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Shattered Health for Women: How Gender Roles Affect Health Socio-Economic Status Nexus Over Life Cycle?

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Abstract

The main objective of this paper is to assess the relationship between health and socio-economic status (SES) across ages by including gender roles for men and women. Although life expectancy of women is greater than men, women's average subjective health measure is worse and morbidity rates are higher. Gender roles in society would be one of the causes of this distinction. Gender roles are proxied by time spent in household work, childcare, active & passive leisure and employment. Mean comparison tests show that women spend more time in household work and childcare and less time in employment and leisure. By using the Time Use Survey for Turkey, the focus of the study is twofold; i) assessing the relationship between SES and subjective health status ii) determining the impact of gender roles along with SES on health status across ages. Results show that the bottom of the SES hierarchy in Turkey are in much worse health than those at the top and average health among men is better than women. A health gradient exists whether income, education or work status is used as indicators of SES. We observe relatively wide SES gradients in health in middle age and the narrowing of it in old ages implying some mixture of *cumulative advantage hypothesis* and *age-as-leveler hypothesis* operates through life cycles. When we depict health gradients according to gender roles, we observe that both men and women in the bottom quartile of time spent on household work and childcare and those in the top quartile of time spent on leisure have better health. Marginal effects of the probit estimation present that health and the SES relationship varies across life cycle. After correcting for endogeneity and introducing gender roles into the model, the effect of being male is still positive, but decreases. When the estimation is repeated separately for men and women, the impact of age and education on health is greater for women, household work has a negative impact on health of both men and women and time spent on childcare effect the health of men negatively. Active leisure increases the probability of good health of women whereas passive leisure does the same for men. Time spent on employment has a positive effect for men and is insignificant for women. The results suggest that if gender roles were to be more equal, the gap in health status between men and women would diminish.

1. Introduction

Socio-economic status (SES) has a substantial impact on health in which socially and economically favored individuals enjoy better health. Huge literature on socioeconomic inequalities reveals strong socioeconomic gradient in health in many countries. Most research in this literature controls for age or analyzes a particular age group (Bender and Habermalz, 2005). However, looking at the socioeconomic differences only at certain ages would lead to an incomplete impression of the extent of health disparities over the life cycle (Van Doorslaer et al., 2008). In other words, the life-course component to the health SES gradient should be taken into account in order to reflect the health of which groups decline more rapidly than the others. Outcomes at prime ages do not arrive independently from earlier ages and are of relevance for outcomes later in life. In this respect comprehending the nature and evolution of socio-economic status (SES) gradient in health, dimensions of SES that effect health along with the impact of gender roles on health in a developing country as Turkey becomes crucial in policy designs and improving the socio-economic and health status of people.

Literature on the subject is divided between two approaches on the evolution of socioeconomic gradient in health over life cycle; *cumulative advantage hypothesis* and *age-as-leveler hypothesis*. According to cumulative advantage hypothesis the differences in health by SES are established in life and subsequently widen as the economic and health disadvantages of the less privileged interact and accumulate (Willson et al., 2007). On the other hand, age-as-leveler hypothesis suggests that deterioration in health is an inevitable part of the process of aging and irrespective of economic means or social position, with the result that the SES-health gradient narrows at advanced ages (Beckett, 2000). A compromise scenario, for which there is growing evidence, is that cumulative advantage operates though middle age, with the SES-health gradient widening until around retirement age, before it narrows in old age as the biological determinants of health strengthen relative to the socioeconomic determinants (Van Doorslaer et al., 2008).

Furthermore, health statistics show that women's subjective health is worse than men in any age and socioeconomic group; they have more illnesses and disabilities than men even if the life-expectancy of women is greater. Gender roles in society would be one of the causes of this distinction. In this respect the main objective of this paper is to assess the relationship between health and SES across ages by including gender roles for men and women in Turkey by using the Turkstat Time Use Survey 2006.[1]

Time uses of certain activities are employed as a proxy for gender roles. Women typically have major responsibility for household tasks and childcare regardless of their educational level or employment status. Working women's ability to work and to sustain time spent in household work and childcare were financed by reductions in their personal care time and in leisure such as watching TV (Bird and Freemont, 1991). Mean comparison tests show that women spend more time in household work and childcare and less time in employment and leisure. These disparities in time uses could explain the different patterns in health-SES gradients for men and women. Thus the focus of the study is twofold; i) assessing the relationship between SES and subjective health status by analyzing health gradients ii) determining the impact of gender roles along with SES on health status across ages by correcting for endogeneity.

[1]The only data that includes time uses of individuals is from 2006.

The rest of the paper is organized as follows: The second section briefly reviews the literature. The third section gives information about the data and variables. The fourth section shows SES gradients in health by treating income, education, work status, and work type as socio-economic status indicators. Moreover we also present gender roles gradients in health and health reporting behavior according to gender roles. The fifth section presents the estimation methodology and results. Lastly sixth section concludes.

2. Brief Literature Survey

Grossman (1972) proposes the first model for demand for health and health determinants. Health can be viewed as a durable capital stock which produces an output of healthy time and health capital differs from other types of human capital. The health of individuals depreciates over time and can be increased by investments in health. Investments in health capital are produced by household production functions whose direct inputs include the own time of the consumer and market goods such as medical care, diet, exercise, recreation and housing (Grossman, 1972). This production function also depends on education since it is assumed that more educated people are more adequate producers of health.

Applying Grossman's seminal model, economists have carried out numerous studies. Muurinen and Le Grand (1985) have made some modifications to Grossman's model to emphasize that people have three kinds of capital: health capital in the form of the health of their bodies, human capital in the form of education, and physical or financial capital in the form of assets (Muurinen and Le Grand, 1985). According to their model, differences in marginal benefits and costs between individuals will lead to differences in their health stocks. Health capital declines with age and it is also affected by the extent to which health capital is used in consumption and in work.

By using an inter-temporal model of Grossman (1972), Case and Deaton (2005) discuss multiple causal links between health income and education, and third factors that affect both health and socioeconomic status, and that contribute to the correlation between them. Their results suggest that self-reported health worsens with age and that it does so much more rapidly among those at the bottom of the income distribution. The differences in health and health decline in different parts of the income distribution is based on whether or not people are in the labor force, a mechanism where causality runs from health to income, not the reverse (Case and Deaton, 2005). Both income and education have independent protective effects on health for those who are in work, and these effects are reduced but not eliminated by controlling for occupation (Case and Deaton, 2005).
Smith (2005) looks at the effects of new health events such as out-of-pocket medical expenses, the intensive and extensive margins of labor supply, health insurance, and household income on SES by using longitudinal data from the US PSID for people between fifty one and sixty one. Among people in their pre-retirement years, feedback from health to working is the critical link with out-of pocket medical expenses in the second tier (Smith, 2005). Results also suggest that health has quantitatively strong consequences for several dimensions of SES, particularly financial ones, in certain age groups.

