will be investigated using the last two waves of the Turkish Demographic and Health Survey (TDHS 2003, 2008). To do this, a difference-in-differences-type design will be used since it is the most appropriate design for measuring exogenous shocks (such as policy changes), which affect certain groups (Lechner, 2011). By using the difference-in-differences technique, the differential impacts on child mortality and fertility of the recent reforms which expanded access to healthcare facilities for certain insurance schemes will be examined. Specifically, in the case of some insurance schemes (the Social Insurance Agency of Merchants, Artisans and the Self-employed, the Active Civil Servants Scheme, and the Government Employees' Retirement Fund) the reforms did not lead to changes in access to healthcare, since individuals on these schemes already had full access to all facilities. These schemes will be used as the control group. In the case of other insurance schemes (the Social Insurance Organisation, GreenCard), forming the treatment group, the reforms greatly extended access to healthcare facilities.

The findings suggest that the introduction of outpatient healthcare services and conditional cash transfers (with the condition of regular visits during ante- and postnatal periods) lowered child mortality rates for Greencard-assured persons living in eastern Turkey. In addition, the policy led to a reduction in the number of children being born in eastern Turkey, and to a decrease in the fact that having children in western Turkey. In addition, the unification of the healthcare facilities provided by the Social Insurance Organisation and the Ministry of Health reduced child mortality for the people living in eastern Turkey insured by the Social Insurance Organisation.

In the next section, a brief description is offered of the Turkish healthcare system and of recent healthcare reforms in Turkey. The third section reviews the literature about child mortality and fertility. The fourth section explains the data, and the methods that have been used to investigate the effects of recent changes in access to healthcare. The fifth

section presents the results of the analysis, and the last section concludes the study.

7.2. Background

The Turkish healthcare system has been a highly complex one, involving several healthcare providers (public, social security and private organisations) in addition to numerous agencies existing to finance healthcare, either public or private (Kisa et al., 2002; Reig and Valverde, 2006; Tatar and Kalvanos, 2006; Baris et al., 2011; Tatar et al., 2011). This complication has resulted in: (i) deficiencies in access to healthcare; (ii) the inefficient use of health resources; (iii) a lack of coordination among healthcare providers; and (iv) the unbalanced distribution of healthcare facilities (Tatar and Kalvanos, 2006; Baris et al., 2011; Tatar et al., 2011). In the end, these deficiencies led to an unequal distribution of health and to Turkey enjoying a poorer health status than other countries with similar personal income levels (Savas et al., 2002; Tatar, 2006). To overcome these problems in financing and accessing healthcare, the Government imposed the Health Transformation Programme in 2003, to be enacted over a ten-year period (2003–13) (OECD, 2008; Aksan et al., 2010).

Prior to the Health Transformation Programme three main public suppliers were existed in the provision of health care: (i) Ministry of Health, (ii) Social Insurance Organisation and (iii) universities (OECD,2008; Akdag, 2008; Akdag, 2009). In addition, there were several public insurance agencies, differing on an occupational basis, in the financing side of healthcare. These agencies were as follows (Mollahaliloglu et al., 2007; OECD, 2008; Akdağ, 2009; Tatar et al., 2011; Savas et al., 2007):

i. *The Social Insurance Organisation* (SIO) was established in 1945. The organisation used to work under Ministry of Workforce and Social Security and used to cover blue collar workers and private sector employees. It used to be financed by

premiums which were 11 per cent of annual income (5% coming from the employee and the remainder from the employer). The secondary source of the organisation's finance was the payments from healthcare services supplied to people not insured by the organisation. The organisation had its own healthcare facilities however, it was unable to provide primary healthcare services (Savas et al., 2007; Mollahaliloglu et al., 2007; OECD, 2008). It used to cover secondary healthcare, maternity care and the services for occupational diseases (ibid.). All the healthcare facilities provided by the organisation have been transferred to Ministry of Health in 2005. Therefore, the people insured by Social Insurance Organisation gained access to the all services (including primary healthcare) provided by Ministry of Health (ibid.). The organisation was fully transferred to the Social Security Institute in 2008.

ii. *The Social Insurance Agency of Merchants, Artisans and the Self-employed* was established as a pension fund for self-employed people and their dependants in 1971; however, the coverage was expanded to unemployed people (those able to pay the premiums), housewives, older people, agricultural workers, and the unemployed wives/husbands of workers living abroad later on. It was a semi-independent organisation working under Ministry of Workforce and Social Security since 1983. It used to provide health insurance for its assureds since 1986. Unlike *The Social Insurance Organisation*, it did not own any role on the provision of healthcare; however, it had contracts with public healthcare providers for general healthcare services. It was financed through premiums and the healthcare premium was 12 per cent of average notional income. This organisation was completely transferred to the Social Security Institute in 2008.

iii. *The Government Employees' Retirement Fund* was established as a pension fund for retired civil servants, retired military personnel and retired parliamentarians in 1949. Although the primary aim was to provide pension for its assureds, the

coverage of the provision enlarged to health insurance later on. It was not a premium-based organisation as it being financed by the state since those belonging to *The Active Civil Servants Scheme* contributed a percentage of their monthly wages. The Fund used to provide the widest access to healthcare services as it had contracts with all public healthcare providers (Savas et al., 2007; Mollahaliloglu et al, 2007). The administration was fully transferred to the Social Security Institute in 2008.

iv. *The Active Civil Servants Scheme* used to cover civil servants, military personnel, students in military schools, and the parliamentarians who were currently working. Expenses were paid out of the general budget as those belonging to the scheme contributed 11 per cent of their monthly wages. The scheme had contracts with public healthcare suppliers and used to provide the same accessibility of healthcare services with *The Government Employees' Retirement Fund*. The fund was fully transferred to the Social Security Institute in 2010.

v. Differing from the above, *GreenCard* was a temporary agency funded by the Government. It covered citizens unable to afford healthcare expenses. The agency was inaugurated in 1992 as a temporary programme pending the existence of universal health coverage. It was Government-financed, and there were no premiums. The requirements for being covered were: (i) being a citizen of the Republic of Turkey; (ii) being uncovered by any of the other insurance schemes; (iii) earning less than one third of the minimum wage per capita, per month (after tax). The people insured by GreenCard have been granted not only conditional cash transfers, but also outpatient healthcare services in 2004. Therefore, their access to healthcare has been expanded by using outpatient healthcare services (Atun et al., 2013). The agency was completely transferred to the Social Security Institute in 2012.

With the application of its Health Transformation Programme, the Government, firstly, merged all public healthcare facilities (under the Ministry of Health) and established the Ministry of Health as a single authority for the provision of healthcare. This unification opened up all public facilities to the entire population (Tatar et al., 2011). Subsequently, the Government integrated all public insurance agencies (under newly established Social Security Institution) and introduced universal health coverage (the General Health Insurance Scheme). These equalised the benefits from different health insurance schemes (ibid.). As a result, following the application of the Health Transformation Programme, healthcare services are provided by a single provider, the Ministry of Health, and financed by the Social Security Institution via the General Health Insurance Scheme (in addition to private agencies). Historical overview of the reforms and developments towards universal health coverage can be seen in Figure 7.1 and 7.2 respectively.

1920–29

- 1920: The Turkish Ministry of Health and Social Affairs (MOHSA) is established after the inauguration of the Turkish Grand National Assembly in 1920 (law no. 3) with a focus on public health

1930–49

- 1945: Social health insurance (Social Insurance Organisation) is established for blue collar workers
- 1946: The first national 10-year health plan is developed
- 1949: Social health insurance for retired civil servants

1950–59

- 1952: Mother and child health division established in the Ministry of Health
- 1953: Mother and child health development centre established, with support from WHO and the United Nations Children's Fund
- 1953: The Turkish Medical Association is established
- 1954: MOHSA assumes a role in the provision of curative services, initially with MOHSA-established model hospitals, and begins training of health workforce
- 1954: Health facilities belonging to provincial and municipal administration are placed under MOHSA administration, managed by provinces
- 1954: The first national 10-year health programme is declared (which is the cornerstone for planning and organisation of the Turkish national health service)

1960–79

- 1961: The Law on the Socialization of Health is adopted, promoting an integrated health service scheme, and establishing a three-tiered health system (health house, health centre, and district hospital), managed by MOHSA
- 1965: The Law of Population Planning is adopted, with pro-natalist policies
- 1971: Bağ-Kur (social health insurance for self-employed people, artisans, and organised groups) is established

1980–89

- 1982: The new constitution reconfirms the importance of the state in protecting the health of the population and in ensuring universal health coverage, including through a unified social health insurance system
- 1987: Basic Health Law is enacted, prescribing a narrower role for the Ministry of Health in service provision and a focus on regulation, but is not fully implemented because of partial rejection of the law by the Constitutional Court

1990–99

- 1992: National Policy Forum is held, with broad stakeholder involvement
- 1992: The Green Card scheme (health insurance for households outside the formal health insurance schemes) is introduced as an interim measure until the creation of a unified health insurance scheme
- 1993: the Law of Health Law, Ministry of Health structure and responsibilities, Provincial Health Administration, General Health Insurance is developed
- 1996: The laws on health financing institution establishment and process, primary care health services, and family medicine, hospitals, and health entities are developed
- 1998: The law of personal health insurance system and health insurance administrative presidency is developed
- 1999: The draft law of health fund institution is developed
- However, the above laws are not enacted because of a political stalemate in the Turkish Grand National Assembly

Source:Atun et al., 2013 – (p.69)

Figure 7.1: Historical overview of healthcare reforms

- 2002: Justice and Development Party includes "improving access to health services" (urgent action plan) in its election platform.
- 2002: Justice and Development Party is elected with a strong parliamentary majority in the Grand National Assembly.
- 2002: Ministry of Health Decree (on the first day of the new government) to eliminate involuntary incarceration in hospitals of patients who cannot meet health-care expenses. The decree forbids hospitals from withholding the bodies of deceased patients when families are unable to meet hospital expenses.
- 2003: The Health Transformation Program (HTP) is designed, building on work done in the previous decade, including elements of the Basic Health Law. Implementation of the HTP begins.
- 2003: Introduction of higher salaries and performance incentives for hospital clinicians to encourage voluntary transition from dual practice to full-time working. Major expansion of the voluntary transition in 2005.
- 2003–04: Active and retired civil servants are allowed to use private hospitals. Ambulance services declared free.
- 2003–04: Green Card benefits expanded to include outpatient benefits and pharmaceuticals. Conditional cash transfers were introduced, covering 6% of the population (for pregnant women and children from the most disadvantaged households), to encourage use of maternal, neonatal, and child health services.
- 2004: Contract-based employment introduced for health-care personnel in rural and less developed regions. Performance-based payments piloted in ten Ministry of Health hospitals.
- 2004: Major changes in pharmaceutical policy, including changes to pricing and to value-added tax. International reference price system introduced, replacing the cost-plus model to reduce the price of drugs.
- 2004: Patient Rights Directive introduced in 2003 is implemented. Patient Rights Units established in hospitals. Electronic systems for patient complaints and suggestions introduced.
- 2004: User choice of health-care providers (hospitals, primary care centres, and physicians) introduced.
- 2005: Hospitals belonging to the Social Insurance Organisation (146 hospitals) integrated with Ministry of Health hospitals. The total number of hospitals managed by the Ministry of Health reached 840 in 2011.
- 2005: Contract-based family medicine with performance-based contracting piloted in Düzce province.
- 2006: Universal health insurance is legally adopted as a part of broader social security reforms. Health expenditures start to grow and global budgets (budget ceilings) are introduced for Ministry of Health facilities to moderate growth in services to address unmet need.
- 2006–10: Contract-based family medicine scaled up in all 81 provinces of Turkey.
- 2007: Cost-sharing for primary health-care services abolished. Primary health care available for all citizens free at the point of delivery.
- 2008: Social Security Institution established as a single organisation for financial pooling and purchasing. The Social Insurance Organisation, Bağ-Kur, and the General Employees Retirement Fund join the Social Security Institution.
- 2008: Free availability of emergency services and intensive care services (including neonatal intensive care) for the whole population extended from public hospitals to all hospitals, including private hospitals with and without Social Security Institution contracts.
- 2008: National air ambulance service introduced and is available to the whole population free of charge. Major expansion in 2010.
- 2008: Cost-sharing in private hospitals for complex conditions (eg, burns, renal dialysis, congenital anomalies, cancer, cardiovascular surgery, and transplant surgery) abolished.
- 2009: Mobile pharmacy services introduced to improve access in rural areas.
- 2009: Tracking system for drugs introduced.
- 2009: Central hospital patient appointment system introduced. Major expansion in 2011.
- 2010: Active civil servants join the Social Security Institution.
- 2010: The Ministry of Health strategic plan for 2010–14 developed.
- 2010–11: Taxes for cigarettes and alcohol raised.
- 2010–12: Laws on Hospital Autonomy and Restructuring the Ministry of Health for a stronger stewardship function are adopted. Public Hospital Authority and Public Health Institution established; Law on Full-Time Practice of University and Health Personnel and Amendments is adopted, paving the way for full-time practice in legal terms.
- 2012: The Green Card scheme joins the Social Security Institution and unified social health insurance is fully implemented.
- 2013: The Ministry of Health strategic plan for 2013–17 is developed.

Source:Atun et al., 2013 – (p.72)

Figure 7.2: Developments towards universal health coverage

This study focuses in particular on two different stages during the unification process. The first is the introduction of Ministry of Health facilities for people insured by the Social Insurance Organisation. The Government merged the facilities provided by the Ministry of Health and

the Social Insurance Organisation in 2005. This combination expanded access to healthcare for people insured by the Social Insurance Organisation, as they gained access to the services provided by the Ministry of Health. On the other hand, this integration did not lead to any change for those people insured by other public insurance schemes, as they already had access to the facilities provided by the Social Insurance Organisation.

The second stage is the introduction of outpatient healthcare services and conditional cash transfers (on condition of regular visits during ante- and postnatal periods) for people insured by GreenCard. In 2004, the Government expanded access to healthcare for GreenCard-assureds by granting them outpatient healthcare services and introducing conditional cash transfers (Atun et al., 2013). Accordingly, people insured by GreenCard started to use outpatient healthcare services from all public providers, and receive cash transfers on condition of regular visits during ante- and postnatal periods (Adato et al., 2011; Duman, 2012). Nothing has changed for those people insured by other insurance schemes, as they already had access to those outpatient services and were not granted any cash transfers.

7.3. Literature Review

The literature about child mortality and fertility has already been reviewed previously (see Chapter 4 for detailed reviews). Instead, the literature about health and fertility effects of extended coverage will be reviewed here.

Studies investigating the effects of extended coverage have been conducted around the world. Using difference-in-differences technique, Nolan (2011) examined the effects of coverage extension on the excess usage of healthcare services in the Republic of Ireland, however could not observe any significant effects. Chen et al. (2007) analysed the effects of recently established National Health Insurance Program (NHI) in Taiwan by employing difference-in-differences estimation strategy. They found

the increased usage of healthcare services; however they did not observe any reductions in mortality. Employing the same technique, Chou et al. (2011) also examined NHI that extended coverage for infant healthcare services in Taiwan and found reductions in infant mortality. Wagstaff et al. (2009) investigated the impacts of introduction of New Cooperative Medical System (NCMS) which expanded the coverage for the rural people in China. Using difference-in differences estimation strategy, they detected increased outpatient and inpatient utilisation respect to the introduction of NCMS. Chen and Jin (2012) have also examined the effects of introducing NCMS in China by employing same estimation strategy. They detected increasing effects on school enrolment however they found no significant impacts on child and maternal mortality.

On the other hand, Currie and Gruber (1996a,b) and Sommers et al. (2012) investigated the impacts of Medicaid expansions and suggested the reductions in child and adult mortality with respect to the improvements in access to healthcare. Joyce and Racine (2005) examined the effects of State Children Health Insurance Program (SCHIP), which is the largest extension of public insurance after Medicaid (Joyce ad Racine, 2005). Using the pooled time series cross-section regressions they found improving effects on child health. Frackenberg (1995) examined the impacts of healthcare in Indonesia, and observed the reducing impacts on infant mortality. McGuire (2001), Dow and Schmeer (2003) and Dow et al. (2003) investigated the effects of expanded coverage in Costa Rica. They all detected reducing impacts on mortality at early ages. Macinko et al. (2006) looked at the effects of healthcare in Brazil and noted the lowering effect of healthcare on infant mortality through the Family Health Programme. Rutherford et al. (2010) reviewed the studies conducted in African countries and noted the substantial effects of healthcare in reducing under-5 mortality rates. Pfutze (2014) examined the effects of recently introduced social security program-Seguro Popular (Popular Health Insurance) in Mexico. Using probit estimations he indicated that reductions in infant mortality which are associated with the implementation of new program are expected.

The studies investigated fertility decisions driven by policies can be divided into three broad types. The first type of studies examines the fertility consequences of the policies altering need of children. Hohm (1975) and Entwistle and Winegarden (1984) analysed old-age programs in 67 and 52 countries respectively and both suggested that social security policies for older ages have negative impacts on fertility. The mechanism is well-explained by Rich (1973) that couples consider children as security at their older ages in case of having no other support (Leibenstein, 1957); however old-age programs eliminate economic dependence on children at older ages and therefore lead reductions in fertility. Contrastingly, Kelly et al. (1976) re-analysed the countries examined by Hohm (1975) and detected no significant association between fertility rates and the introduction of old-age programs.