Van Doorslaer et al. (2008) try to outline an economic explanation for socioeconomic differences in health over the life cycle for The Netherlands. Their opinion is divided concerning whether and how the socioeconomic gradient in health varies over the life cycle. Evidence suggests that lower socioeconomic groups do indeed suffer a double health penalty in that they begin adult life with a slightly lower level of health, which subsequently deteriorates at a faster rate through middle age. Bender and Habermalz

(2005) investigate the relationship between health and SES as defined by labor force status and per capita household income in Germany across different age groups. This result indicates that it is important to differentiate policies by age and take into account the two-way relationship between health and SES (Bender and Habermalz, 2005). Zhao (2005) studies the health determinants for the Chinese urban adult population based on self-reported categorical health status. The effect of education on health is significantly positive and the cost of health care services has significantly negative impact on health.

However, the studies mentioned above do not take gender roles into account when determining the different behavior of men and women in SES-health nexus. Gove and Hughes (1979) argues that certain social roles are related to poor mental health, which in turn is linked to mild physical illness, the primary type of morbidity experienced by women; when marital status, living arrangements, role activities are controlled, health differences between men and women disappear (Gove and Hughes, 1979). Verbrugge (1989) investigated sex differences in morbidity, controlling for social roles and found that stress, unhappiness, and low levels of employment were associated with poorer health, whereas participation in productive and personally fulfilling roles was associated with better health. Bird and Fremont (1991) analyze the effect of social roles on subjective health. Women receive less education than men, earn lower wages, spend less time in paid work, and spend more time doing housework and caring for children and these differences favor men's health (Bird and Fremont, 1991). If men and women spent their time in the same way women would have better self-rated health than men (Bird and Fremont, 1991). Lee and Powers (2002) analyze women's health to explore relations between role occupancy and health, well-being, and health service use in three generations of Australian women. The most striking finding is that the relation between role occupancy and well-being differed across age groups (Lee and Powers, 2002). Among young women, the best health was associated with occupancy of one role; among mid-age women, those with three or more roles were in the best health; and for older women, those with one role were in the best health (Lee and Powers, 2002).

3. Data and Variables

The data used is the Time Use Survey 2006 conducted by the Turkish Statistical Institute (Turkstat) within the scope of the studies compliant with the European Union (EU). The questionnaire was formed in order to provide target variables requested by EUROSTAT for obtaining detailed information on time uses of individuals during the day according to gender, age group, working conditions, wealth, health and etc. The entire members of the households that live within the borders of the Republic of Turkey were included within the scope. However, the population in the aged home, elderly house, prisons, military barracks, private hospitals, hotels and child care centers together with immigrant population were excluded. Settlements with a population of 20,001 and over are defined as urban, 20,000 and less are defined as rural.

In 2006, each month approximately 390 households, totaling 5,070 households were selected to implement the Time Use Survey. 11,815 members of households aged 15 years and over were interviewed and were asked to complete two diaries, one for a weekday and one for a weekend day by recording all their daily activities during 24 hours at ten minute slots. The time Use Survey consists of three sub-surveys; a diary survey, an individual survey and a household survey. The diary survey is composed of two diaries (one for the weekday and one for the weekend) and contains information on average time spent on certain activities of individuals in each household. The household survey contains

information on certain household characteristics such as wealth, household structure, income of the household and etc. The individual survey contains information on individual characteristics of the members of the each household. After excluding duplicated individuals, individuals with incomplete data and non-response categories we have 10,730 individuals of whom 5,060 are men and 5,670 are women. Variables we use in this study are as the following:

Demographic Characteristics: Variables that give information about demographic characteristics are; age groups, gender, marital status and whether the individual lives in an urban area.

Health Status: The subjective health measure is assessed by the question: "How would you rate your health status compared to people at your age: 1) very well, 2) well, 3) fair, 4) bad/very bad. However in order to provide more explicit results the subjective health measure in this study is reduced to two categories; 1) good and 2) bad. A good health status contains very well and well health, while a bad health status contains bad/very bad and fair health and this is used as a binary dependent variable in the estimation process.

Education: Education level shows the degree completed and has five categories; 1) illiterate (contains illiterate individuals and literate individuals who have not completed a degree) 2) primary school, 3) secondary school, 4) high/vocational high school and 5) university or higher. Education quartiles are obtained from the education level variable. The first quartile is the value in the data set that holds 25 % of the values below it and the third quartile is the value in the data set that holds 25% of the values above it. The first two quartiles contain illiterate individuals and individuals with primary education respectively. The third quartile contains secondary education. The fourth quartile has high/vocational high school and university or higher education.

Income: The income variable in the survey gives the average net income of the household and contains incomes from wage, salary, entrepreneurial income, unemployment benefit, disability benefit, pension and scholarship. The income variable is presented as income groups in the original data. Thus, we took the mean value of each group in order to generate a new income variable. Per capita household income is calculated by using OECD equivalence scale which assigns 1 for the head of household, 0.5 for each other person if she/he is older than 14 and 0.3 if she/he is younger than 14. After calculating income per capita, income quartiles are obtained; first quartile is the value in the data set that holds 25% of the values below it and third quartile is the value in the data set that holds 25% of the values above it.

Labor Indicators: Labor indicators used in the study are; whether the individual is working or non-working and whether she/he is a blue collar or a white collar worker. Non-working category includes individuals that are unemployed and out of the labor force. Working individuals are the individuals who are employed full time. Furthermore occupation gives the individual occupation codes according to ISCO88. Managers, professionals, associate professionals, office clerks, service workers and artisans are regarded as white collar-workers and agriculture workers, skilled and unskilled workers as blue-collar workers.

Time Uses: Time uses of certain activities are measured as the total time spent in minutes within 24 hours. Variables used are; household work, childcare, employment, active leisure and passive leisure. Household work contains food preparation, cleaning and washing. Active leisure contains jogging, hunting, sports, hobbies and games. Passive leisure contains watching tv, listening to music and reading.

4. Descriptive Statistics and Health Gradient

4.1 SES Gradient in Health Over Life Cycle

Before looking at how social roles affect the health status of individuals we try to put forward some descriptive statistics and demonstrate the life cycle behavior of SES-health gradient in Turkey in this section.