The second type of studies examines the fertility impacts of the policies modifying costs of children. Accordingly, Joyce et al. (1998) and Zavodny & Bitler (2010) analysed Medicaid expansions for pregnant women and children in the United States. Both indicated that extended coverage has reduced the costs of childrearing and therefore fertility rates of poorly educated women have been increased. Brewer et al. (2012) investigated the effects of welfare reforms in the UK and have noted the increases in fertility rates brought about by benefit increases. Walker (1995) and Mörk et al. (2013) showed the increasing effects on fertility rates brought about by improved benefits and reductions in the costs of having children in Sweden. Cigno and Rosati (1996) suggested that increasing the cost of having children (by expanding self-financing social security) has lowered women's fertility in Germany, Italy, the UK and the USA. Rindfuss et al. (2010) and Bauernschuster et al. (2013) examined the impacts of expanded coverages of childcare in Norway and Germany respectively. They both indicated increasing effects on fertility led by the reductions in the costs of children.

The last type of studies examines the fertility consequences of policies improving the knowledge of family planning. Both Schmidt (2007) and Ohinata (2011) investigated the effects of infertility insurance mandates

on fertility in the United States and observed significant increases in the birth rates of white women. Linderooth and McCullough (2007), Kearney and Levine (2009), Kutinova and Conway (2008) and Dennis et al. (2012) examined fertility effects of Medicaid family planning expansions in the United States. They all indicated better fertility outcomes and lower fertility rates respect to improved preventive behaviour after the expansions. De Leine et al. (2011) also examined Medicaid family planning expansions however, did not detect any significant relationship between coverage expansions and fertility. Gold (2001) and Bailey (2012) investigated the fertility effects of Title X (another program dedicated to family planning) in the United States. Accordingly, they (Gold, 2001; Bailey, 2012) observed significant reductions in fertility rates through the improved preventive behaviour after the introduction of the program. The policies examined in this study are expected to have effects closer to those are observed by third type of studies.

Turkey is among the OECD countries with comparatively high child mortality rates (OECD, 2012). Indeed, it is one of two OECD countries whose fertility rates are constantly higher than the replacement rate (D'Addio and d'Ercole, 2005). Therefore, Turkey is putting in place policies to reduce child mortality and fertility rates. This paper investigates two such policies in order to examine the impacts of healthcare on child mortality and fertility.

7.4. Data & Methods

This paper uses the last two waves (the eighth and ninth) of the Turkish Demographic and Health Survey, which has been conducted every five years since 1968. This survey is a country-wide, representative cross-sectional survey focusing on women of reproductive age (15–49) (Rutstein and Rojas, 2006). The eighth wave of the survey, which was performed in 2003, illustrates the state of health of the Turkish population before the reforms applied. It was conducted in 10,836 households (with a 92.9% response rate), and involved 8,075 individual interviews with ever-married women within those households (with a 95.6% response rate)

(TDHS, 2003). The ninth wave of the survey depicts the post-policy state of public health in Turkey. It was carried out in 2008, and involved 10,525 households (with an 88.4% response rate) and 7,405 individual interviews with ever-married women within the selected households (TDHS, 2008).

To investigate the effects of extended access to healthcare on child mortality and fertility, two variables (a binary and a continuous variable) have been generated for each outcome (child mortality and fertility); hence there are four different outcome variables. The outcome variables are related either to the deaths or to the births occurring within the five-year period covered by each of the surveys. The questions regarding child mortality (for continuous and binary variables respectively) were: 'How many children have you had who were born alive but who died later, within the last five years?' and 'Have you ever given a birth to a boy or a girl who was alive but who died later, within the last five years?' The questions regarding fertility (for continuous and binary variables respectively) were: 'How many children have you had who were born alive within last five years?' and 'Have you given birth to a boy or a girl who was alive within the last five years?' Furthermore, four different outcome variables regarding number of children (one for each from 0 to 3+) have been generated for fertility estimations, since the results called for further investigations. In addition, some exogenous factors that could impact on child mortality and fertility rates, such as age, education, ethnicity, marital status and parental education, will be controlled for with the aim of purifying the effect of policies. The summary statistics regarding the variables are presented in Tables 7.1 – 7.3.

Variable	ENTIRE POPULATION							
	PRE-POLICY				POST-POLICY			
	Obs	Mean	Min	Max	Obs	Mean	Min	Max
Child Mortality								
The number of children who died within the last 5 years	5382	0.054	0	2	6127	0.044	0	2
Ever had a child who died within the last 5 years	5382	0.045	0	1	6127	0.039	0	1
Fertility								
The number of children who were born within the last 5 years	5382	0.5	0	4	6127	0.513	0	5
Ever had a child who was born within the last 5 years	5382	0.387	0	1	6127	0.402	0	1
Age								
Respondent's age	5382	34.448	15	49	6127	34.318	15	49
Education								
Years of education	5382	5.935	0	19	6127	5.795	0	19
Marital Status								
Married	5382	0.959	0	1	6127	0.961	0	1
Widowed	5382	0.022	0	1	6127	0.018	0	1
Ethnicity								
Kurdish	5382	0.141	0	1	6127	0.189	0	1
Arabic	5382	0.018	0	1	6127	0.022	0	1
Other race	5382	0.014	0	1	6127	0.007	0	1
Mother's education								
No edu.	5382	0.709	0	1	6127	0.704	0	1
Primary edu.	5382	0.233	0	1	6127	0.252	0	1
Higher edu.	5382	0.038	0	1	6127	0.028	0	1
Father's education								
No edu.	5382	0.349	0	1	6127	0.345	0	1
Primary edu.	5382	0.459	0	1	6127	0.472	0	1
Higher edu.	5382	0.138	0	1	6127	0.129	0	1

Table 7.1: Summary Statistics – Entire Population

Variable	EAST							
	PRE-POLICY				POST-POLICY			
	Obs	Mean	Min	Max	Obs	Mean	Min	Max
Child Mortality								
The number of children who died within the last 5 years	1346	0.123	0	2	1731	0.103	0	2
Ever had a child who died within the last 5 years	1346	0.096	0	1	1731	0.085	0	1
Fertility								
The number of children who were born within the last 5 years	1346	0.781	0	4	1731	0.771	0	5
Ever had a child who was born within the last 5 years	1346	0.531	0	1	1731	0.534	0	1
Age								
Respondent's age	1346	32.91	16	49	1731	33.053	15	49
Education								
Years of education	1346	4.324	0	18	1731	3.732	0	19
Marital Status								
Married	1346	0.965	0	1	1731	0.971	0	1
Widowed	1346	0.024	0	1	1731	0.015	0	1
Ethnicity								
Kurdish	1346	0.447	0	1	1731	0.557	0	1
Arabic	1346	0.04	0	1	1731	0.029	0	1
Other race	1346	0.005	0	1	1731	0.002	0	1
Mother's education								
No edu.	1346	0.829	0	1	1731	0.864	0	1
Primary edu.	1346	0.133	0	1	1731	0.111	0	1
Higher edu.	1346	0.025	0	1	1731	0.018	0	1
Father's education								
No edu.	1346	0.479	0	1	1731	0.506	0	1
Primary edu.	1346	0.323	0	1	1731	0.323	0	1
Higher edu.	1346	0.15	0	1	1731	0.126	0	1

Table 7.2: Summary Statistics – East

Variable	WEST							
	PRE-POLICY				POST-POLICY			
	Obs	Mean	Min	Max	Obs	Mean	Min	Max
Child Mortality								
The number of children who died within the last 5 years	1595	0.023	0	2	1566	0.017	0	2
Ever had a child who died within the last 5 years	1595	0.02	0	1	1566	0.016	0	1
Fertility								
The number of children who were born within the last 5 years	1595	0.401	0	3	1566	0.341	0	3
Ever had a child who was born within the last 5 years	1595	0.344	0	1	1566	0.301	0	1
Age								
Respondent's age	1595	34.577	15	49	1566	35.312	16	49
Education								
Years of education	1595	6.782	0	19	1566	6.844	0	19
Marital Status								
Married	1595	0.958	0	1	1566	0.954	0	1
Widowed	1595	0.016	0	1	1566	0.02	0	1
Ethnicity								
Kurdish	1595	0.042	0	1	1566	0.066	0	1
Arabic	1595	0.001	0	1	1566	0.001	0	1
Other race	1595	0.019	0	1	1566	0.017	0	1
Mother's education								
No edu.	1595	0.598	0	1	1566	0.563	0	1
Primary edu.	1595	0.32	0	1	1566	0.371	0	1
Higher edu.	1595	0.048	0	1	1566	0.04	0	1
Father's education								
No edu.	1595	0.284	0	1	1566	0.261	0	1
Primary edu.	1595	0.507	0	1	1566	0.549	0	1
Higher edu.	1595	0.147	0	1	1566	0.128	0	1

Table 7.3: Summary Statistics – West

The study uses a difference-in-differences-type design, since it is the most appropriate design for measuring exogenous shocks (such as policy changes), which affect certain groups (Lechner, 2011). By using the difference-in-differences technique, the differential impacts on child mortality and fertility of the recent reforms in accessing healthcare will be evaluated. In particular, the reforms which expanded access to healthcare facilities for only GreenCard- and SIO-assureds will be examined.

The difference-in-differences technique is a version of fixed effects estimation using aggregate data (Angrist and Pischke, 2008). It indicates the difference in the relevant outcomes for the treatment group (the people affected by the policy – GreenCard- and SIO-assureds in this study) before and after policy implementation, minus the difference in the relevant outcomes in the control group (the people not affected by the policy – in this study, people using other public insurance schemes) before and after policy implementation (Card and Krueger, 1994):

$$\boldsymbol{DiD} = \left(\bar{\boldsymbol{y}}_{\boldsymbol{treatment,2008}} - \bar{\boldsymbol{y}}_{\boldsymbol{treatment,2003}}\right) - \left(\bar{\boldsymbol{y}}_{\boldsymbol{control,2008}} - \bar{\boldsymbol{y}}_{\boldsymbol{control,2003}}\right) \quad (7.1)$$

The heart of the difference-in-differences technique is the potential outcomes in the control group (Angrist and Pischke, 2008). Specifically, it is assumed that in the absence of treatment, outcome of interest is determined by the sum of a time-invariant group effect and a year effect that is common across groups (ibid.):

$$\boldsymbol{E}\left[\boldsymbol{Y}_{\boldsymbol{0igt}}|\boldsymbol{g},\boldsymbol{t}\right] = \boldsymbol{\gamma g} + \boldsymbol{\tau t} \quad (7.2)$$

where $\boldsymbol{Y}_{\boldsymbol{0igt}}$ is the outcome of interest of individual $\boldsymbol{i}$ in group $\boldsymbol{g}$ and time $\boldsymbol{t}$ if there is no treatment (the implementation of policies for this study), $\boldsymbol{\gamma}$ indicates time-invariant group effect and $\boldsymbol{\tau}$ indicates the year effect respectively. In addition to these, let $\boldsymbol{D}_{\boldsymbol{gt}}$ be a dummy for the groups

affected by treatment and periods ($\boldsymbol{D_{gt}}$ will be equal to 1 for the treatment group in post-treatment period, 0 otherwise). Assuming that $\boldsymbol{E[Y_{1igt} - Y_{0igt}|g,t]}$ is a constant, the outcome of interest (either child mortality or the number of children for this study) can be written as:

$$\boldsymbol{Y_{igt} = \gamma g + \tau t + \delta D_{gt} + \varepsilon_{igt}} \quad (7.3)$$

where $\boldsymbol{\delta}$ detects the effect of treatment conditional on $\boldsymbol{E(\varepsilon_{igt}|g,t) = 0}$. Namely, the differences in control and treatment groups will be:

$$\boldsymbol{E[Y_{igt}|g = control, t = 2008] - E[Y_{igt}|g = control, t = 2003] = \tau_{2008} - \tau_{2003}}$$

$$\boldsymbol{E[Y_{igt}|g = treatment, t = 2008] - E[Y_{igt}|g = tratment, t = 2003] = \tau_{2008} - \tau_{2003} + \delta} \quad (7.4)$$

and the difference-in-differences will be:

$$\boldsymbol{\{E[Y_{igt}|g = treatment, t = 2008] - E[Y_{igt}|g = tratment, t = 2003]\} - \{E[Y_{igt}|g = control, t = 2008] - E[Y_{igt}|g = control, t = 2003]\} = \delta} \quad (7.5)$$

Additionally, the difference-in differences technique can also be applied through convenient regression method (Angrist and Pischke, 2008). Let $\boldsymbol{treatment}$ be a dummy for being in treatment group and $\boldsymbol{dt}$ be a dummy that takes value of 1 for the observations obtained in post-treatment period (after the coverage extended by policy). Then,

$$\boldsymbol{Y_{igt} = a + \gamma treatment + \tau dt + \delta(treatment \cdot dt) + \varepsilon_{igt}} \quad (7.6)$$

is the same as equation 5.3 where $\boldsymbol{treatment \cdot dt = D_{gt}}$. It is a saturated model since conditional mean function $\boldsymbol{E[Y_{igt}|g,t]}$ takes on four possible values and there are four parameters (ibid.):

$$\boldsymbol{a = E[Y_{igt}|g = control, t = 2003] = \gamma control + \tau_{2003}} \quad (7.7)$$

$$\boldsymbol{\gamma = E[Y_{igt}|g = treatment, t = 2003] - E[Y_{igt}|g = control, t = 2003] = \gamma treatment - \gamma control} \quad (7.8)$$

$$\boldsymbol{\tau = E[Y_{igt}|g = control, t = 2008] - E[Y_{igt}|g = control, t = 2003] = \tau_{2008} - \tau_{2003}} \quad (7.9)$$

$$\boldsymbol{\delta = \{E[Y_{igt}|g = treatment, t = 2008] - E[Y_{igt}|g = tratment, t = 2003]\} - \{E[Y_{igt}|g = control, t = 2008] - E[Y_{igt}|g = control, t = 2003]\}} \quad (7.10)$$

Further, the regression formulation of the difference-in-differences allows one to add additional groups, periods and covariates (Card, 1992; Angrist and Pischke, 2008). Therefore, the linear probability model was estimated for each outcome variable to investigate the impacts of recent healthcare reforms in this chapter:

$$\boldsymbol{y_i = \beta_0 + \beta_1 SIO_i + \beta_2 Greencard_i + \beta_3 (SIO_i \times survey_{2008}) + \beta_4 (GreenCard_i \times survey_{2008}) + \beta_5 survey_{2008} + \beta_6 X_i + \varepsilon_i} \quad (7.11)$$

where y_i is the outcome of interest, and SIO (GreenCard) is an indicator that equals 1 if the individual is insured by SIO (GreenCard). $survey_{2008}$ is a dummy variable equal to 1 for the observations carried out in 2008. X_i is a set of exogenous variables that may impact on outcome variables such as age, education, ethnicity, marital status and parental education. β_O is the constant and ε_i is the error term. The coefficients of interest relate to the interaction terms $(SIO_i \times survey_{2008})$ and $(GreenCard_i \times survey_{2008})$, where β_3 and β_4 capture the changes in outcomes with

respect to the mentioned reforms for SIO- and Greencard-assureds respectively.

Since the basic idea of the difference-in-differences technique is that treatment and control groups represent the same trend (implying that changes – apart from the treatment – will be identical over time), controlling for the groups that were not affected by exogenous shock will eliminate the effect of confounding factors (Angrist and Pischke, 2008). Therefore, the difference will show the pure effects of policy implementations after other exogenous variables are controlled for if necessary. In this study, age, education, ethnicity, marital status and parental education will be controlled for, as they change slightly over time and this may have some impact on outcome variables.

Additionally, placebo tests have been employed, with the aim of testing the validity of the estimation design. First, the equation (7.11) is estimated for some outcomes those should be uninfluenced by the policy such as respondent's height, year of respondent's birth and parental education (father's primary education). Second, the same estimation design is constructed for the time periods those are irrelevant with the policy. Specifically, data from the seventh wave (1998) of the Turkish Demographic and Health Survey are used as pre-policy data, while data from the eighth wave (2003) are used as a post-policy data set. Parental education variables are missing in the pseudo-design since information about parental education is not included in the data from the seventh wave (1998) of the Turkish Demographic and Health Survey. The results for the robustness checks are shown in Tables 7.4 – 7.6. These suggest some impacts on selected outcomes especially for GreenCard-assureds; however, these effects may be associated with different compositions of outcomes (in control and treatment groups). In addition there is no clear pattern indicating the impacts of policy implementation on selected outcomes. On the other hand, the pseudo-design points to some statistically significant effects on child mortality and fertility for Greencard-assureds. However, point estimates of placebo design have opposite signs as of those observed for the primary design.

	Height			Head of household			Year of birth		
	Entire	*East*	*West*	*Entire*	*East*	*West*	*Entire*	*East*	*West*
$(SIO_i \times survey_{2008})$	5.32	0.556	11.727	**-0.018****	-0.016	-0.021	**0.041*****	0.018	-0.009
$(GreenCard_i \times survey_{2008})$	**9.963****	10.654	24.965	**-0.024****	-0.005	**-0.058***	**-0.041****	0.039	0.025

Table 7.4: Placebo estimations: Different outcomes

Placebo - Child Mortality						
Variables	*The number of children who died within the last 5 years*			*Ever had a child who died within the last 5 years*		
	Entire	East	West	Entire	East	West
SIO	-0.002	-0.005	0.002	0.000	0.015	-0.001
GreenCard	0.037**	0.049	0.048	0.035**	0.043	0.051*
$survey_{2008}$	-0.016*	-0.071**	0.001	-0.008	-0.034*	-0.000
$(SIO_i \times survey_{2008}$	0.001	0.024	0.000	-0.000	0.005	0.003
$(GreenCard_i \times survey_{2008})$	**0.07*****	**0.115****	-0.032	**0.038****	**0.058***	-0.03
Age	-0.001**	0.001	-0.001	-0.001***	-0.000	-0.000
Years of education	-0.003***	-0.009***	-0.001*	-0.002***	-0.006***	-0.001
Married	0.055***	0.107***	0.023**	0.046***	0.083***	0.019**
Widowed	0.02	0.028	0.006	0.021	0.029	0.005
Kurdish	0.08***	0.042*	0.048**	0.044***	0.012	0.044***
Arabic	0.03	0.035	-0.026	0.007	-0.011	-0.02
Other race	0.006	0.046	-0.019	0.001	0.047	-0.16
_cons	0.04***	0.028	0.025	0.039***	0.043	0.021

Table 7.5: Placebo design: Child Mortality

Placebo - Fertility						
Variables	*The number of children who was born within the last 5 years*			*Ever had a child who was born within the last 5 years*		
	Entire	**East**	**West**	**Entire**	**East**	**West**
SIO	-0.003	0.026	-0.016	-0.003	0.023	-0.013
GreenCard	0.135***	0.071	0.203**	0.059***	0.038	0.105
$survey_{2008}$	0.011	-0.025	0.066**	0.016	0.004	0.048*
$(SIO_i \times survey_{2008}$	-0.003	-0.005	-0.015	-0.003	-0.04	-0.004
$(GreenCard_i \times survey_{2008})$	**0.179*** **	**0.311*** **	-0.021	**0.091*** **	**0.132*** **	0.063
Age	-0.034***	-0.039***	-0.030***	-0.026***	-0.024***	-0.025***
Years of education	-0.002	-0.012*	0.000	0.002**	0.000	0.002
Married	0.883***	1.16***	0.704***	0.693***	0.796***	0.599***
Widowed	0.732***	0.846***	0.579***	0.584***	0.599***	0.485***
Kurdish	0.231***	0.141***	0.17***	0.099***	0.047**	0.093**
Arabic	0.202***	0.276***	0.097	0.043	0.061	0.036
Other race	0.088*	0.022	-0.071	0.032	-0.000	-0.063
_cons	0.758***	0.806***	0.71***	0.563***	0.464***	0.581***

Table 7.6: Placebo design: Fertility

7.5. Results

The results for child mortality estimations are presented in Table 7.7. Accordingly, the child mortality rates of GreenCard-assureds have decreased on average with the introduction of outpatient healthcare services. Particularly, introducing outpatient healthcare services and conditional cash transfers is more effective in reducing child mortality among GreenCard-assureds living in eastern Turkey. However, similar post-policy impacts on child mortality could not be observed for western Turkey.

In addition, the joining together of the facilities provided by the Social Insurance Organisation and the Ministry of Health has reduced child mortality for people living in eastern Turkey insured by the Social Insurance Organisation. The policy has decreased the probability of having a child who passed away by 4%. It has also been effective in

reducing the number of children died (e.g., it has led to 0.05 less children). However, it is believed that the smaller number of observations led to statistically insignificant estimations for the number of children who died.

The potential explanations for the divergent observations for eastern and western parts of Turkey may be twofold. The first is the different compositions and characteristics of each region. As the eastern part of the country has relatively lower levels of education, wealth, etc. (Ersungur, 2007), it is more likely to have higher levels of child mortality. The second possible explanation is the unbalanced distribution of healthcare facilities between these regions. Since the number of healthcare facilities is significantly higher in western Turkey, child mortality is less likely to occur there. Hence, the aforementioned policies for GreenCard- and SIO-assureds have led to greater impacts on child mortality in eastern Turkey, as expected. On the contrary, unexpectedly, they seem almost ineffective in western Turkey.

The policies examined have similar characteristics with those exploited by Frackenberg (1995), Currie and Gruber (1996a,b), McGuire (2001), Dow and Schmeer (2003), Dow et al. (2003), Chen et al. (2007), Nolan (2011), Chou et al. (2011). Unlike Nolan (2011) and Chen et al. (2007), the results observed confirm the existing literature suggesting the reductions in mortality at early ages with respect to coverage extensions (Frackenberg, 1995; Currie and Gruber, 1996a,b; McGuire, 2001; Dow and Schmeer, 2003; Dow et al., 2003; Chou et al., 2011).

Additionally, the findings regarding fertility estimations are presented in Table 7.8. Accordingly, it appears that the fertility of GreenCard-assureds have on average decreased following the introduction of outpatient healthcare services and conditional cash transfers (with the condition of regular visits). In particular, the policy has reduced the numbers of children being born in eastern Turkey, while it has had a negative impact on having a child in western Turkey. This was expected given that the average number of children being born in eastern Turkey is very much higher than in the west of the country, the policy can be seen to have

decreased the numbers of children being born there. On the other hand, the policy has had a negative effect on those having children in the west of the country, as the average number of children is relatively lower. Further investigations regarding numbers of children confirm the findings for eastern and western divergence (see Table 7.9). Accordingly, having one child or having three or more children have decreased, while having no children has increased in the western Turkey. In eastern Turkey, the numbers of those having three or more children has decreased. The underlying reason for the reductions in fertility especially in the East, may be improved knowledge of family planning and contraception. Since the spread of contraception (D'Addio and d'Ercole, 2005) and knowledge of family planning (Adato et al., 2011) in Turkey are both low (especially among the economically worse-off), regular visits to healthcare centres have probably improved people's knowledge of family planning and led to reductions in the fertility rates of Greencard-assureds. In addition, unexpectedly, it can be seen that the bringing together of the healthcare services provided by the Social Insurance Organisation and the Ministry of Health has not affected the fertility decisions of people insured by the Social Insurance Organisation.

The policies investigated show similarities to those employed by Gold (2001), Schmidt (2007), Lindrooth and McCullough (2007), De Leine et al. (2011), Ohinata (2011), Bailey (2012). In contrast to Schmidt (2007), De Leine et al. (2011) and Ohinata (2011), the findings suggest the reductions in fertility with regard to the introduction of healthcare services. The results confirm the findings of Gold (2001), Lindrooth and McCullough (2007) and Bailey (2012), suggesting the reductions in fertility through the improved knowledge of family planning.

Child Mortality						
Variables	*The number of children who died within the last 5 years*			*Ever had a child who died within the last 5 years*		
	Entire	**East**	**West**	**Entire**	**East**	**West**
SIO	0.000	0.02	0.004	0.000	0.017	0.003
GreenCard	0.100***	0.144***	0.018	0.073***	0.094***	0.021
$survey_{2008}$	-0.004	0.015	-0.001	-0.002	0.015	-0.002
$(SIO_i \times survey_{2008}$	-0.008	-0.052	-0.007	-0.007	-0.048*	-0.004
$(GreenCard_i \times survey_{2008})$	**-0.059*** **	**-0.101*** **	-0.033	**-0.041*** **	**-0.068*** **	-0.032
Age	0.000	0.000	0.000	0.000**	0.000	0.000
Years of education	-0.004***	-0.008***	-0.001	-0.003***	-0.007***	-0.001
Married	0.013	0.021	0.007	0.01	0.008	0.006
Widowed	-0.021	-0.057	-0.01	-0.021	-0.065	-0.01
Kurdish	0.086***	0.056***	0.063***	0.067***	0.044***	0.053***
Arabic	0.039**	0.059	-0.022	0.030**	0.041	-0.019
Other race	-0.016	0.073	-0.016	-0.014	0.075	-0.015
Mother's edu.						
No educ.	-0.021	0.029	-0.043**	-0.019	0.031	-0.046***
Primary educ.	-0.017	0.039	-0.047***	-0.018	0.029	-0.046***
Higher educ.	-0.012	0.052	-0.028	-0.014	0.033	-0.028
Father's Edu.						
No educ.	-0.002	-0.013	0.006	0.002	0.004	0.005
Primary educ.	-0.004	-0.022	0.013	0.001	-0.003	0.011
Higher educ.	-0.007	-0.037	0.007	0.000	-0.009	0.008
_cons	0.067**	0.034	0.060**	0.066**	0.041	0.061**

Table 7.7: Estimations for Child Mortality

Fertility						
Variables	*The number of children who was born within the last 5 years*			*Ever had a child who was born within the last 5 years*		
	Entire	**East**	**West**	**Entire**	**East**	**West**
SIO	-0.021	0.005	-0.046*	-0.018	-0.029	-0.032
GreenCard	0.264***	0.324***	0.137**	0.115***	0.134***	0.126**
$survey_{2008}$	0.006	0.021	-0.05	0.007	-0.02	-0.028
$(SIO_i \times survey_{2008}$	-0.01	-0.074	0.03	0.002	0.032	0.019
$(GreenCard_i \times survey_{2008})$	**-0.100*** **	**-0.142** **	-0.128	**-0.046** **	**-0.022**	-0.149**
Age	-0.039***	-0.043***	-0.033***	-0.030***	-0.027***	-0.028***
Years of education	-0.006***	-0.015***	-0.003	-0.002	-0.002	-0.001
Married	0.264***	0.432***	0.200***	0.198***	0.257***	0.165***
Widowed	0.110**	0.102	0.138	0.089**	0.054	0.113
Kurdish	0.263***	0.187***	0.139***	0.121***	0.090***	0.088***
Arabic	0.284***	0.406***	-0.115	0.083***	0.112**	-0.045
Other race	0.032	0.165	-0.091	0.000	0.053	-0.066
Mother's edu.						
No educ.	-0.052	-0.056	-0.104*	-0.028	-0.034	-0.049
Primary educ.	-0.074*	-0.069	-0.141**	-0.034	-0.037	-0.069
Higher educ.	-0.072	-0.217	-0.054	-0.035	-0.129	0.008
Father's Edu.						
No educ.	-0.017	-0.056	0.014	-0.03	-0.095**	-0.01
Primary educ.	-0.025	-0.079	0.016	-0.023	-0.072*	0.000
Higher educ.	-0.037	-0.08	-0.004	-0.028	-0.069	-0.017
_cons	1.621***	1.763***	1.499***	1.252***	1.211***	1.242***

Table 7.8: Estimations for Fertility

	Having no child			Having one child		
	Entire	*East*	*West*	*Entire*	*East*	*West*
$(SIO_i \times survey_{2008}$	-0.001	-0.032	-0.018	0.007	**0.11****	0.004
$(GreenCard_i \times survey_{2008})$	**0.046****	0.022	**0.149****	-0.019	0.047	**-0.186*****

	Having two children			Having three or more children		
	Entire	*East*	*West*	*Entire*	*East*	*West*
$(SIO_i \times survey_{2008}$	-0.001	**-0.056***	0.016	-0.004	-0.022	-0.002
$(GreenCard_i \times survey_{2008})$	-0.002	-0.026	0.054	**-0.024*****	**-0.043****	**-0.016****

Table 7.9: Further Estimations for Fertility Outcomes

7.6. Discussion

The primary aim of this study has been to evaluate recent healthcare reforms in Turkey. Specifically, the effects of extended access to healthcare on child mortality and fertility have been investigated. The data used relate only to women of reproductive age (15–49). Robustness checks indicate some effects on selected outcomes; however, these are attributable to false positives. In addition, pseudo-design points to some effects on child mortality and fertility for Greencard-assureds; however, these are contrary to the findings from primary estimations.

The findings from difference-in-differences estimations confirm the existing literature suggesting the reductions in mortality at early ages with respect to coverage extensions (Frackenberg, 1995; Currie and Gruber, 1996a,b; McGuire, 2001; Dow and Schmeer, 2003; Dow et al., 2003; Chou et al., 2011). Accordingly, the results indicate that the introduction of outpatient healthcare services and conditional cash transfers has decreased child mortality rates for Greencard-assureds living in eastern Turkey. Further, the uniting of the healthcare facilities provided by the Social Insurance Organisation and the Ministry of Health has led to a lowering of child mortality among people living in eastern

Turkey insured by the Social Insurance Organisation. On the other hand, the reducing impacts of the policies on the child mortality could not be observed for western Turkey.

The underlying reasons for the divergent observations for eastern and western parts of Turkey may be twofold. The first is the different compositions and characteristics of each region. As the eastern part of the country has relatively lower levels of education, wealth, etc. (Ersungur, 2007), it is more likely to have higher levels of child mortality. The second possible explanation is the unbalanced distribution of healthcare facilities between these regions. Since the number of healthcare facilities is significantly higher in western Turkey, child mortality is less likely to occur there. Hence, the aforementioned policies for GreenCard- and SIO-assureds have led to greater impacts on child mortality in eastern Turkey, while they seem almost ineffective in western Turkey.

In addition, the findings also confirm the existing literature (Gold, 2001; Lindrooth and McCullough, 2007; Bailey, 2012) suggesting the reductions in fertility with respect to the introduction of healthcare services. Accordingly the introduction of outpatient healthcare services and conditional cash transfers has decreased the numbers of children being born in eastern Turkey while it has decreased the likelihood of having children in western Turkey. The potential explanation for the reduction in fertility rates may be improved knowledge of family planning and contraception. Since the spread of contraception (D'Addio and d'Ercole, 2005) and knowledge of family planning (Adato et al., 2011) in Turkey are both low (especially among the economically worse-off), regular visits to healthcare centres have probably improved people's knowledge of family planning and led to reductions in the fertility rates of GreenCard-assureds. In addition, given that the average number of children being born in eastern Turkey is very much higher than in the west of the country, the policy can be seen to have decreased the numbers of children being born there. On the other hand, the policy has had a

negative effect on those having children in the west of the country, as the average number of children is relatively lower.

The findings imply that increased accessibility of healthcare services and improved knowledge about family planning lead better health and fertility outcomes. Although the period under analysis is limited between 2003 and 2008, it is the period that Turkish health care is transformed. Therefore, it is believed that the findings can be generalised especially for the countries in socioeconomic transformation. In other saying, they may be useful as the distribution of healthcare services is still unbalanced and there is still lack of knowledge about family planning in developing and underdeveloped world.

In the light of existing literature, it is believed that the policies enhancing (i) the accessibility of healthcare services and (ii) the knowledge of family planning especially in eastern Turkey will be beneficial not only for improving health and fertility (Lindrooth and McCullough, 2007; Kutinova and Conway 2008; Chou et al., 2011; Dennis et al., 2012) but also for reducing the costs of maternal and infant care (Currie and Gruber, 1996b; Lindrooth and McCullough, 2007) and increasing the utilisation of healthcare services (Currie and Gruber, 1996a; Chen et al., 2007; Kutinova and Conway 2008; Wagstaff et al., 2009).

Chapter 8

The Effects of Schooling on Health and Fertility in Turkey

8.1 Introduction

The association of education with health and fertility has long been studied. The causal effects of education on health and fertility are well established. Accordingly, since the education increases the productivity of health, higher educated people can produce more health (Grossman, 1972). In other words, higher educated people are more likely to have better health (ibid.). As for fertility, various explanations have been made for the causal link between education and fertility. First and foremost, education increases the opportunity cost of children (via improving labour market opportunities of women); therefore lowers the fertility (Becker, 1960; Mincer, 1963). Second, education improves the knowledge of health-related behaviour and birth control; thus may reduce fertility (Becker, 1960; Grossman, 1972; Rosenzweig and Schultz, 1987; Thomas et al., 1991; Schultz, 2007).

In this chapter, the impacts of education on health (i.e. child mortality) and fertility (i.e. number of children) in Turkey will be investigated. Lower rates of girls' schooling (UNESCO-IBE, 2011), early marriage and higher fertility (OECD, 2008; TDHS, 2008) are long standing issues of eastern Turkey, i.e., underdeveloped parts of Turkey. Accordingly, in general, eastern girls have lower schooling than the girls living in the west (UNESCO-IBE, 2011). In addition, eastern women marry earlier and they have higher fertility rates compared to western women (TDHS, 2008). Therefore, identifying the effects of education on health and fertility is crucial especially for treating the issues of early marriage, higher fertility and lower enrolment of girls in underdeveloped parts of Turkey.

Investigating the impacts of education on health and fertility is tricky as endogeneity becomes an issue, since education is influenced by unobservable characteristics those may also affect health and fertility preferences. To overcome this, a policy extended compulsory schooling will be exploited as a source of exogenous variation in a regression discontinuity design.

The remainder of the chapter is organised as follows. Section 8.2 provides a literature review on the effects of education both on health and fertility. Section 8.3 gives a brief description of the Turkish education system and related reforms of compulsory schooling. Section 8.4 describes the data and the estimation strategy that has been used. Section 8.5 presents the results and section 8.6 discusses the results and concludes.

8.2 Literature Review

The effects of education on both health and fertility have been well-documented. Accordingly, there is a positive relationship between education and health and fertility outcomes (Strauss and Thomas, 1995); that is, increasing education improves health and reduces higher fertility (ibid.).

The studies reviewed exhibited the impacts of education on health and fertility outcomes in different parts of the world. Accordingly, Gakidou et al. (2010) investigated the impacts of education on child mortality in 175 countries and detected substantial reductions in child mortality led by the increases in education. Cleland and van Ginneken (1988) examined the impacts of maternal education on infant and child mortality in developing countries and found significant reductions in early-age mortality related to the increases in the level of maternal education. In addition, Glied and Lleras-Muney (2003) and Lleras-Muney (2005) indicated reducing effects of schooling on adult mortality in the United States. Spasojevic (2010) and Meghir et al. (2012) suggested improving impacts of schooling on health in Sweden. Further, Oreopoulos (2006) and Silles (2009) indicated improvements in health with respect to the

increased level of education in the United Kingdom. Van Kippersluis et al. (2009) evidenced that education postpones mortality at older ages in Denmark. Breierova and Duflo (2004) observed the decreasing impacts of female education on child mortality in Indonesia. Gunes (2013b) investigated the effects of education on child health in Turkey and observed the improvements in child health led by the increases in schooling. On the other hand, Arendt (2005), Albouy and Lequien (2009) did not detect a causal link between education and health in Denmark and France respectively. In addition, Jurges et al. (2009), Clark and Royer (2010) and Braakmann (2011) also did not observe a causal effect of education on health (even though Jurges et al. (2009) found some correlation) in the United Kingdom.