Table 1: Life Expectancy, Subjective Health Status and Health Problem (2006)

	Men	Women
life expectancy (years)	70.23	74.81
health status (percentages)		
bad health	21.76	30.55
good health	78.24	69.45
health problem (percentages)		
no problem	90.53	88.88
permanent illness	0.71	1.28
mental problems	5.40	6.80
bone/muscle diseases	1.05	1.00
eye/ear disease	0.49	0.25
speech defect and other	1.82	1.79
disability (percentages)	2.73	4.86

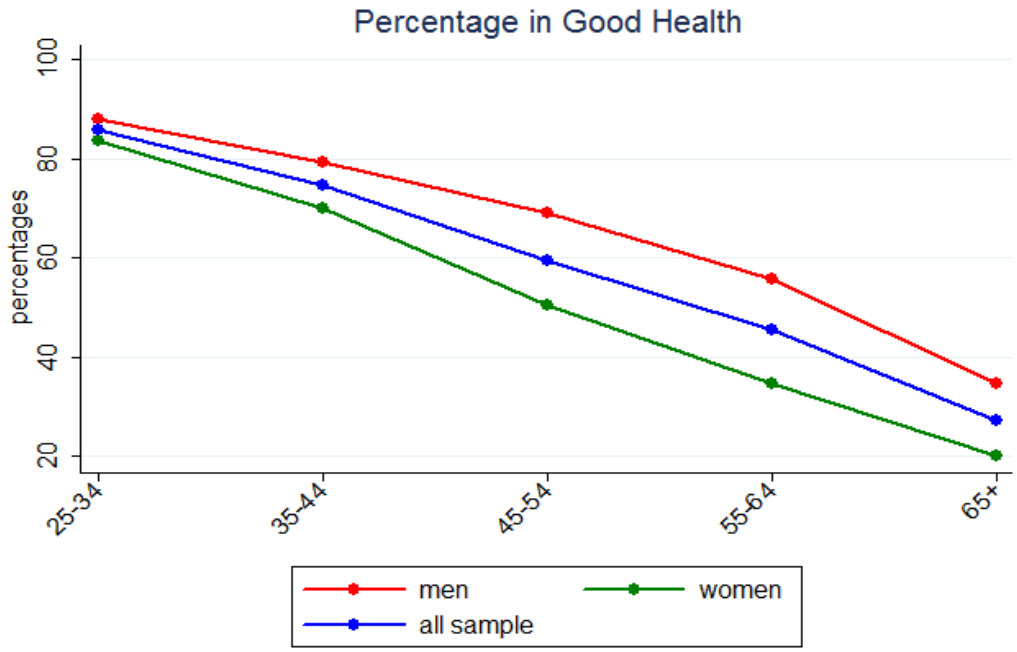
Source: World Development Indicators, Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

Table 1 shows the life expectancy, subjective health status, health problems and disability rates for men and women for the year 2006. Life expectancy is in years and from the World Development Indicators 2006. The rest of the variables are from the Turkstat Time Use Survey 2006 in percentages and are adjusted by using sample weights.

Women live four years more than men on average, although they report that their health is worse than men. Same picture emerges when we look at the health problems and disability rates. 1.80 %, 6.80 %, and 4.86% of women report that they have permanent illnesses, mental problems and disabilities respectively. These ratios are only 0.71 %, 5.40 % and 2.73 % for men.

However Table 1 only represents the average picture for men and women and provides no information on socio-economic differences. Furthermore static relation between health and SES would also give insufficient information on how much more rapidly health declines for some groups than others. In other words, snapshots of socioeconomic differences in health at a given age give an incomplete impression of the extent of health disparities over a life cycle (Van Doorslaer et al., 2008). In this respect, we try to bring a life cycle perspective to the examination of socioeconomic differences in health in this section. The aim here is not to determine the causality from SES to health but to form a context that put forwards the magnitude and nature of SES-health gradient and to form a substructure for the following section which analyzes the impact of SES and gender roles on health.

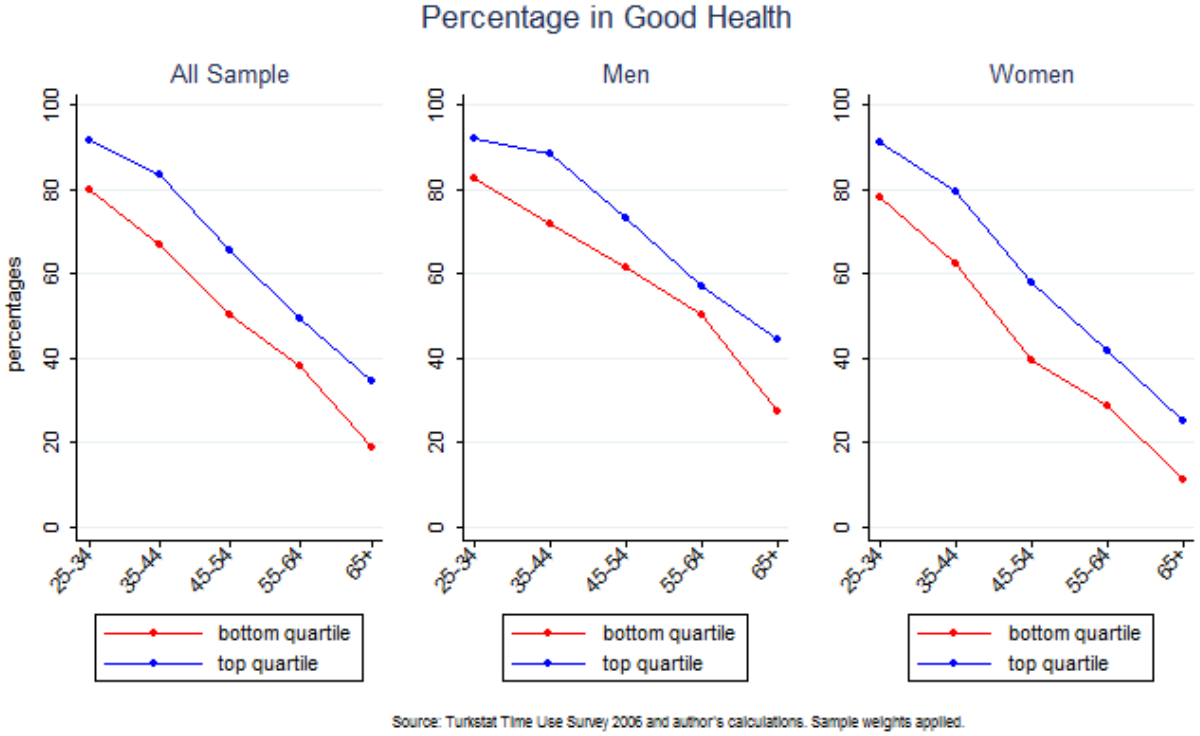
Figure 1: Subjective Health by Age According to Gender



Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied

Figure 1 shows the evolution of the percentage of individuals in good health across ages. The percentages would be interpreted as: *Prob(being in good health / gender).* Not surprisingly good health decreases with age. Women report that they have worse health than men in every age group and the slope of the line is steeper for women which indicates that women's health decline more rapidly than men.