Studies have also presented the causal link between education and fertility outcomes. Amin and Behrman (2014), Leon (2006) and Puerta (2009) examined the effects of maternal education on fertility in the United States. They observed that increases in schooling led to better fertility outcomes (such as fewer children and delayed childbearing). In addition, Black, Deverux and Salvanes (2008) observed the decreasing impacts of education on fertility in Norway and the United States. Monstad, Propper and Salvanes (2008) also detected delaying impacts of education on timing of childbirth in Norway. Fort (2005) and (2009) examined the fertility consequences of education in Italy and both suggested postponements in early births. Cygan-Rehm and Maeder (2012) investigated the effects of education on fertility in Germany. They stated the reductions in fertility rates and the delays at first birth brought about by an increased level of education. Clark et al. (2014) and Silles (2011) examined the relationship between education and fertility in the United Kingdom and observed the reductions in early fertility. De Paoli (2010) investigated the fertility effects of education and indicated a negative impact on teenage childbearing led by the increases in schooling in Ecuador. In addition, Lavy and Zablotsky (2011) pointed to the decreasing effects of schooling on fertility among Palestinians. Osili and Long (2008) examined the association between education and fertility in Nigeria and detected reductions in fertility led by the increasing level of

education. Kirdar et al. (2010, 2011) and Gunes (2013a) investigated the impacts of education on the timing of marriage and early fertility in Turkey and observed delays on the timing of fertility and therefore, reductions in early fertility. Contrastingly, Braakmann (2011) examined the relationship in the United Kingdom; and detected increasing effects of schooling on fertility rates. Fort et al. (2011) examined the relationship between education and fertility in eight European counties. They indicated the increases in average number of children led by increasing level of education. On the other hand, McCary and Royer (2011) and Breierova and Duflo (2004) investigated the impacts of education on fertility in the United States and in Indonesia respectively. However they observed no statistically significant impacts on fertility.

Further, the policy exploited in this chapter (i.e., extension of compulsory schooling from five to eight years) has also been employed by Kirdar et al. (2010), (2011) and Gunes (2013a,b) as an exogenous shock to see the impacts of education in Turkey. However, Kirdar et al. (2010, 2011) and Gunes (2013a) focused on the timing of fertility (rather than fertility itself). Besides, Gunes (2013b) focused on the child health using height for age and weight for age Z-scores as measurement. The contribution of this chapter is that it focuses on the effects on child mortality and fertility itself (i.e. number of children) rather than its timing. However, since the child mortality and fertility of the individuals affected by the compulsory schooling policy are examined, the sample contains relatively young women at reproductive age (e.g. the eldest woman affected by the policy is 21 years old). Therefore, it is important to note that, in this chapter, the terms 'child mortality' and 'fertility' refer to adolescents (15-19 years old) and young adults (20 and 21 years old) who have married at least once, rather than complete fertility and child mortality.

8.3. Background

The Turkish educational system is planned, managed and controlled by the state (Ministry of National Education, 2006) and publicly-provided

educational services are free of charge at all stages (UNESCO-IBE, 2007, 2011). The Ministry of National Education is responsible for all educational services in Turkey (with the exception of military education) and it is made up of central, provincial and overseas organisations (ibid.). At the provincial level, educational services are under the supervision of education directorates of related provinces (Ministry of National Education, 2006; UNESCO-IBE, 2007, 2011). In addition, the Council of Higher Education is responsible for planning, coordinating and policy-making regarding higher education (ibid.). Further, the Student Selection and Placement Centre, affiliated to the Council of Higher Education, is responsible for the selection and placement of students in higher education institutions (ibid.).

The Turkish educational system has been altered by several reforms recently. Two major changes are related to the duration of compulsory schooling. At the moment, compulsory education covers twelve years of education starting from primary education (European Commission, 2012). It was five years starting from primary education prior to 1997. However, it was expanded to eight years through the implementation of regulatory change in compulsory schooling in 1997. Therefore compulsory schooling became a non-interruptible eight years of education (starting from primary education). Such a regulation has long been debated as (i) it was determined just after a chaotic period and (ii) it abolished religious education at early ages (Carkoglu, 2004). Subsequently, compulsory education was further extended from eight to twelve years in 2012. The new regulation brought a new approach; that is, an interruptible twelve years of compulsory education (four years of primary school, four years of secondary school and four years of high school) instead of eight continuous years of compulsory schooling (European Commission, 2012). The recent regulation has also been discussed substantially since it provides the flexibility to obtain religious education at early ages (ibid.).

In this study, the regulation implemented in 1997 (expanding compulsory schooling from five to eight years) will be used as an exogenous variation

in order to understand the impacts of education on health and fertility. It is important to note that the policy enacted in 2012 (extending compulsory education from eight to twelve years) could not be incorporated in this piece of work due to data limitations.

The Turkish education system is formed by two main parts: (i) formal and (ii) non-formal education. Formal education is the regular part conducted within schools for the individuals in a certain age group (Ministry of National Education, 2005, 2006). Non-formal education is for individuals who left school without achieving a qualification (ibid.). The study considers the formal side of Turkish education system consisting of (i) pre-primary, (ii) primary, (iii) secondary and (iv) higher education. The school year at the primary and secondary levels covers 180 weekdays of teaching in two semesters in total (UNESCO-IBE, 2007, 2011). The academic year usually starts around mid-September and finishes by mid-June of each year (ibid.).

Some brief information about the formal education and the reforms implemented can be seen as follows (Carkoglu, 2004; Ministry of National Education, 2005, 2006, 2012; UNESCO-IBE, 2007, 2011):

(i) *Pre-primary education* is non-compulsory education for children from birth to the age of 69 months old. The main objective is to prepare children at certain ages for primary education both physically and mentally (Ministry of National Education, 2005, 2006; UNESCO-IBE, 2007, 2011). The program considers the developmental needs of three age groups and is offered in (i) day nurseries for children 0-36 months old; (ii) kindergartens for children 36-60 months old; and (iii) pre-school classes for children 61-69 months old.

(ii) *Primary education* is one of the compulsory parts of Turkish education for all children older than 69 months old. It is free of charge in public schools. The main objective of primary education is to provide basic knowledge, skills and attitudes to be good citizens (Ministry of National Education, 2006). It

was introduced as five years of education in 1923 (Gunduz, 2011). Policy-makers extended the primary education from five to eight years by integrating the first three years of secondary education in 1997. It was an incessant eight years of education until it was divided into two parts by the modification in 2012. The first four years of primary education form the first level of compulsory schooling, and the following four years of education establish the second level of compulsory education (European Commission, 2012).

(iii) *Secondary education* used to cover six years of education following primary education. It was not compulsory prior to the 1997 modification; however the first three years of secondary education was integrated into primary education and became compulsory with the regulatory change in 1997. Therefore, secondary education became three years (four years in some special cases; i.e. intensive foreign language courses) following the primary education. However, the duration of secondary education was expanded to four years (five years in some special cases; i.e. intensive foreign language courses) in 2005. Finally, four years of secondary education became compulsory by the regulation enacted in 2012. Hence, four years of secondary education formed the last part of twelve years' compulsory schooling.

(iv) *Higher education* covers at least two years of education provided in universities, faculties and institutions following secondary education (Ministry of National Education, 2005, 2006). It requires qualifications based on a nation-wide examination organised by the Student Selection and Placement Centre (ibid.). Each university generally offers two-year pre-bachelor's programmes (on a vocational basis) and four-year bachelor's programmes. Master's degree programmes usually take two years and finally, doctoral

programmes last between two and five years (UNESCO-IBE, 2007, 2011).

This chapter particularly focuses on the extension of compulsory education (i.e. primary education) from five years to eight years in 1997. Compulsory education lasted five years in Turkey prior to 1997. Policy makers extended compulsory education from five years to eight years in 18th August 1997. The new regulation was applied immediately in the 1997-98 academic year (beginning from September 1997). The policy affected those students proposing to start their fifth grades in September 1997. In other words, the policy affected the students starting schooling in the 1993-94 academic year (beginning from September 1993) or later. Therefore the students starting schooling in September 1993 or later have been forced to have eight years of education instead of five years.

The school starting age was 69-80 months in Turkey. The children who were 69 months old or older at the beginning of each academic year (September each year) were obliged to start schooling. By considering the age of school starters, it can be calculated that the individuals born in or after January 1987 are affected by the policy. Therefore, the individuals born before January 1987 were obliged to have five years of schooling. However, the individuals born after January 1987 were forced to have eight years of schooling.

8.4. Data and Estimation Strategy

8.4.1 Data

This chapter uses the last two waves (the eighth & the ninth) of the Turkish Demographic and Health Survey which has been repeated every five years since 1968. This survey is a representative cross-sectional survey country-wide and focuses on women at reproductive age (15-49) (Rutstein and Rojas, 2006). The eighth wave of the survey, which was performed in 2003, illustrates the situation of Turkish health before the reforms applied. It was conducted in 10,836 households (92.9% response

rate in total) and it contains 8,075 individual interviews with ever-married women within those households (95.6% response rate in total) (TDHS, 2003). The ninth wave of the survey depicts the post-policy situation of Turkish health. It was carried out in 2008, contains 10,525 households (88.4% response rate in total), with 7,405 individual interviews with ever-married women within the selected households (TDHS, 2008).

This chapter investigates the effects of schooling on child mortality and fertility. To do this, child mortality has been measured by (i) the number of children died and (ii) having a child who was alive but died later. On the other hand, fertility has been measured by the number of children. Additionally, four different outcome variables regarding the number of children (a variable for each from 0 to 3+) have been generated to see the impacts on fertility clearly. It is important to note that the measures are related either by the deaths or the births within the five-year periods last at the time of surveys. The rationale behind it is that the surveys repeat every five years and therefore, the actual situation is desired to be captured.

There are also two variables of interest that measure educational attainment. The first is having more than five years of education, which is directly affected by the policy of extended compulsory education. The second is having eight or more years of education whose likelihood might be increased by the policy. Although the years of education were also available in the data set, the discontinuities in educational attainment were clearer when measured by (i) having more than five years of education and (ii) having eight or more years of education. Therefore these measures have been preferred to indicate educational attainment in the models. The summary statistics regarding variables can be seen in Table 8.1 below.

As already mentioned, the policy affected students starting schooling in September 1993 or later. Unfortunately, there is no information about the time of school starting in the dataset. Hence, the time of individual's birth will be exploited instead. Once the age of school starting is

considered, it is discovered that the individuals born in or after January 1987 are affected by the policy. Thus, the time of birth will determine which individuals were affected by the policy and which were not. To do this, two different timing bases will be used: (i) the month of birth and (ii) the quarter of birth. Initially the month of birth was proposed to be used as the determining variable. However, the quarter of birth was also contemplated in order to detect the discontinuities more accurately.

The individual dataset contains the women between 15-49 years old, as expressed before. When the time of birth is considered, the youngest individuals available in the dataset were born in 1993. That means there is approximately a six year period available to reflect the individuals affected by the policy (those born in or after January 1987). Therefore, in order to obtain better results, the sample is restricted to the individuals born within six years' bandwidth around the threshold (January 1987).

Variable	Quarter of Birth				Month of Birth			
	Obs	Mean	Min	Max	Obs	Mean	Min	Max
Number of children	2560	1.209	0	8	2674	1.222	0	8
Having no children	2560	0.314	0	1	2674	0.309	0	1
Having one child	2560	0.485	0	1	2674	0.486	0	1
Having two children	2560	0.17	0	1	2674	0.172	0	1
Having three or more children	2560	0.031	0	1	2674	0.031	0	1
Number of children died	2560	0.043	0	3	2674	0.043	0	3
Ever having child mortality	2560	0.038	0	1	2674	0.037	0	1
Having more than 5 years of education	2560	0.352	0	1	2674	0.353	0	1
Having eight or more years of education	2560	0.336	0	1	2674	0.336	0	1
Being affected by the policy	2560	0.187	0	1	2674	0.178	0	1

Table 8.1: Summary Statistics

8.4.2 Estimation Strategy

Under the classical assumptions, (i) linearity in parameters, correct specification and additive error, (ii) random sampling and nonstochastic independent variables, (iii) zero conditional mean of errors and uncorrelated error term and independent variables, (iv) no perfect collinearity and variability of regressors, and (v) homoscedasticity and normally distributed error terms, OLS estimators will be the best (minimum-variance) linear unbiased estimators. However, when investigating the causal effects of education on health and fertility, the OLS estimations will be problematic as the level of education might be

influenced by unobservable characteristics (such as familial background, ability, preferences regarding personal career) which also affect outcomes of interest (health and fertility). Since the explanatory (independent) and dependent variables are jointly determined, assumption (iii) will be violated; i.e. the error term and the treatment will be correlated. Hence OLS estimates will suffer from an endogeneity problem and will no longer be unbiased. The common strategy to overcome such problem is to implement instrumental variables methods (Angrist and Krueger, 2001; Glied and Lleras-Muney, 2003; Lleras-Muney, 2005; Oreopoulos, 2006; Albouy and Lequien, 2009; Spasojevic, 2010). IV methods were originally pioneered to overcome measurement errors in explanatory variables (Reiersol, 1941; Sargan, 1958); however they have also been widely used to reduce the bias from omitted variables in estimates of causal relationships (Angrist and Krueger, 2001). In order to detect the causal effect, they exploit the variability in the variable of interest that is unrelated to omitted factors and they randomly assign the variable of interest (ibid.). Therefore, they are not always possible to be implemented as they require a degree of exogenous variations in the variable of interest for assignment (ibid.). The changes in education, smoking and minimum wage are always good candidates for such variations (Angrist and Krueger, 2001; Albouy and Lequien, 2009).

In this chapter, the variation in educational attainment with respect to the change in compulsory schooling law is exploited in order to understand the causal relationship between education and health and fertility. Specifically, educational attainment is assigned to be affected by the compulsory schooling law, which is induced by the timing of birth as an instrumental variable. While doing this, a regression discontinuity design will be used since it is a useful method to understand whether a program or treatment is effective by establishing a comparison between the groups existed pre- and post-program (Trochim, 1990). It is distinguished from other quasi-experimental strategies by its method of assignment since the participants are assigned to a program on the basis of a cut-off score on a measurement (ibid.). In other words, the probability of receiving a specific treatment (extending compulsory education for this

chapter) is a function of a continuous determining variable (month or quarter of birth of birth for this chapter) (Imbens and Lemieux, 2008). This allows the estimation of the causal effects of treatment by comparing the outcomes for the individuals below and above the threshold (Lee and Lemieux, 2009). In this study using a regression discontinuity design will allow to understand the causal effects of education on child mortality and fertility by comparing the individuals who are affected by compulsory schooling policy and the ones who are not affected.

The regression discontinuity design is generally used in two forms: sharp and fuzzy design. Sharp design is used if the treatment status is a deterministic and discontinuous function of a covariate (Angrist and Pischke, 2008). In other words, sharp design occurs when the determining variable switches the treatment on or off at the cut-off (Trochim, 1990; Angrist and Pischke, 2008). Fuzzy design exploits the jump in the probability of treatment conditional on a covariate (ibid.). The discontinuity in the probability of treatment at the cut-off point has been used as an instrument in fuzzy design (Angrist and Pischke, 2008):

$$\boldsymbol{P(D_i = 1|x_i) = \begin{Bmatrix} g_1(x_i) & if\ x_i \geq x_0 \\ g_0(x_i) & if\ x_i < x_0 \end{Bmatrix}\ where\ g_1(x_0)\ \neq\ g_0(x_0)} \qquad (8.1)$$

where x_i is the determining variable for individual i, x_0 is the cut-off point and $P(D_i = 1|x_i)$ is the probability of treatment on given x_i. Thus the treatment effect can be estimated:

$$\boldsymbol{\tau = \frac{E[Y_i|x_i=x_0^+]-E[Y_i|x_i=x_0^-]}{E[D_i|x_i=x_0^+]-E[D_i|x_i=x_0^-]}} \qquad (8.2)$$

where $\boldsymbol{x_0^-}$ and $\boldsymbol{x_0^+}$ indicate the points directly below and above cut-off point treatment. This is equivalent to an instrumental variables estimate:

$$\boldsymbol{Y_i = a + \beta_i * g(x_i) + \tau * D_i + \varepsilon_i} \qquad (8.3)$$

Therefore, the following model is estimated with the aim of identifying the impacts of education on selected outcomes:

$$\boldsymbol{Y_{it} = g(T_i) + \tau * E_i + \delta_t + \varepsilon_i} \quad (8.4)$$

where Y_{it} is the outcome of interest (child mortality and the number of children for this chapter) for individual i in a survey year t. $g(T_i)$ is a flexible parametric function of time of birth (month of birth and quarter of birth for this chapter). δ_t is the survey year and ε_i is the error term. E_i is the educational attainment for individual i, which is measured by (i) having more than five years of education and (ii) having eight or more years of education, and instrumented with the timing of birth (being born before or after the cut-off point). Standard errors are clustered by the time of birth (either the month or the quarter of birth, depending upon the timing basis of models).

The OLS estimations of Eq. (8.4) will suffer from endogeneity issue as the level of education might be influenced by unobservable characteristics (such as familial background, ability, preferences regarding personal career) which also affect outcome of interest. The common strategy to overcome such problem is use an instrumental variable (Angrist and Krueger, 2001; Glied and Lleras-Muney, 2003; Lleras-Muney, 2005; Oreopoulos, 2006; Albouy and Lequien, 2009; Spasojevic, 2010). A good instrument should have a reasonable correlation with the endogenous regressors, but should be uncorrelated with the outcome variable beyond the relation through the endogenous regressor (Angrist and Krueger, 2001). It has been suggested that changes in compulsory education laws are always good instruments to be employed, since they affect educational attainment directly, and have indirect effects on health and fertility through education (Albouy and Lequien, 2009). Therefore, in this study, educational attainment (E_i) will be instrumented variable that is induced by the changes in compulsory schooling policy (See Eq. 8.5 below). The policy affected students starting schooling in September 1993 or later. Since there is no information about the time of school starting,

the time of individual's birth will be exploited instead. Once the age of school starting is considered, it is discovered that the individuals born in or after January 1987 are affected by the policy. Hence, the time of birth will determine which individuals were affected by the policy and which were not. Accordingly, the individuals born in or after January 1987 are affected by the policy change and forced to have eight years of compulsory schooling while their counterparts born before January 1987 used to have five years of compulsory schooling. Therefore, the timing of birth (being born after January 1987) will be employed as an instrument to assign the individuals and it will be tested for weak instrument problem using F-statistics of first stage estimation. The following regression is estimated as first stage in order to identify the effects of policy change on educational attainment:

$$\boldsymbol{E_i = \pi_0 + \theta * Tr_i + \pi_1 * T_i + \pi_2 * T_i * Tr_i + \delta_t + \mu_i} \quad (8.5)$$

where Tr_i is a dummy variable suggesting that an individual was affected by the policy. T_i and $T_i * Tr_i$ are linear in time of birth (either quarter or month of birth). Their slopes, i.e. π_1 and π_2, are allowed to be different on each sides of the threshold. It is important to keep in mind that the regression discontinuity estimates are unbiased only if the individuals below and above the threshold have identical characteristics except treatment (Jurges et al., 2009).

Robustness checks have also been performed to question the validity of the estimation strategy. Therefore, the instrumental variables estimations have been employed with a restricted sample. To do this, the bandwidth has been narrowed from six years to two years around the threshold (January 1987). Specifically, the main estimations consider the women born in or between January 1981 and January 1993 while the estimations for the robustness check account for only the women born in or between January 1985 and January 1989.

The results have been shown in the last two columns of Table 8.3 & 8.4. The results obtained for the restricted sample are more or less equivalent to those obtained from the main estimations.

8.5. Results

8.5.1. First Stage Results

The discontinuities in educational attainment can be seen graphically in Figure 8.1 below. As expressed before, educational attainment has been measured by (i) having more than five years of education and (ii) having eight or more years of education. Hence the discontinuities on both regressions can be seen in the figure. Additionally both time bases (the month and the quarter of birth) have been illustrated in Figure 8.1.

The jumps at the threshold are clearly noticeable. They are even clearer when the quarter of birth has been used as determining variable rather than the month of birth. It is observed that the individuals born after threshold certainly have a higher probability of both (i) having more than five years of education and (ii) having at least eight years of education. Furthermore, the probabilities are even higher for the younger individuals.

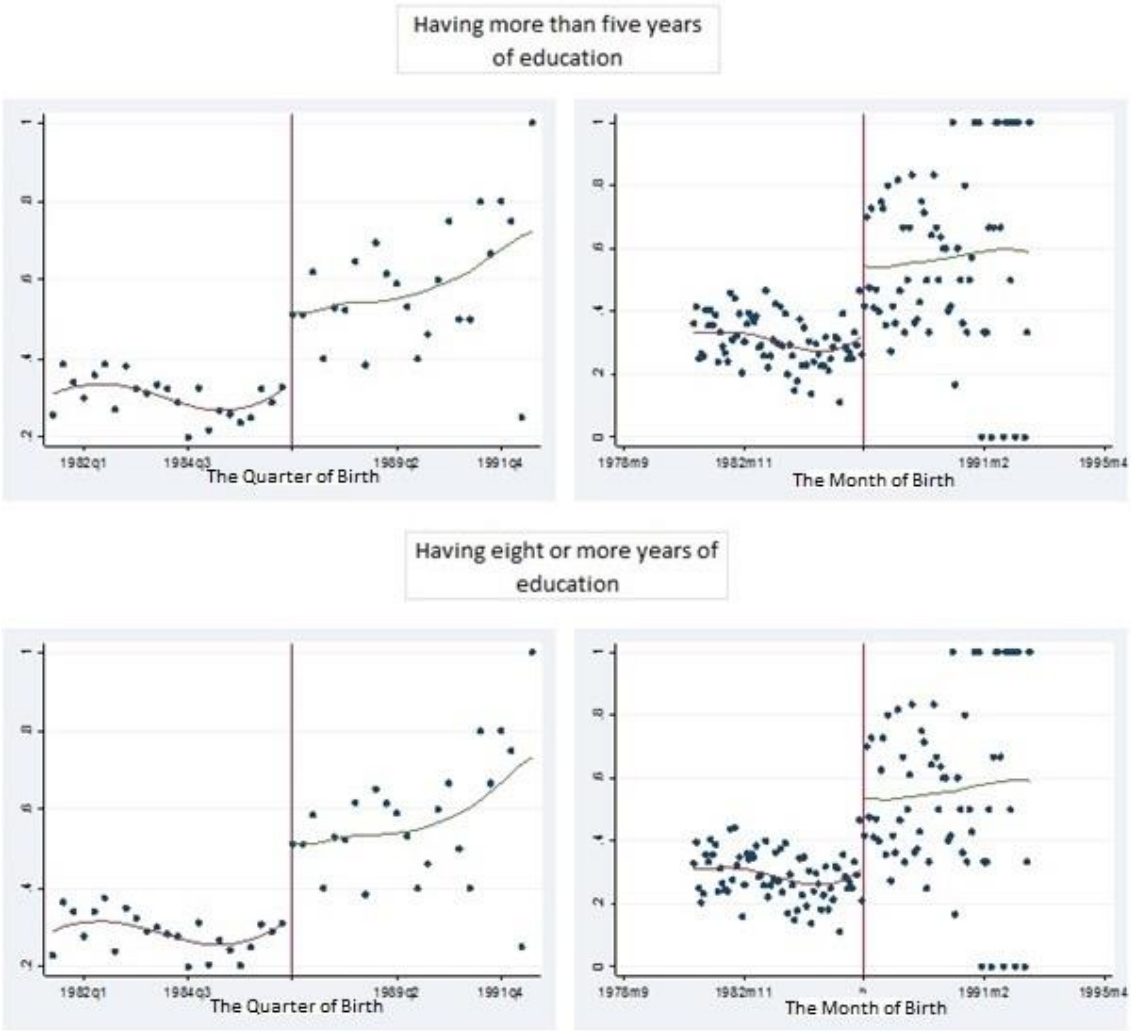


Figure 8.1: Regression Discontinuities in Educational Attainment

	6 years around the threshold				2 years around the threshold			
	quarterly basis		monthly basis		quarterly basis		monthly basis	
	having more than 5 years of education	having 8 or more years of education	having more than 5 years of education	having 8 or more years of education	having more than 5 years of education	having 8 or more years of education	having more than 5 years of education	having 8 or more years of education
treatment	0.239***	0.245***	0.24***	0.246***	0.183***	0.193***	0.183***	0.194***
number of observations	2560	2560	2674	2674	717	717	769	769
F-statistics	46.86	56.81	31.17	34.47	29.56	45.22	9.2	10.71

Table 8.2: First Stage Estimations

The results of first stage estimations can be seen in Table 8.2. The findings confirm the observations from first stage graphs. Accordingly, the women born in or after January 1987 are around 24% more likely to have more than five years of education compared to those born before January 1987. They are also approximately 24% more likely to have eight or more years of education. In general, findings from all first stage regressions do not suffer from weak the instrument problem.

NUMBER OF CHILDREN BORN						
	OLS		6 years around		2 years around	
	(1)	(2)	(3)	(4)	(5)	(6)
	quarterly basis	monthly basis	IV-quarterly basis	IV-monthly basis	IV-quarterly basis	IV-monthly basis
having more than 5 years of education	-0.61***	-0.605***	-0.086	-0.141	-0.298	-0.275
	(0.047)	(0.037)	(0.3)	(0.323)	(0.687)	(0.619)
having 8 or more years of education	-0.63***	-0.632***	-0.084	-0.137	-0.283	-0.259
	(0.050)	(0.039)	(0.293)	(0.315)	(0.651)	(0.584)
number of observations	2560	2674	2560	2674	717	769

HAVING NO CHILD						
	OLS		6 years around		2 years around	
	(1)	(2)	(3)	(4)	(5)	(6)
	quarterly basis	monthly basis	IV-quarterly basis	IV-monthly basis	IV-quarterly basis	IV-monthly basis
having more than 5 years of education	0.144***	0.142***	-0.163	-0.191	-0.263	-0.382
	(0.017)	(0.017)	(0.158)	(0.187)	(0.198)	(0.386)
having 8 or more years of education	0.151***	0.151***	-0.159	-0.186	-0.25	-0.359
	(0.016)	(0.024)	(0.154)	(0.181)	(0.189)	(0.358)
number of observations	2560	2674	2560	2674	717	769

HAVING ONE CHILD						
	OLS		6 years around		2 years around	
	(1)	(2)	(3)	(4)	(5)	(6)
	quarterly basis	monthly basis	IV-quarterly basis	IV-monthly basis	IV-quarterly basis	IV-monthly basis
having more than 5 years of education	0.011	0.013	0.108	0.104	0.601	0.515
	(0.017)	(0.018)	(0.183)	(0.218)	(0.387)	(0.522)
having 8 or more years of education	0.005	0.006	0.105	0.101	0.571	0.485
	(0.16)	(0.019)	(0.178)	(0.212)	(0.366)	(0.486)
number of observations	2560	2674	2560	2674	717	769

Table 8.3: Estimations for Fertility

HAVING TWO CHILDREN						
	OLS		6 years around		2 years around	
	(1)	(2)	(3)	(4)	(5)	(6)
	quarterly basis	monthly basis	IV-quarterly basis	IV-monthly basis	IV-quarterly basis	IV-monthly basis
having more than 5 years of education	-0.117***	-0.119***	0.099	0.134	-0.259	-0.026
	(0.011)	(0.011)	(0.122)	(0.157)	(0.313)	(0.36)
having 8 or more years of education	-0.12***	-0.121***	0.097	0.13	-0.246	-0.024
	(0.012)	(0.011)	(0.119)	(0.152)	(0.297)	(0.339)
number of observations	2560	2674	2560	2674	717	769

HAVING THREE OR MORE CHILDREN						
	OLS		6 years around		2 years around	
	(1)	(2)	(3)	(4)	(5)	(6)
	quarterly basis	monthly basis	IV-quarterly basis	IV-monthly basis	IV-quarterly basis	IV-monthly basis
having more than 5 years of education	-0.038***	-0.036***	-0.044	-0.047	-0.077	-0.107
	(0.005)	(0.006)	(0.041)	(0.042)	(0.071)	(0.088)
having 8 or more years of education	-0.036***	-0.036***	-0.043	-0.046	-0.073	-0.1
	(0.005)	(0.005)	(0.04)	(0.041)	(0.066)	(0.081)
number of observations	2560	2674	2560	2674	717	769

Table 8.3 *continued*: Estimations for Fertility

NUMBER OF CHILDREN DIED						
	OLS		6 years around		2 years around	
	(1)	(2)	(3)	(4)	(5)	(6)
	quarterly basis	monthly basis	IV-quarterly basis	IV-monthly basis	IV-quarterly basis	IV-monthly basis
having more than 5 years of education	-0.046***	-0.044***	-0.054	-0.08	-0.108	-0.107
	(0.005)	(0.008)	(0.048)	(0.05)	(0.108)	(0.085)
having 8 or more years of education	-0.047***	-0.046***	-0.054	-0.078	-0.103	-0.101
	(0.006)	(0.008)	(0.047)	(0.048)	(0.101)	(0.078)
number of observations	2560	2674	2560	2674	717	769

EVER EXPERIENCED CHILD MORTALITY						
	OLS		6 years around		2 years around	
	(1)	(2)	(3)	(4)	(5)	(6)
	quarterly basis	monthly basis	IV-quarterly basis	IV-monthly basis	IV-quarterly basis	IV-monthly basis
having more than 5 years of education	-0.039***	-0.037***	-0.057	-0.074	-0.127	-0.094
	(0.004)	(0.006)	(0.042)	(0.041)	(0.105)	(0.08)
having 8 or more years of education	-0.039***	-0.038***	-0.056	-0.072	-0.12	-0.088
	(0.005)	(0.006)	(0.041)	(0.04)	(0.098)	(0.074)
number of observations	2560	2674	2560	2674	717	769

Table 8.4: Estimations for Child Mortality

8.5.2. Results for child mortality and fertility

The results of both OLS and instrumental variables (IV) regressions for regression discontinuity design are presented in Table 8.3 & 8.4. The OLS estimations are presented in the first two columns of the tables. The following two columns show the results of IV estimations. It is important to keep in mind that the OLS estimations (1st and 2nd columns) and IV estimations shown in the 3rd and 4th columns consider the individuals born in 6 years bandwidth around the threshold (January 1987). In other words, the women born between January 1981 and January 1993 have been taken into account. The last two columns (5th and 6th) are devoted to the IV estimations of restricted sample for robustness check. The only

difference from the main IV estimations is that the bandwidth is narrowed to 2 years around threshold instead of 6 years.

As already mentioned, there are two different timing bases used as determining variable; (i) the quarter of birth and (ii) the month of birth. The results for both bases are presented in the tables. The estimations using the quarter of birth are presented first. Next, the ones using the month of birth are introduced. Nevertheless, it can be seen that there is no major difference depending upon timing basis, although slightly higher impacts have been observed, as expected, for the estimations using the month of birth.

The estimations for fertility outcomes can be seen in Table 8.3. The OLS estimations (presented in the 1st and 2nd columns) depict a strong statistical association between education and fertility outcomes. As expected, there is negative impact of education on fertility. In other words, more educated individuals (those obliged to have eight years of schooling instead of five) have fewer children, on average, than their less educated counterparts. Two measures of educational attainment, i.e. (i) having more than five years of education and (ii) having eight or more years of education have almost identical impacts on selected fertility outcomes. Accordingly, the women obliged to have higher schooling (by the policy) are more likely to have no children. In contrast they are less likely to have two or more children compared to the individuals not affected by the policy.

On the other hand, IV estimations (shown in the 3rd and 4th columns) indicate mixed impacts of education on selected fertility outcomes. However the effects are not statistically significant at the 10% confidence level. The findings are in line with existing literature (Breierova and Duflo, 2004; Black, Deverux and Salvanes, 2004; Leon, 2006; Puerta 2009) since they suggest reducing impacts of education on the number of children. Accordingly, the women affected by the policy (obliged to study eight years of education instead of five) have fewer children than those not affected. Furthermore, extra education decreases the likelihood of having no children and having three or more children, but increases the

likelihood of having one or two children. However, as mentioned, all these effects are not statistically different from zero at 10% significance level. First stage estimations present a strong impact of the policy on educational attainment (see Table 8.2); therefore there is no weak instrument problem. However, the standard errors in IV estimations are much larger than those obtained from the OLS as the instrumented variable is predicted from a different source of variation in educational attainment (Monstad, Propper and Salvanes, 2008). Hence it is believed that, this is related to significance falls in IV estimations in this study.

As for child mortality, the results can be seen in Table 8.4. Again, two different measures of schooling; i.e. (i) having more than five years of education and (ii) having eight or more years of education have almost identical impacts on selected child mortality outcomes.

The OLS estimations (placed in the first two columns of Table 8.4) indicate a statistically significant relationship between education and child mortality. The women obliged to have longer education (by the policy extending compulsory education) have fewer children that died. Besides, they have a lower possibility of experiencing child mortality compared to the women not affected by the policy.

IV estimations show similar impacts to those obtained from OLS estimations although they are not statistically significant at the 10% significance level. Accordingly, schooling reduces child mortality numbers and its likelihood, as expected. The findings suggest that the women affected by the policy have lower child mortality than those not affected. Furthermore they have lower a likelihood to have a child who was born alive and died later. Nevertheless, as stated, these effects are not statistically different from zero at 10% significance level. Again, it is believed that significance falls in IV estimations (i.e., there are higher standard errors) since instrumented variable (education for this study) is predicted from a different source of variation (compulsory schooling policy) in educational attainment.

8.6. Discussion

In this chapter, the effects of education on child mortality and fertility in Turkey have been investigated using regression discontinuity design. In particular the reform extending compulsory education from five years to eight years has been exploited. By doing this examination the research firstly highlights the impacts of education on Turkish health and fertility. This is critical as another educational reform bearing similar characteristics (further extending compulsory schooling) has been implemented recently. Thus, it is believed that the findings may enlighten further research about recent policy. The investigations exploiting recent policy could not be conducted in this study since the data of the latest wave (TDHS-2013) has not been published.

The policy extending compulsory schooling has long been debated so far as it banned religious education at early ages. However, health and fertility effects of the policy are barely identified. Therefore, this study investigates health and fertility effects of the policy extended compulsory schooling. Such policy has also been employed by Tayfur et al. (2010), (2011) and Gunes (2013a,b) to examine the effects of education on fertility timing and child health respectively. Using this reform, Tayfur et al. (2010, 2011) and Gunes (2013a) detected statistically significant impacts of schooling in the delay of fertility timing. Additionally, Gunes (2013b) suggested statistically significant effects of education improving child health. In contrast, this piece of work has exploited the same policy to identify the impacts of education on fertility (i.e. number of children) and child mortality (i.e. the number of children who died).

Accordingly, the change in compulsory education led to a 24% increase in having more than five years of education for women affected by the policy. It also led to an approximately 24% increase in having eight or more years of education for them. Further, it has been revealed that women forced to have more schooling (eight years of schooling instead of five) have lower fertility (i.e. number of children) and child mortality compared to their counterparts not affected by the policy (who have

relatively lower schooling). In other saying, higher schooling leads lower number of children and lower number of children died.

The findings of fertility estimations reflect similarities to those obtained by McCary and Royer (2011) and Breierova and Duflo (2004) as they observe reducing impact of education on fertility, though they bear the lack of statistical significance. Similarly, the findings of this study indicate the reducing impacts of schooling on fertility (i.e. number of children), however they are not statistically different from zero.

Unlike Breierova and Duflo (2004), our findings for child mortality lose statistical significance when the instrumental variable techniques are employed even though they depict the decreasing impacts of education on child mortality (i.e. the number of children died).