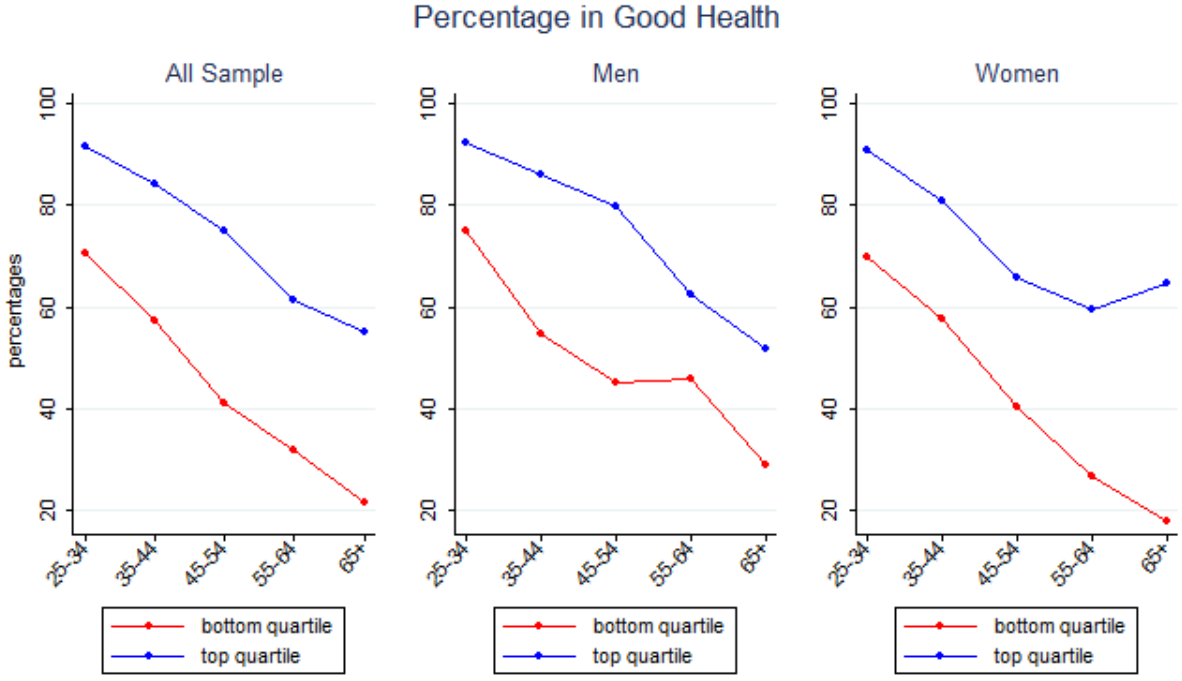
Figure 2: Subjective Health by Age According to Gender and Income Quartiles



Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

Income can be attributed as the first indicator of socio-economic (SES) status. Income is the household income per capita adjusted by OECD equivalence scale in which 1 is assigned for the head of household, 0.5 for each other person if he/she is older than 14 and 0.3 if he/she is younger than 14. Self-assessed health statuses of individuals from different income quartiles are compared. The bottom income quartile represents the lowest quartile (lowest income group), whereas the top income quartile represents the highest quartile (highest income group). Figure 2 shows income gradients in health and again one can think of percentages in the figures as: *Prob(good health/top quartile & age & gender)*. There is a clear income gradient in health for both men and women according to Figure 2. However the decline in good health over life-course according to income quartiles is greater for women. Although the starting points of top and bottom income quartiles are very close to each other, the rate of deterioration, which is given by the slope of the curves, is greater for women. For instance, almost 60 % of women report that they are in good health that are in top income quartile at the age group 45-54, while this ratio is only attained for men at the age group 55-64.

Figure 3: Subjective Health by Age According to Gender and Education Quartiles

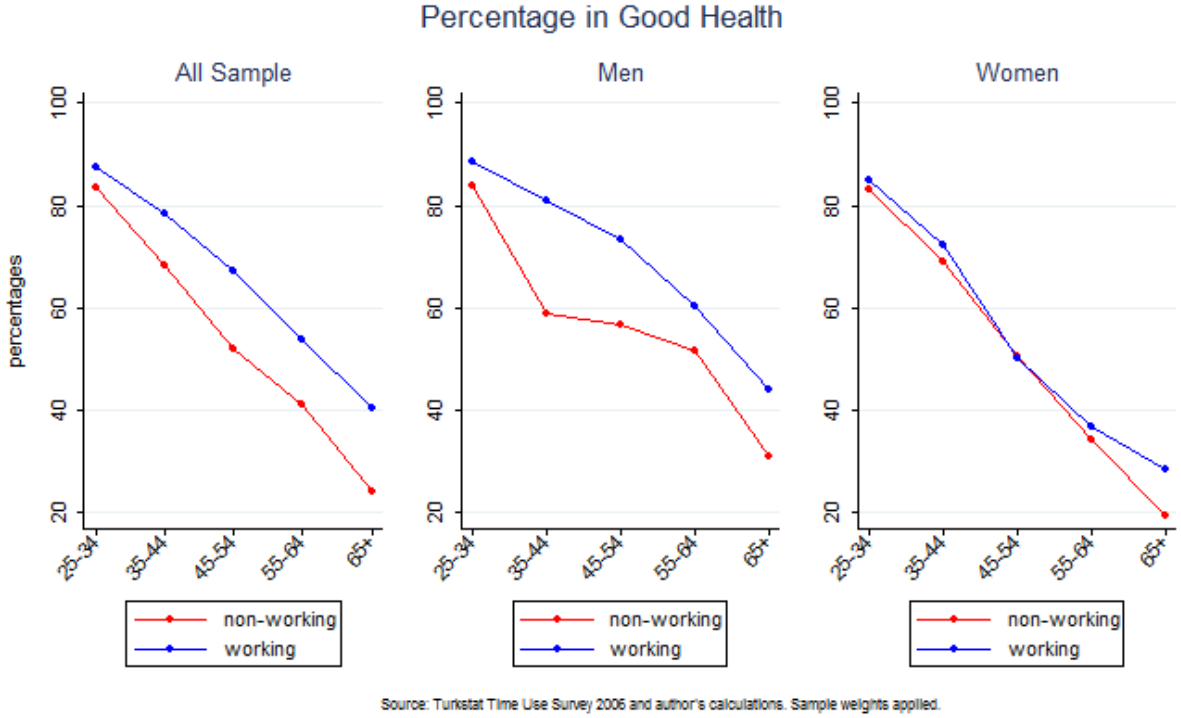


Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

The second SES indicator is education. Completed educational levels are used in order to determine education quartiles of the individuals. Again, the first quartile shows the bottom education quartile and the fourth quartile shows the top education quartile. There is a clear gradient in education between top and bottom education quartiles and women's health still declines more rapidly in every education quartile except the top quartile for the age group older than 55 according to Figure 3. However, this picture could be due to the small sample size of women who are older than 55 and have high education. When we look at the bottom education quartile, about 30 % of men report that they are in good health at the age of 65, whereas this ratio is only about 20 % for women. Another striking feature is the gradient in education widens at older ages for women while it narrows for men.