Using an instrumented variable sourced by an exogenous shock causes higher standard errors (Monstad, Propper and Salvanes, 2008). In this chapter, an educational reform extending compulsory education has been exploited as an exogenous variation. Therefore, it is possible that this led to the obtaining of statistically insignificant results when the instrumental variable techniques were performed.

Chapter 9

Conclusion

The aim of the thesis is to provide a broad analysis of the inequalities in Turkish health and fertility. Turkey is an interesting case as (i) it consists of both well-developed parts in the West and relatively less-developed (or developing) parts in the East and (ii) it has been going through a far-reaching reform process in the last decade (Tatar et al., 2011).

The scenarios of health and fertility in both developed and developing countries are clear. However, there is not much information about the countries between them, in other saying, the countries in transforming process. Therefore, the results of this thesis are important for the literature as they provide information about (i) the mechanisms effecting health and fertility and (ii) the inequalities in health and fertility in a country in socioeconomic transformation.

By performing several empirical studies, this thesis contributes comprehensively to the literature on health and fertility. During the analyses, data from the Turkish Demographic and Health Survey have been employed. The survey contains individual interviews with only ever-married women at reproductive age (15-49) in Turkey. Therefore, the investigations of the thesis have nothing to say about men living in Turkey. Having broader data sets which include not only women but also men and children in Turkey will allow to conduct wider investigations and observe more comprehensive results. Due to scarcity of the data, the investigations of health of men and children are left to be studied in future. Apart from these, providing more detailed information about socioeconomic factors such as occupation, income and development.

Chapter 2 briefly describes the data used in this thesis.

Chapter 4 focuses on the socioeconomic inequalities in health and fertility in Turkey. Accordingly, the socioeconomic determinants of health and fertility have been identified for 2003 and 2008 separately. To do this, two different aspects of health - child mortality and obesity - have been considered as health indicators. Also, abortion, contraception and the number of children have been used as fertility indicators.

The results were as expected for all health and fertility indicators excluding obesity, which was of particular interest. Accordingly, increasing impacts of age and decreasing effects of age at first marriage (except for number of children) have been observed in all health and fertility indicators. In addition, the findings suggest that women with lower socioeconomic status have relatively higher child mortality and number of children. In contrast they have lower abortion and contraception. These may be related to their poorer access to healthcare services (including family planning services) and poorer knowledge about family planning.

Subsequently, in Chapter 5, the levels of income-related health and fertility inequalities in 2003 and 2008 have been measured respectively. Also, detected inequalities have been decomposed into their components using the socioeconomic models constructed in Chapter 4. Finally, the first difference in income related inequalities over time has been decomposed.

Accordingly, inequality analyses indicate that child mortality and the number of children are more concentrated among deprived women while abortion and contraception are more concentrated among wealthier women. Further, income related inequalities in child mortality have been increasing over time. On the other hand, the inequalities in abortion and contraception have been decreasing for the same period. As for the inequalities in the number of children, they have almost remained the same. The decomposition analyses suggest that wealth, age and education are the most important contributors of income related inequalities in health indicators. On the other hand, it appears that not

only wealth, age, education but also living in the developed parts of Turkey contributes greatly to the inequalities in fertility indicators.

The findings (from Chapters 4 and 5) highlight especially the roles of wealth and education in improving health and fertility. Therefore, the policies increasing the level of wealth and education of deprived women may be beneficial in reducing child mortality and higher fertility. The results also reveal the importance of the accessibility of healthcare services (including family planning services). Thus, enhancing the accessibility of healthcare services especially for deprived women may be worthwhile in reducing child mortality and higher fertility.

The analyses of obesity reveal surprising implications. Women with lower socioeconomic status have relatively low BMI scores even though their reproductivity is higher. However, wealthier women also have lower scores than the base category – middle wealth group. These required further research into obesity.

Therefore chapter 6 focuses in detail on the socioeconomic inequalities in obesity in depth. It investigates the determinants of obesity in the most and the least developed parts of Turkey. Subsequently, it measures income related obesity inequalities in these regions. Finally it decomposes both the (i) income related obesity inequalities and (ii) the obesity gap between these regions.

Accordingly, the findings suggest that age, ethnicity, education, income, marital status and employment are significantly associated with obesity in Turkey. The income effects are important as they have impacts on obesity in two ways. That is, the results indicate that (i) lower socioeconomic groups have higher obesity rates, and that (ii) higher socioeconomic groups have higher obesity rates. This may be due to the pooling of individuals from different regions with different levels of development. In addition, regional effects on obesity were not clear. Hence, the individuals have been separated and different models have been constructed for eastern and western Turkey since they are referred to as the least and the most developed parts of Turkey respectively

(Ersungur et al., 2007). As a result, it is understood that higher socioeconomic characteristics are associated with higher obesity rates in eastern Turkey (the least developed part) while they are related to lower obesity rates in western Turkey (the most developed part). Therefore, it is shown that western Turkey has the characteristics with of developed countries whereas eastern Turkey resembles developing countries. In addition, inequality analysis suggests that obesity is more concentrated among wealthier women in eastern women whereas it is more concentrated among poorer women in western Turkey. This confirms the fact that eastern Turkey reflects the characteristics close to developing countries while western Turkey is closer to developing countries in this respect. Decomposition of income related inequalities between eastern and western Turkey indicates that the inequalities are predominantly associated with wealth and ethnicity. Wealth effects (on income related inequalities in obesity) are mainly due to the differences in the partial associations between wealth and obesity. This may be related to food intake if it is the case that eastern women cannot afford food as well as western women. Therefore it is believed that the policies dealing with the nutritional issues of eastern women may be useful in reducing the inequalities between eastern and western Turkey.

Another interesting result is that differences in the partial associations of being Kurdish and having obesity between eastern and western Turkey have significant effects on income related inequalities between these regions. This may be related with their food intake again if it is the case that Kurdish women in western Turkey have calorie intense diets (such as fast food) and/or Kurdish women in eastern Turkey do not have proper food intake. Accordingly, in addition to the policies dealing with the nutritional issues of eastern women, policies which encourage healthy behaviour of western women may also be helpful in reducing the inequalities in obesity.

Therefore the study indicates that designing specific policies for regions with different levels of development will be useful in reducing the inequalities between eastern and western Turkey.

Chapter 7 undertakes the evaluation of recent healthcare reforms in Turkey. Specifically, it investigates the effects of extended access to healthcare on child mortality and fertility using difference in differences estimation design. The findings from difference in differences estimations suggest that extended coverage (by introducing outpatient healthcare services and conditional cash transfers) has decreased child mortality rates for GreenCard-assureds living in eastern Turkey. Further, coverage extension (via uniting of the healthcare facilities provided by the Social Insurance Organisation and the Ministry of Health) has led to a lowering of child mortality among people living in eastern Turkey insured by the Social Insurance Organisation. In addition, the introduction of outpatient healthcare services and conditional cash transfers has decreased the numbers of children being born in eastern Turkey while it has decreased the likelihood of having children in western Turkey. The potential explanation for the reduction in fertility rates may be improved knowledge of family planning and contraception. Since the spread of contraception (D'Addio and d'Ercole, 2005) and knowledge of family planning (Adato et al., 2011) in Turkey are both low (especially among the economically worse-off), regular visits to healthcare centres have probably improved people's knowledge of family planning and led to reductions in the fertility rates of GreenCard-assureds. In addition, given that the average number of children being born in eastern Turkey is very much higher than in the west of the country, the policy can be seen to have decreased the numbers of children being born there. On the other hand, the policy has had a negative effect on those having children in the west of the country, as the average number of children is relatively lower. In the light of existing literature, it is believed that the policies' enhancing of (i) the accessibility of healthcare services and (ii) the knowledge of family planning especially in eastern Turkey will be beneficial not only for improving health and fertility (Lindrooth and McCullough, 2007; Kutinova and Conway 2008; Chou et al., 2011; Dennis et al., 2012) but also for reducing the costs of maternal and infant care (Currie and Gruber, 1996b; Lindrooth and McCullough, 2007) and increasing the utilisation of healthcare services

(Currie and Gruber, 1996a; Chen et al., 2007; Kutinova and Conway 2008; Wagstaff et al., 2009).

Chapter 8 investigates the effects of education on child mortality and fertility in Turkey using an instrumental variables technique in a regression discontinuity design. In particular it exploits the reform extending compulsory education from five years to eight years. By doing this examination the research firstly highlights the impacts of education on Turkish health and fertility. This is critical as another educational reform bearing similar characteristics (further extending compulsory schooling) has been implemented recently. Thus, it is believed that the findings may enlighten further research about recent policy.

The findings suggest that the change in compulsory education led to an increase in having more than five years of education for women affected by the policy. It also headed to an increase in having eight or more years of education for them. Further, it has been revealed that the women forced to have eight years of schooling (instead of five) have lower fertility (i.e. number of children) and child mortality than their counterparts. These findings stress the importance of education in improving health and fertility. Since the educational variations are associated with the disparities in health and fertility (Cutler and Lleras-Muney, 2006), improving the educational levels of lower educated individuals (e.g. reducing the educational variations) may lead to reductions in health and fertility inequalities, and therefore improvements in health and fertility (Woodward and Kawachi, 2000; Marmot, 2010).

Chapter 10

Appendices

Appendix A: Decomposition of Erreygers index (2009a) for binary outcome variables

Decomposition of Erreygers index (2009a) for child mortality

Child Mortality						
Ever had a child who died						
	2003			2008		
	Elasticity	CI	Cont.	Elasticity	CI	Cont.
Respondents' Age At The Time Of Survey	3.337	0.071	-272.59%	3.606	0.072	-347.88%
Squared Function Of Respondent's Age	-0.402	0.073	33.63%	-0.489	0.071	46.80%
Having No Education At All	0.098	-0.344	38.72%	0.141	-0.354	66.94%
Being Graduated From Primary Education	0.009	-0.117	1.17%	-0.025	-0.138	-4.63%
Being Graduated From Higher Education	0.014	0.169	-2.74%	0.012	0.200	-3.34%
Being From Kurdish Background	0.090	-0.315	32.52%	0.050	-0.385	26.09%
Being From Arabic Background	0.005	-0.023	0.13%	0.008	-0.043	0.48%
Being From Other Non-Turkish Backgrounds	-0.003	0.007	0.03%	0.002	0.001	0.00%
Being Married	0.207	0.007	-1.61%	0.167	-0.005	1.21%
Being Widowed	0.009	-0.010	0.11%	0.004	-0.005	0.03%
Respondents' Age At First Marriage	-2.121	0.042	102.80%	-1.528	0.054	110.44%
Living In Southern Turkey	-0.022	-0.032	-0.79%	-0.019	-0.075	-1.94%
Living In Central Turkey	-0.011	0.029	0.36%	0.032	0.101	-4.41%
Living In Northern Turkey	-0.012	0.044	0.57%	-0.016	0.068	1.44%
Living In Western Turkey	-0.038	0.202	8.77%	-0.018	0.283	6.96%
Living In Urban Turkey	-0.097	0.355	39.60%	-0.026	0.515	17.96%
Being In The Poorest Wealth Category	0.077	-0.540	47.54%	0.073	-0.653	63.85%
Being In Poorer Wealth Category	0.045	-0.367	18.86%	0.000	-0.316	0.02%
Being In Richer Wealth Category	0.010	0.295	-3.23%	-0.054	0.368	26.59%
Being In The Richest Wealth Category	-0.049	0.696	38.89%	-0.084	0.564	63.66%
Having No Social Security At All	0.041	-0.373	17.61%	0.014	-0.172	3.20%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.004	0.122	-0.55%	0.006	0.086	-0.73%
Being Insured By Social Insurance Organisation	0.024	0.229	-6.26%	0.008	0.298	-3.30%
Being Insured By GreenCard	0.026	-0.213	6.45%	0.056	-0.406	30.57%
Being Insured By Private Organisations	0.000	0.015	-0.01%	0.001	0.008	-0.01%
Explained CI			-0.087			-0.074

Decomposition of Erreygers index (2009a) for abortion

Abortion						
Ever had an induced abortion						
	2003			2008		
	Elasticity	CI	Cont.	Elasticity	CI	Cont.
Respondents' Age At The Time Of Survey	3.840	0.071	89.90%	-0.215	0.072	72.31%
Squared Function Of Respondent's Age	-0.834	0.073	-19.97%	-0.023	0.071	7.79%
Having No Education At All	-0.057	-0.344	6.42%	0.002	-0.354	2.66%
Being Graduated From Primary Education	-0.011	-0.117	0.43%	-0.005	-0.138	-3.22%
Being Graduated From Higher Education	0.008	0.169	0.45%	-0.001	0.200	0.89%
Being From Kurdish Background	-0.031	-0.315	3.24%	0.001	-0.385	1.48%
Being From Arabic Background	-0.008	-0.023	0.06%	0.001	-0.043	0.16%
Being From Other Non-Turkish Backgrounds	-0.005	0.007	-0.01%	0.000	0.001	0.00%
Being Married	-0.348	0.007	-0.78%	0.029	-0.005	0.74%
Being Widowed	-0.011	-0.010	0.04%	0.001	-0.005	0.03%
Respondents' Age At First Marriage	-1.474	0.042	-20.48%	0.130	0.054	-32.84%
Living In Southern Turkey	0.019	-0.032	-0.20%	-0.001	-0.075	-0.21%
Living In Central Turkey	0.039	0.029	0.37%	-0.002	0.101	0.90%
Living In Northern Turkey	0.002	0.044	0.03%	-0.002	0.068	0.78%
Living In Western Turkey	0.048	0.202	3.21%	-0.006	0.283	8.30%
Living In Urban Turkey	0.123	0.355	14.39%	-0.004	0.515	10.37%
Being In The Poorest Wealth Category	-0.040	-0.540	7.06%	0.005	-0.653	14.30%
Being In Poorer Wealth Category	-0.006	-0.367	0.71%	0.002	-0.316	3.63%
Being In Richer Wealth Category	0.004	0.295	0.36%	-0.002	0.368	2.69%
Being In The Richest Wealth Category	0.048	0.696	10.91%	-0.005	0.564	13.62%
Having No Social Security At All	-0.055	-0.373	6.68%	-0.005	-0.172	-4.39%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	-0.012	0.122	-0.49%	0.000	0.086	0.04%
Being Insured By Social Insurance Organisation	-0.044	0.229	-3.33%	-0.006	0.298	7.92%
Being Insured By GreenCard	-0.015	-0.213	1.02%	-0.004	-0.406	-7.99%
Being Insured By Private Organisations	-0.001	0.015	0.00%	-0.001	0.008	0.03%
Explained CI			0.304			0.021

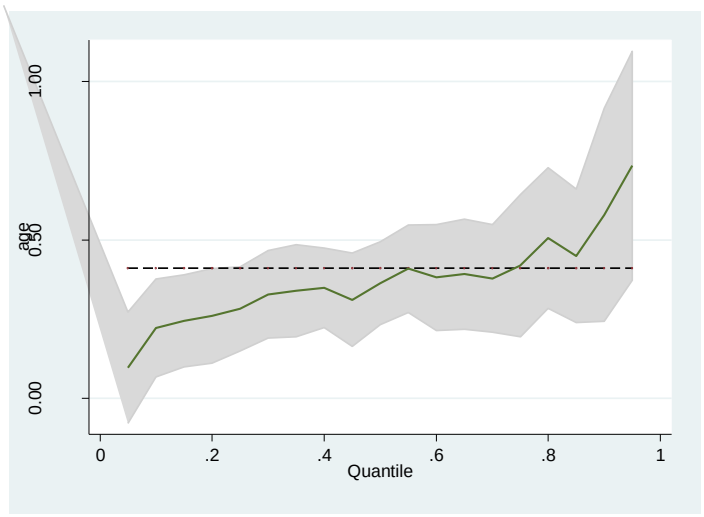
Decomposition of Erreygers index (2009a) for contraceptive use

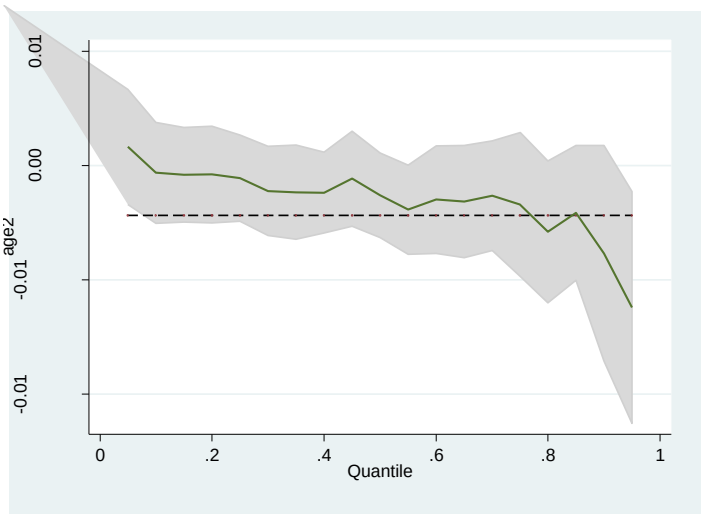
Contraception						
Ever used a contraceptive method						
	2003			2008		
	Elasticity	CI	Cont.	Elasticity	CI	Cont.
Respondents' Age At The Time Of Survey	1.900	0.071	133.51%	2.140	0.072	147.95%
Squared Function Of Respondent's Age	-0.931	0.073	-66.91%	-1.035	0.071	-70.98%
Having No Education At All	-0.022	-0.344	7.41%	-0.020	-0.354	6.79%
Being Graduated From Primary Education	-0.019	-0.117	2.23%	-0.013	-0.138	1.66%
Being Graduated From Higher Education	0.003	0.169	0.47%	0.001	0.200	0.28%
Being From Kurdish Background	-0.022	-0.315	6.67%	-0.009	-0.385	3.36%
Being From Arabic Background	-0.001	-0.023	0.02%	-0.004	-0.043	0.19%
Being From Other Non-Turkish Backgrounds	0.000	0.007	0.00%	0.000	0.001	0.00%
Being Married	0.108	0.007	0.72%	0.122	-0.005	-0.64%
Being Widowed	-0.001	-0.010	0.01%	-0.003	-0.005	0.01%
Respondents' Age At First Marriage	-0.265	0.042	-11.06%	-0.265	0.054	-13.72%
Living In Southern Turkey	0.008	-0.032	-0.26%	0.004	-0.075	-0.26%
Living In Central Turkey	0.008	0.029	0.22%	0.009	0.101	0.90%
Living In Northern Turkey	0.005	0.044	0.22%	0.007	0.068	0.44%
Living In Western Turkey	0.015	0.202	3.01%	0.013	0.283	3.60%
Living In Urban Turkey	0.032	0.355	11.22%	0.023	0.515	11.56%
Being In The Poorest Wealth Category	-0.014	-0.540	7.20%	-0.010	-0.653	6.12%
Being In Poorer Wealth Category	-0.002	-0.367	0.76%	0.001	-0.316	-0.28%
Being In Richer Wealth Category	0.005	0.295	1.49%	-0.001	0.368	-0.40%
Being In The Richest Wealth Category	0.002	0.696	1.20%	0.002	0.564	1.04%
Having No Social Security At All	-0.005	-0.373	1.81%	-0.007	-0.172	1.18%
Being Insured By The Social Insurance of Merchants, Artisans and the Self-employed	0.002	0.122	0.18%	-0.002	0.086	-0.16%
Being Insured By Social Insurance Organisation	0.002	0.229	0.53%	-0.002	0.298	-0.55%
Being Insured By GreenCard	0.003	-0.213	-0.66%	-0.005	-0.406	1.89%
Being Insured By Private Organisations	-0.001	0.015	-0.01%	0.000	0.008	0.00%
Explained CI			0.101			0.104