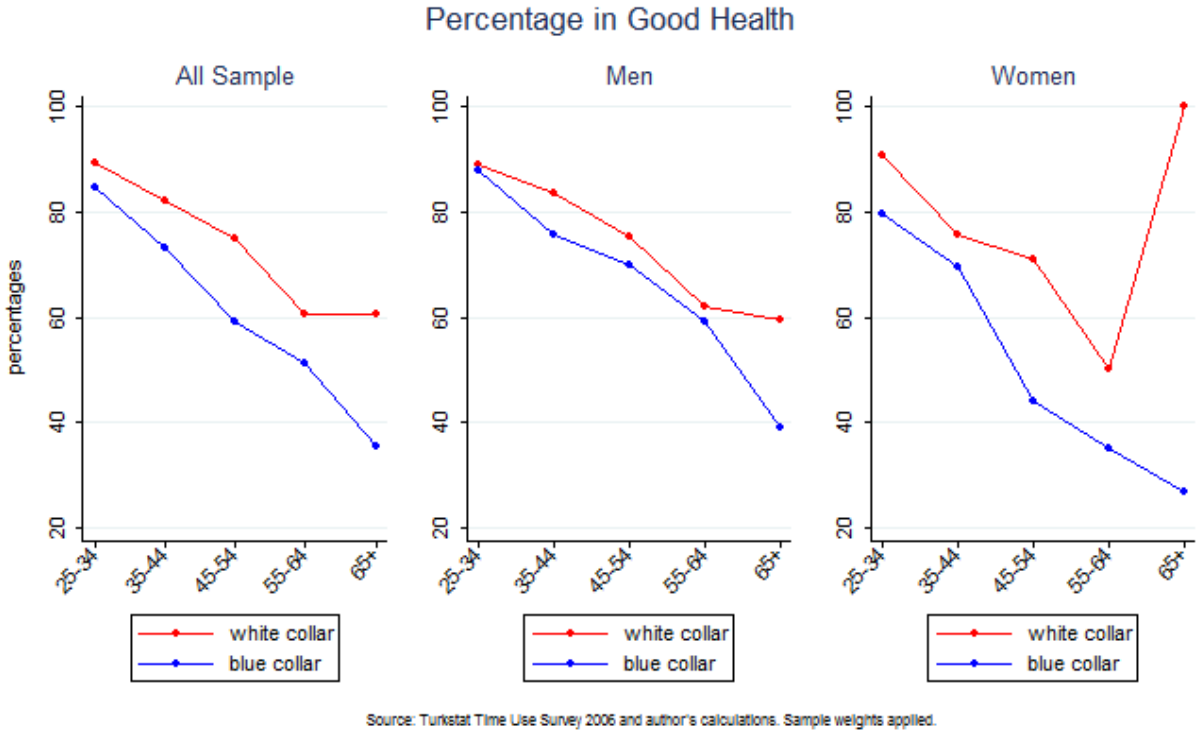
The theory predicts that individuals with physically demanding jobs will result in higher depreciation rates and will have a higher relative health decline over the life cycle (Grossman, 1972). Occupation is less predetermined than education, but is more so than income, offering another opportunity to examine whether the widening of the income gradient until old ages may be influenced by the impact of health on work activity (VanDoorslaer et al., 2008). Figure 4 shows the health gradient according to work status. Working individuals are individuals who are employed both full time and part time. Non-working individuals are individuals who are unemployed and out of the labor force (students, retirees, disabled people and people in home production). There is a clear gradient for men in every age category, where as there is almost no gradient for women between the ages 35-64. The decline in health for both working and non-working women is more than men across life cycle.

Figure 4: Subjective Health by Age According to Gender and Work Status



As mentioned before, theory suggests that individuals with physically demanding jobs have higher depreciation rates and have a higher relative health decline over the course of life. In this respect we distinguish between blue and white collar workers. Agriculture workers, skilled and unskilled workers refer to blue collar workers. White collar workers include managers, professionals, associate professionals, office clerks and service workers. We expect poorer health and higher depreciation rate for blue collar workers.

Figure 5: Subjective Health by Age According to Gender and Work Type



Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

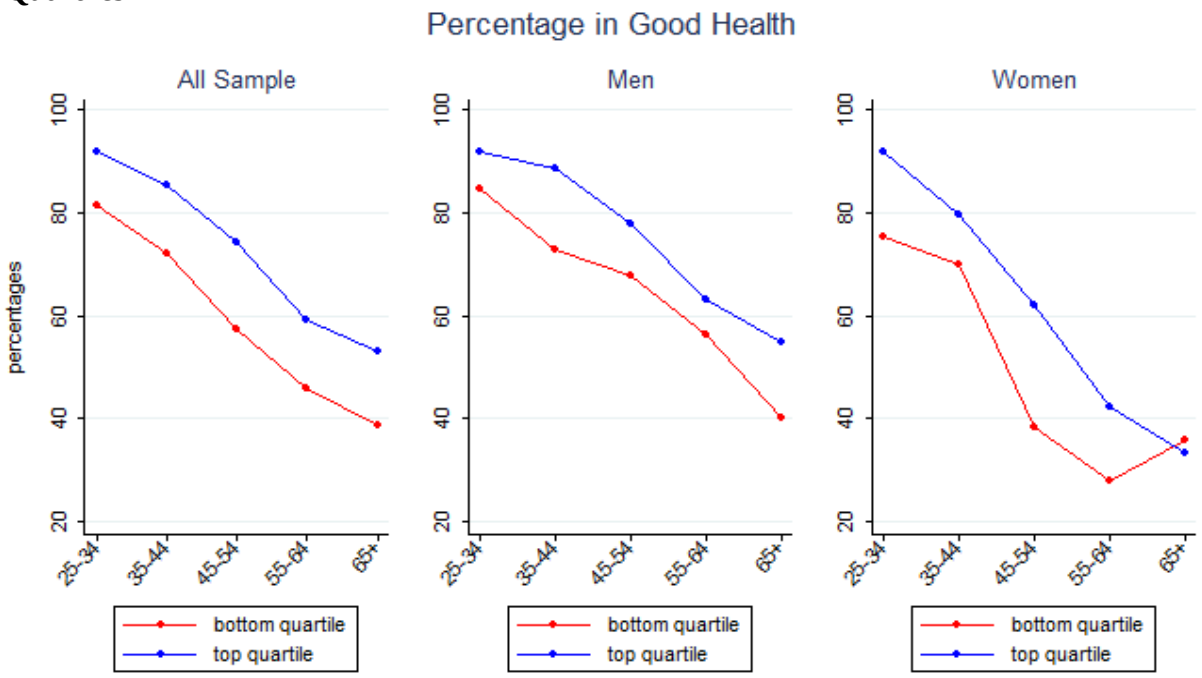
Figure 5 shows the health gradient of working individuals according to the type of work. Blue collar workers always have worse health than white collar counterparts suggesting that physically demanding jobs results in higher depreciation rates. However, the health gradient is larger for women than men. Again the huge jump seen in white collar workers for women is due to the small sample size.