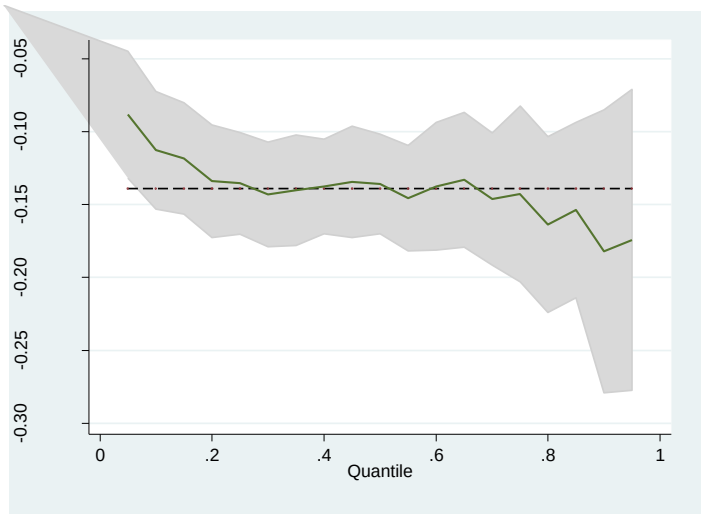
Appendix B: The results for quantile regressions:

Quantile regressions have been performed for BMI to ascertain the effects of obesity determinants in different quartiles. Accordingly, gray shaded areas illustrate the confidence intervals of the estimated quantile regression coefficients. Horizontal straight lines depict the OLS coefficient estimates. Vertical axes show the coefficient estimates of named explanatory variable over the BMI distribution. Horizontal axes illustrate the quantiles of the variable of interest (BMI). Therefore, O.2th quantiles on the horizontal axes imply the first twenty per cent of BMI distribution (i.e. the weakest twenty per cent of all observations). For each explanatory variable, the point estimates can be interpreted as the effects of a one unit change of the variable on the variable of interest (BMI for relevant study) holding the other variables fixed (Koenker and Hallock, 2001).

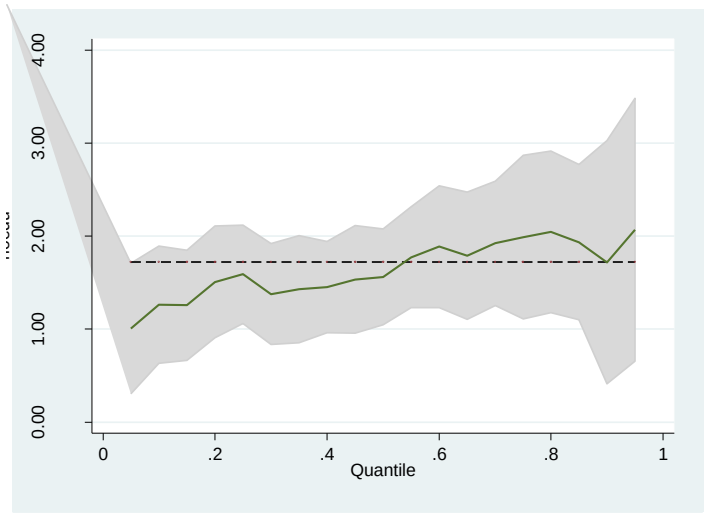
Quantile regressions of Age variables

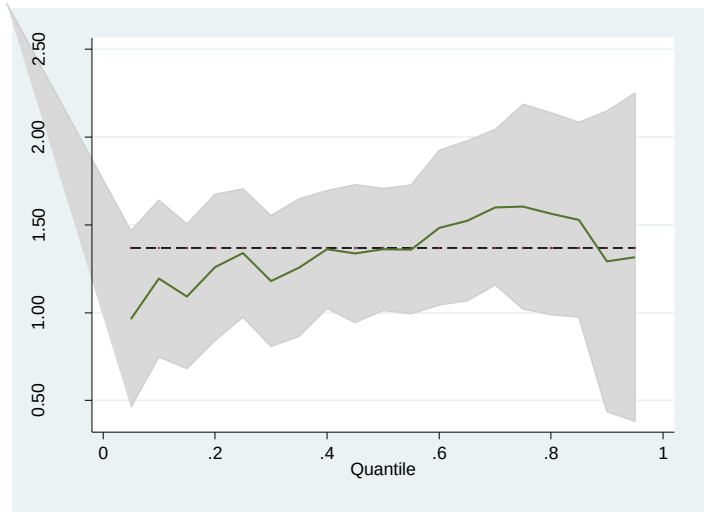


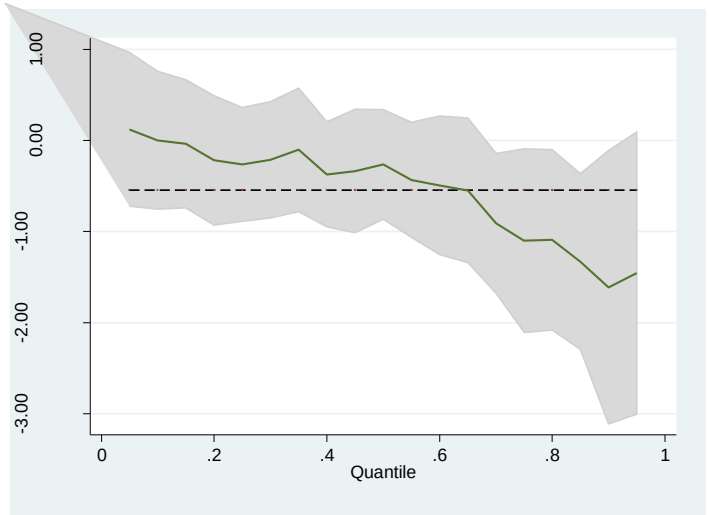




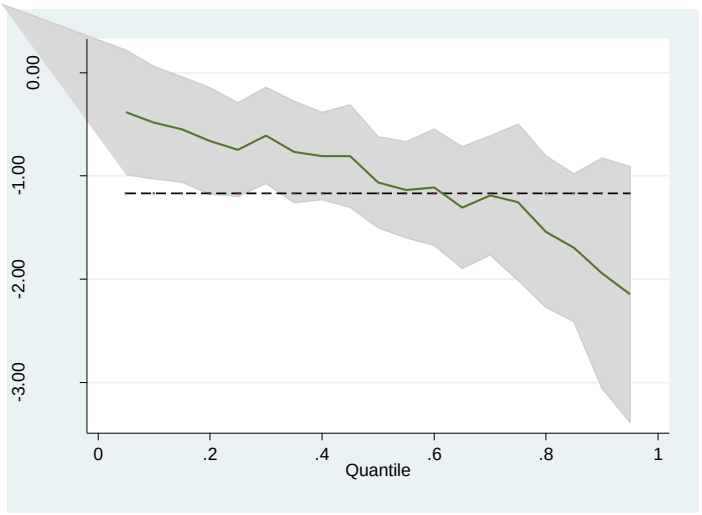
Quantile regressions of Education variables

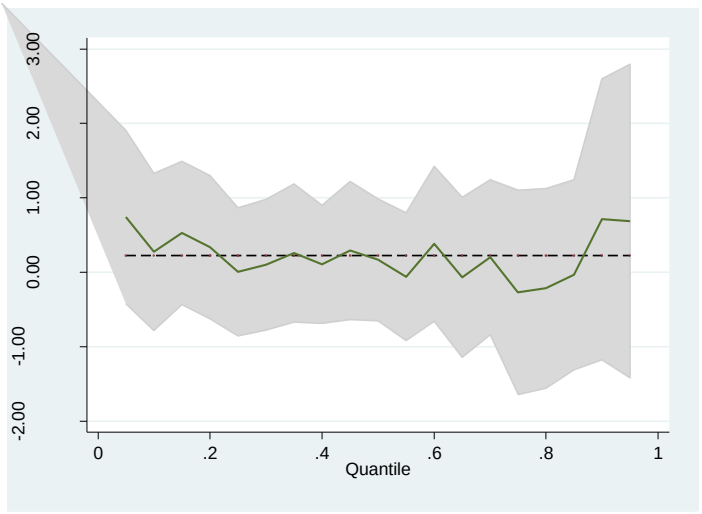


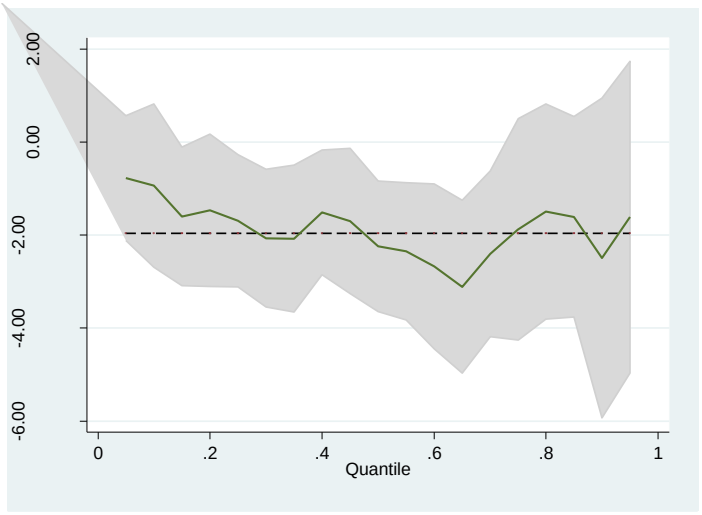




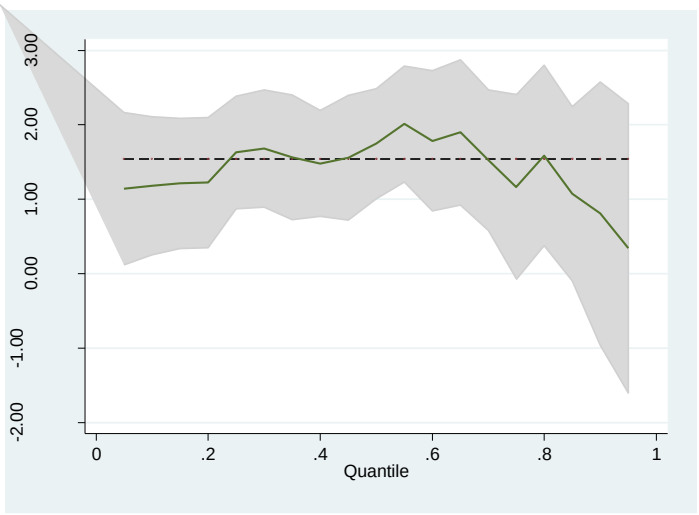
Quantile regressions of Ethnicity variables

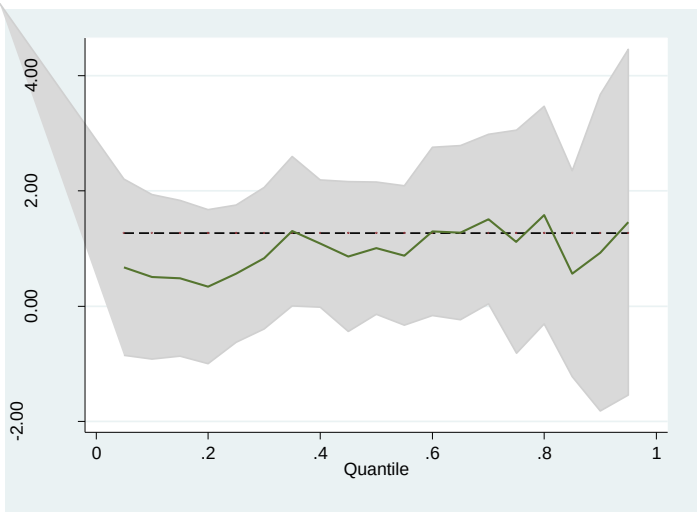




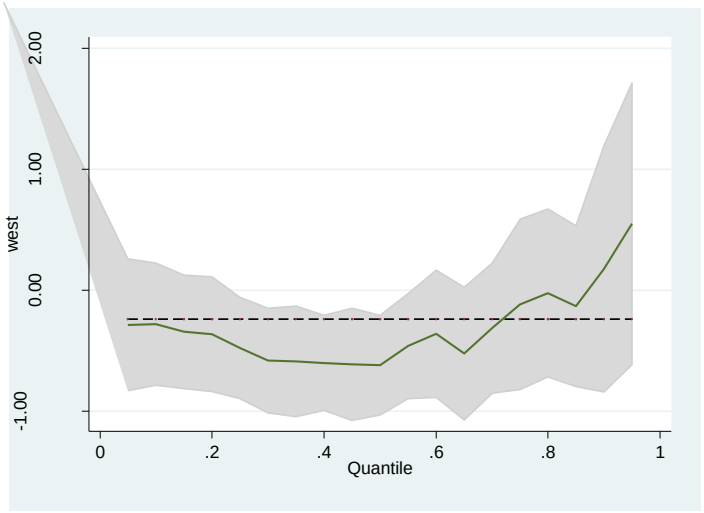


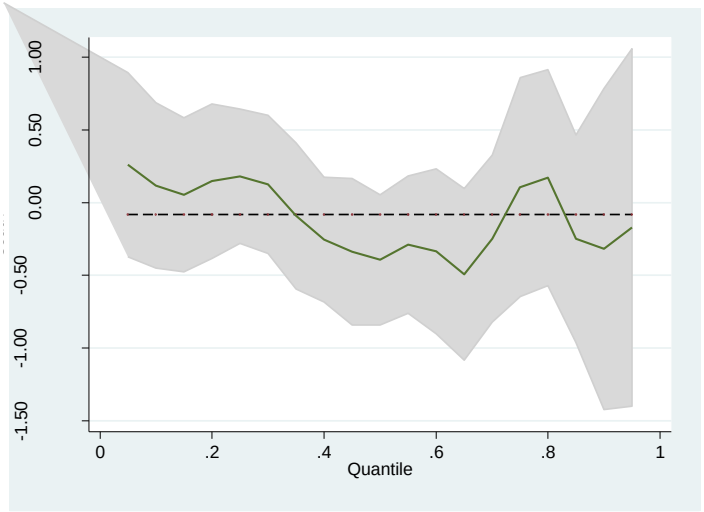
Quantile Regressions of Marital Status variables



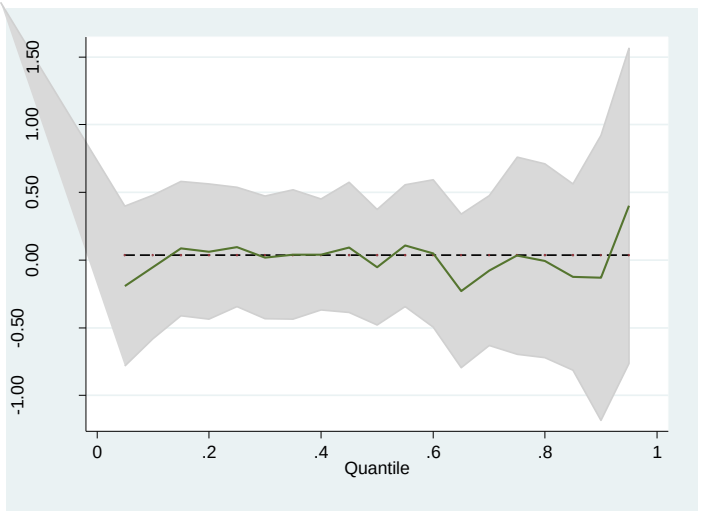


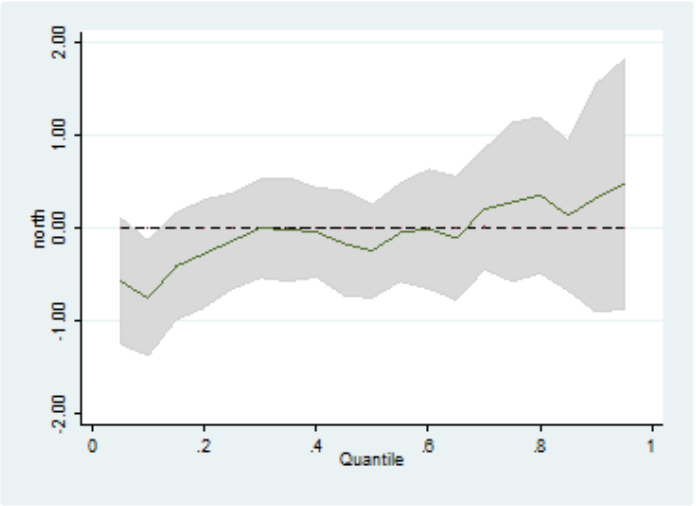
Quantile regressions of regional variables



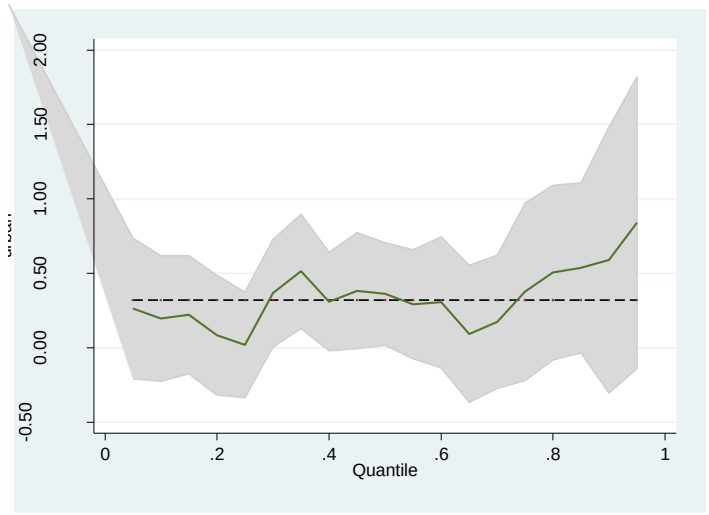


Quantile regressions of regional variables

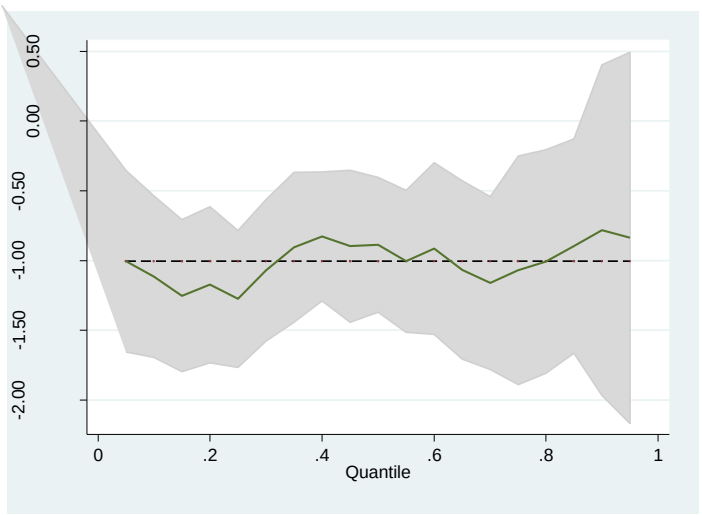


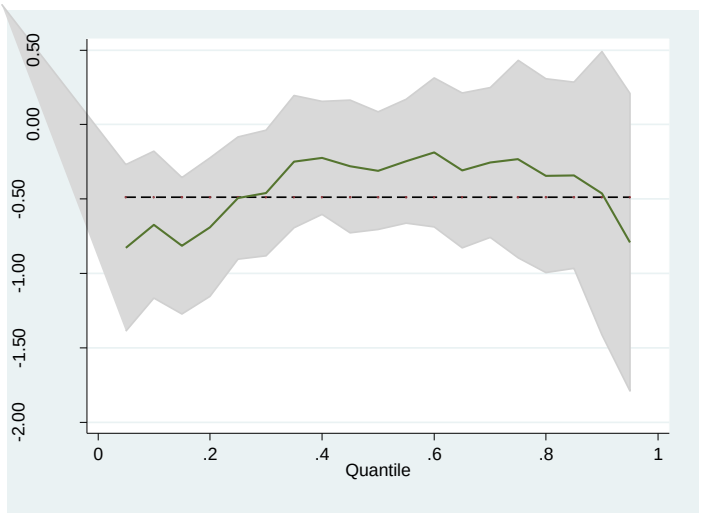


Quantile regressions of Urbanisation variable



Quantile regressions of Wealth variables





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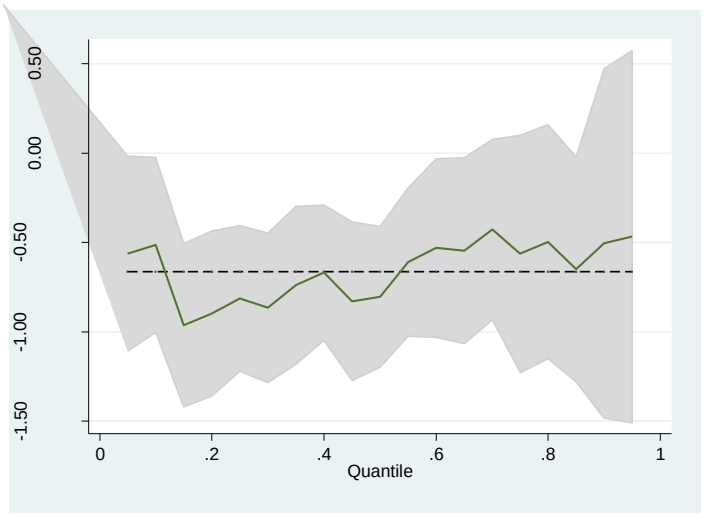
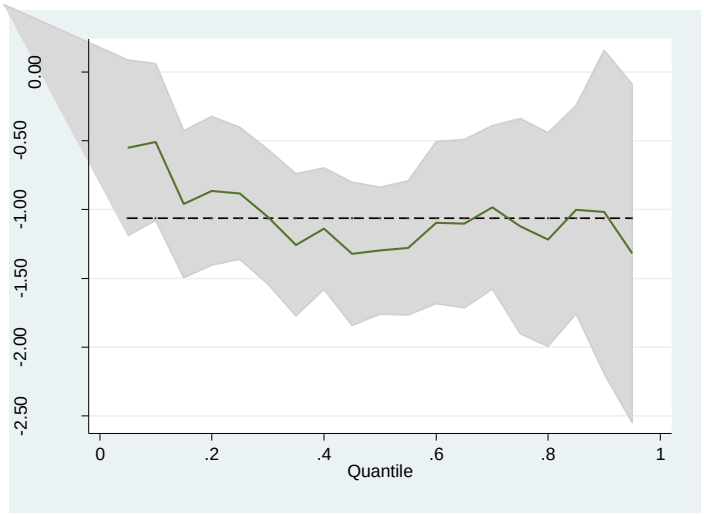
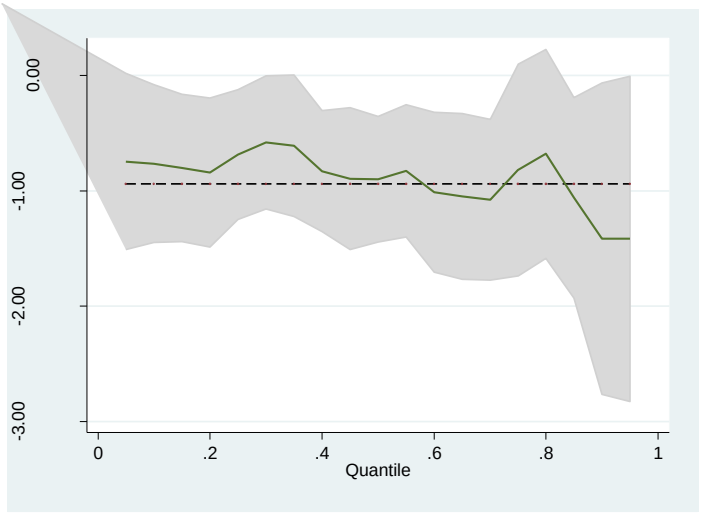
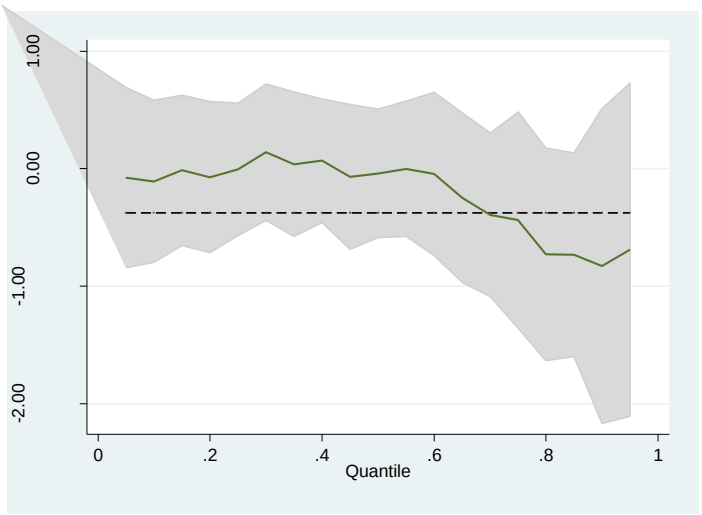




Quantile regressions of Social security variables





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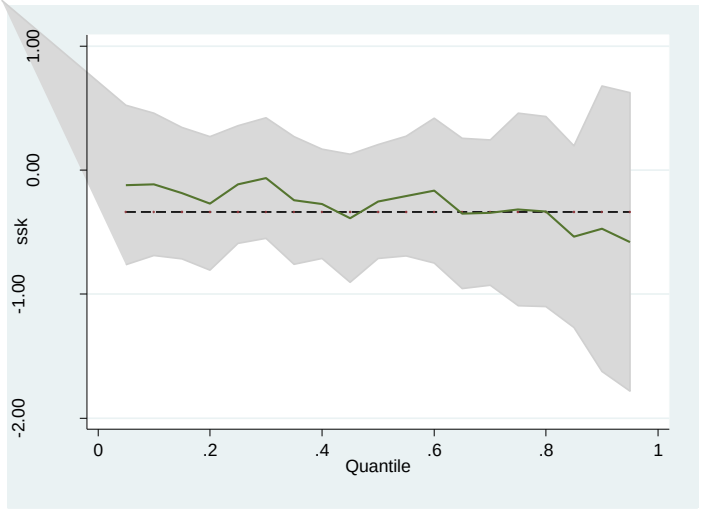
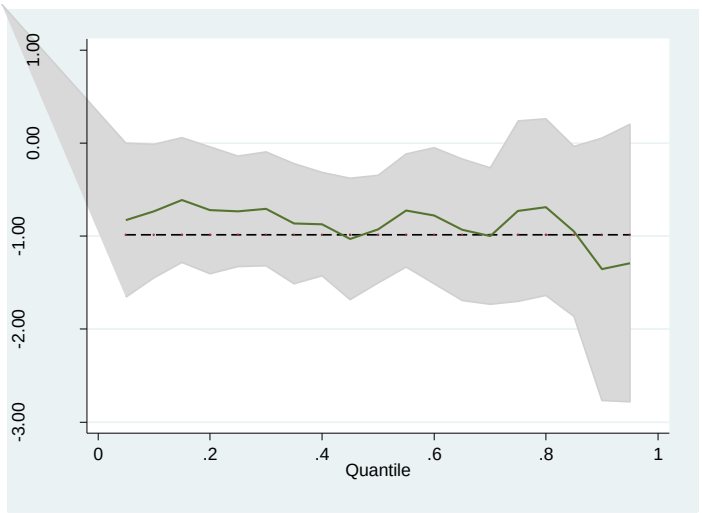
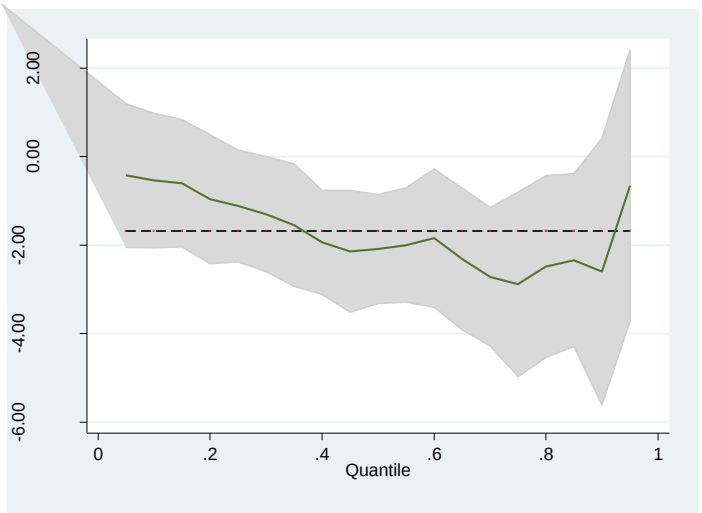
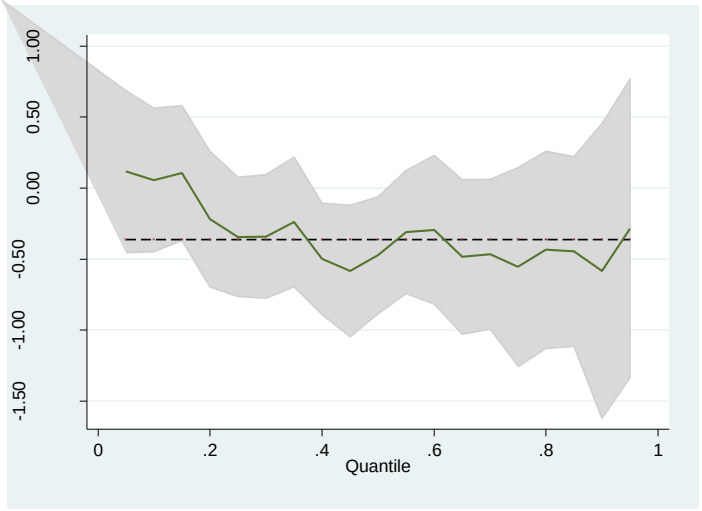
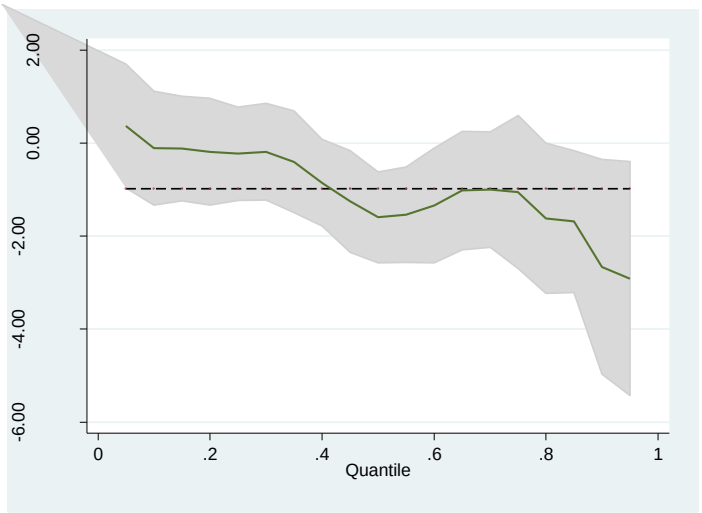


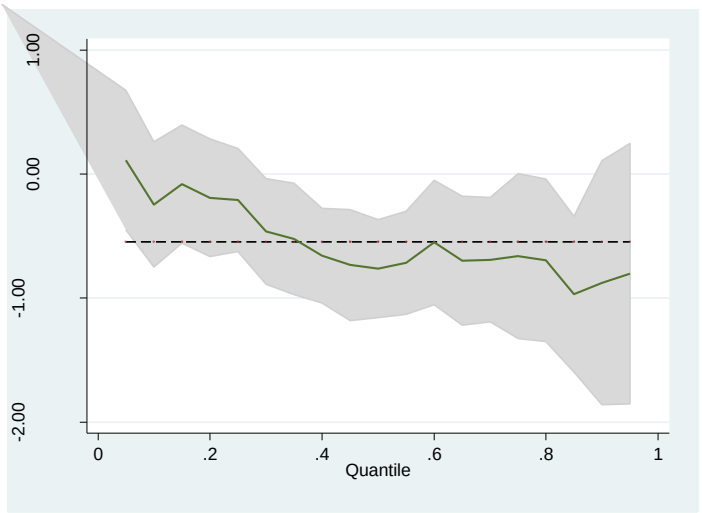




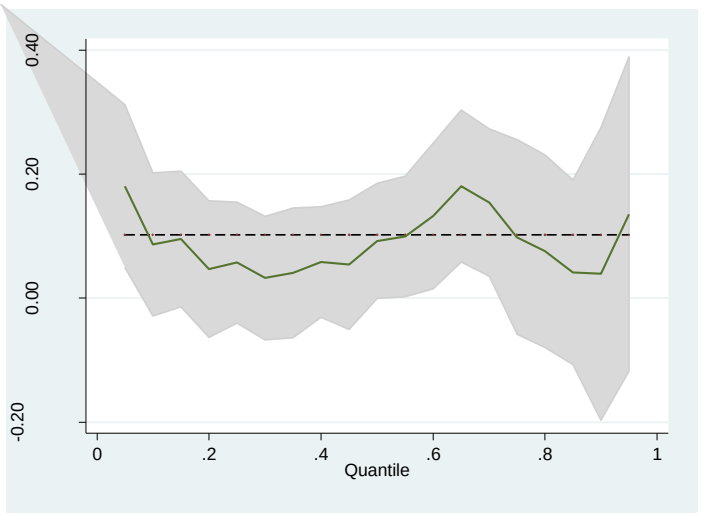
Quantile regressions of Employment status variables







Quantile Regressions of Number of children variable



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