In order to understand the importance of work status versus income and education in determining the life cycle profile of health, we present the prevalence of good health according to income and education conditioned on work status. According to Case and Deaton(2005) Smith (2005, 2007), Van Doorslaer et al. (2008) and Van Kippersluis et al. (2009) education increasingly affects health either directly or indirectly through choice of occupation and the depreciation of health leads to labor force withdrawal and a decline in income of economically disadvantaged groups.

We have argued in the previous sections that the widening of income gradient might be due to an increasing effect of health on work and thus on income. To gain further insight about the importance of this mechanism, we now compare evolution of self-assessed health statuses according to income across workers and non-workers.

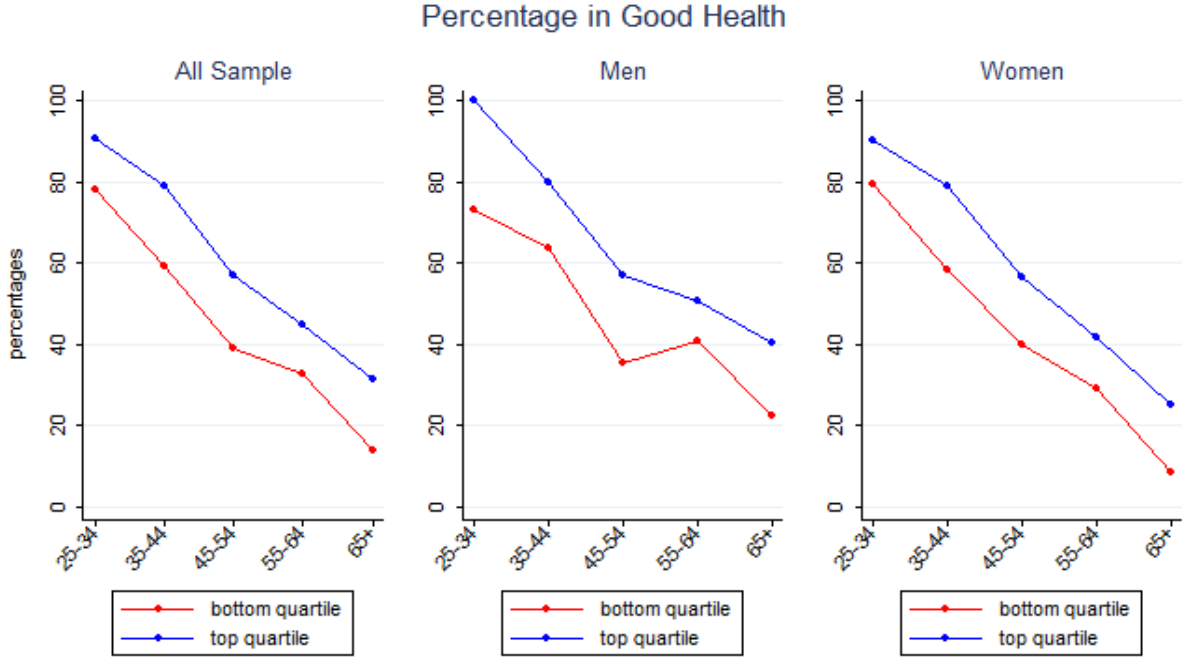
Figure 6 and Figure 7 shows health gradients over the life cycle of working and non-working individuals respectively according to income quartiles. The graphs demonstrates that even after conditioning on work status, women's health declines faster than men according to every income quartile. After conditioning income on work status, income-health gradient for working individuals widens which can be seen by comparing Figure 2 and Figure 6. Another important fact is that the income gradient disappears for non-working men and stays almost the same for non-working women. Since the income variable is the average household income, this situation could be interpreted as the following: men earn the majority of household income in general.

Figure 6: Subjective Health of Working Individuals by Age According to Gender and Income Quartiles



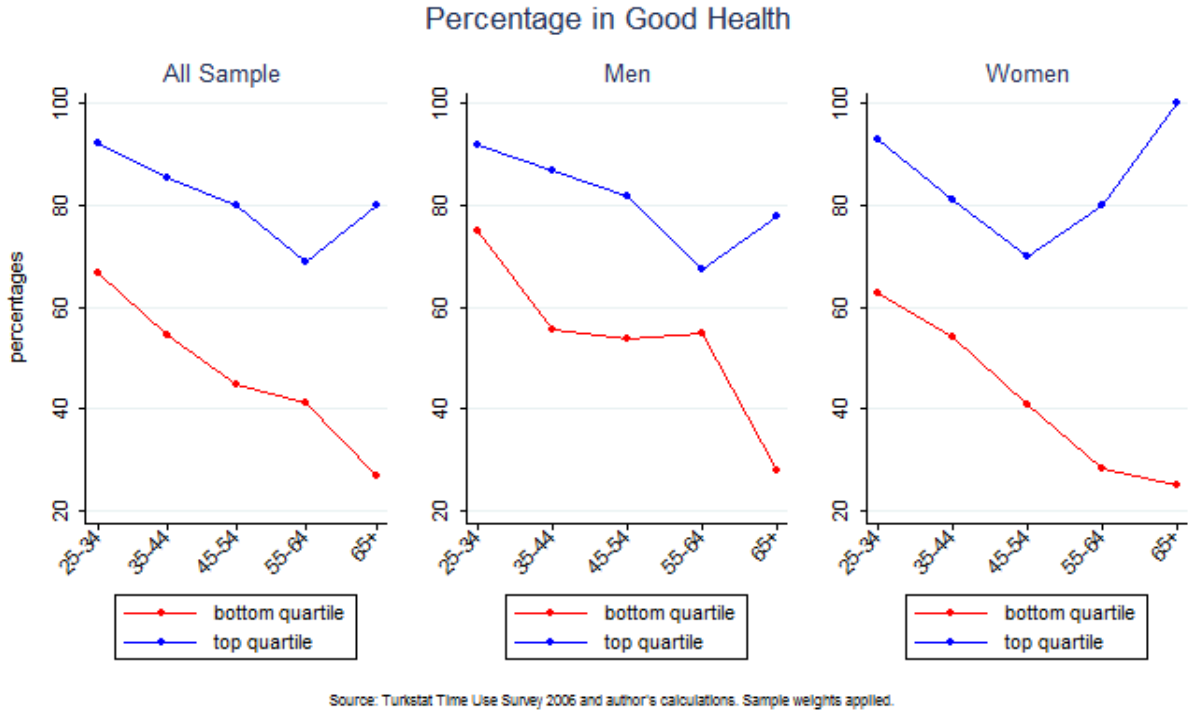
Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

Figure 7: Subjective Health of Non-Working Individuals by Age According to Gender and Income Quartiles



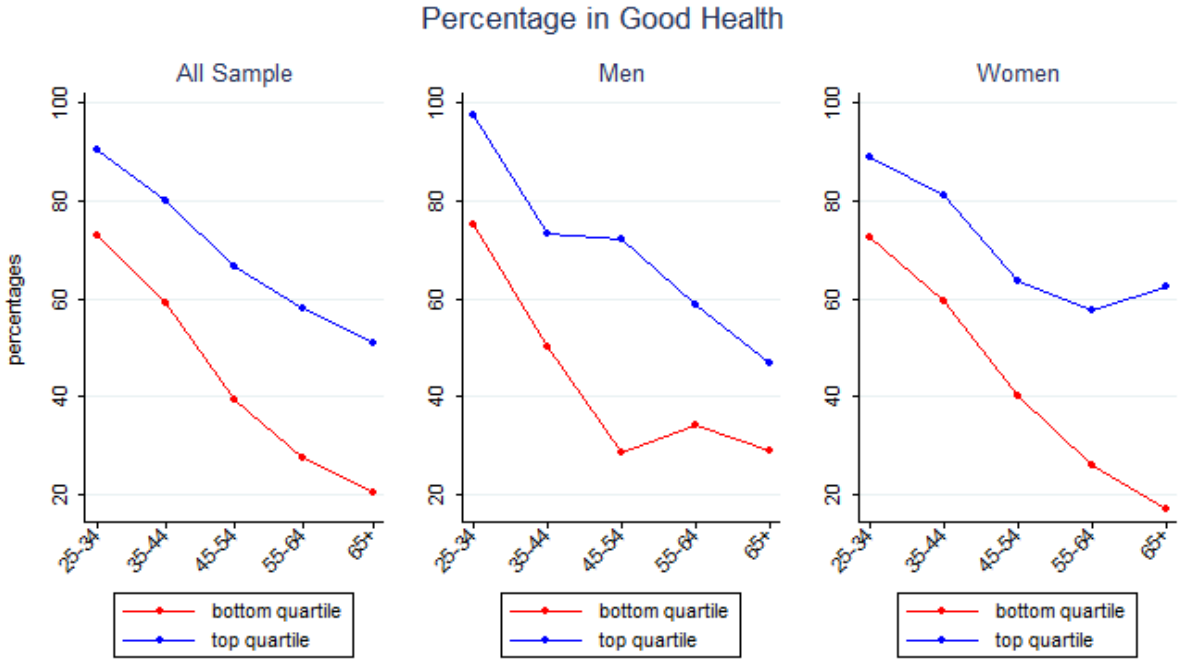
Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

Figure 8: Subjective Health of Working Individuals by Age According to Gender and Education Quartiles



Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

Figure 9: Subjective Health of Non-Working Individuals by Age According to Gender and Education Quartiles



Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

Now let's turn attention to the change of education gradient when we condition education quartiles and education levels on work status. Figure 8 and Figure 9 show the education gradients for workers and non-workers respectively. Apparent from Figure 8 and Figure 9 the health gradient stays almost the same for working men and widens for working women. On the other hand, for non-working individuals the health gradient for men extends whereas the gradient for women remains almost the same. This situation could be attributed the low labor force participation rates for women and women's preference to stay out of the labor force in Turkey.

4.2 How Does The Health Gradient Behave According to Gender Roles?

So far the socioeconomic health gradient is depicted regardless of the gender roles. However, how much time and effort is actually spent on certain activities that mirror gender roles would be an important indicator of subjective health status. First let's look at how men and women spent their time. Table 2 and Table 3 show the mean time spent on certain activities according to education for all sample and for working individuals respectively. Stars indicate that mean time uses between men and women are statistically different.

Women spend more time in household work and childcare regardless of their educational level or employment status. Time spent on household work and childcare of women decrease with the rise in education and employment, but still is statistically higher than men. On the other hand, employment hours are always higher for men in every education and employment category. When we look at the time spent on leisure the picture is the same; men spend more time on both active and passive leisure. The only irregularity is in the sleep time; educated women sleep more than men.

In this sub-section we put forward the behavior of gender role gradients in health without taking socio-economic status into account. As we mentioned before, we proxy gender roles by time spent on household work, childcare, employment, and active and passive leisure. Although the gradients observed in this section are not as obvious as the SES gradients in health, they still provide interesting patterns. However, one should keep in mind that the graphs depicted in this section do not reveal any causality.

Table 2: Mean Comparison Tests for Time Uses According to Education

	(1) men all sample	(2) women all sample	(3) men bottom educ. quart.	(4) women bottom educ. quart.	(5) men top educ. quart.	(6) women top educ. quart.
household work	12.96***	248.42***	18.79***	255.11***	12.46***	192.03***
	(37.18)	(149.55)	(49.93)	(158.19)	(31.08)	(136.36)
childcare	9.90***	41.46***	7.25***	29.75***	11.97***	43.04***
	(25.46)	(76.50)	(21.90)	(59.74)	(29.64)	(85.30)
employment	253.32***	68.09***	136.00***	50.85***	277.95***	103.10***
	(240.18)	(154.62)	(194.89)	(131.03)	(233.46)	(182.04)
active leisure	33.03***	7.82***	19.51***	1.56***	44.21***	19.60***
	(67.27)	(27.55)	(47.95)	(10.09)	(78.12)	(43.43)
passive leisure	144.94***	126.544***	155.58***	117.48***	150.61***	139.87***
	(106.21)	(96.28)	(108.69)	(97.52)	(110.19)	(101.57)
sleeptime	507.36***	513.94***	539.72***	520.10***	502.22***	523.72***
	(107.55)	(105.87)	(123.70)	(520.10)	(502.22)	(523.72)

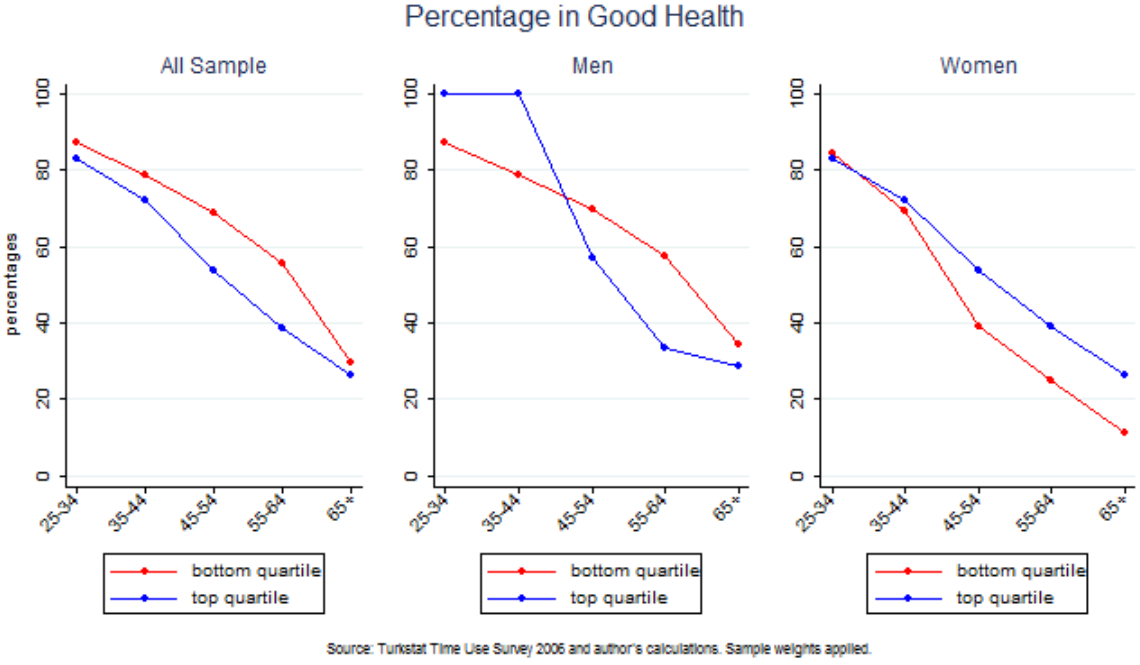
Standard deviations in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Mean Comparison Tests for Time Uses of Working Individuals According to Education

	(1) men all sample	(2) women all sample	(3) men bottom educ. quart.	(4) women bottom educ. quart.	(5) men top educ. quart.	(6) women top educ. quart.
household work	10.26***	195.39***	13.09***	227.18***	10.50***	124.99***
	(32.08)	(144.69)	(38.56)	(148.17)	(28.66)	(111.97)
childcare	11.09***	31.07***	6.81***	24.11***	13.61***	31.28***
	(26.09)	(59.71)	(20.07)	(42.16)	(29.52)	(67.56)
employment	357.70***	253.10***	275.01***	224.12***	368.10***	276.05***
	(211.40)	(205.36)	(198.86)	(192.06)	(198.49)	(203.36)
active leisure	24.74***	6.35***	16.67***	0.87***	32.28***	17.22***
	(55.59)	(24.61)	(47.33)	(8.18)	(63.39)	(39.82)
passive leisure	123.14***	93.70***	131.05***	81.64***	129.23***	108.38***
	(91.69)	(76.02)	(91.41)	(72.25)	(93.67)	(77.54)
sleeptime	487.74	485.98	503.31***	478.84***	488.43***	505.40***
	(98.93)	(93.58)	(101.11)	(100.44)	(93.57)	(94.00)

Standard deviations in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 10: Subjective Health by Age According Time Spent on Household Work

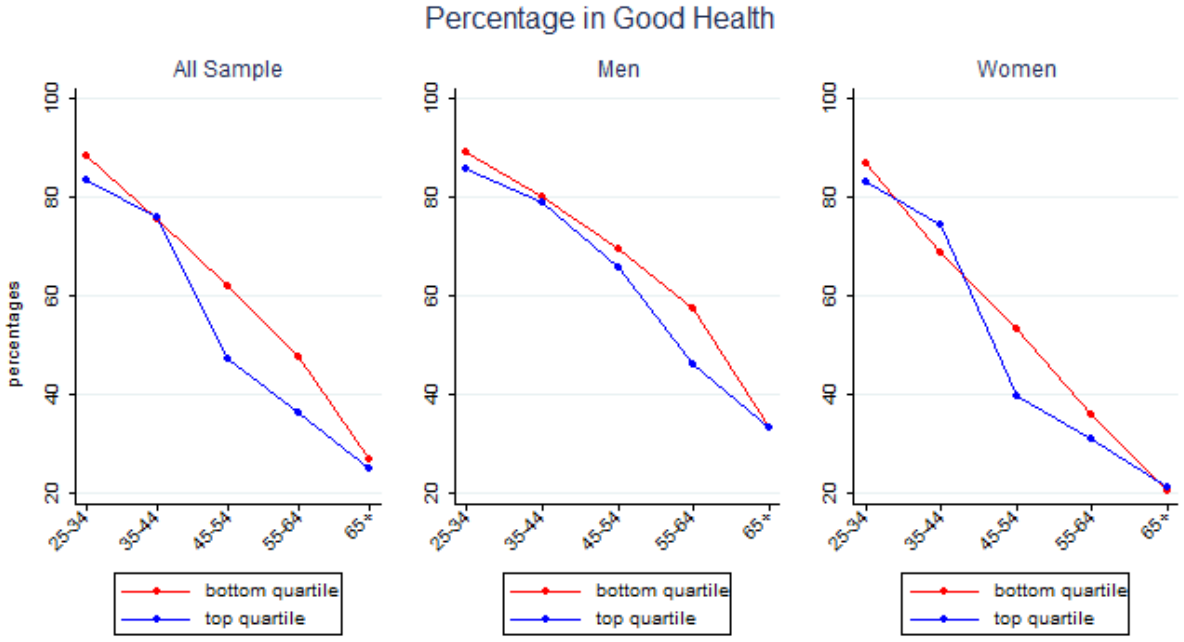


Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

Figure 10 shows the percentage of individuals in good health according to the top and bottom quartiles of time spent on household work. The first observation is that the rate of decline in health for women is greater than men as in the previous cases. Furthermore, women in the top quartile always report that their health is better than their counterparts in the bottom quartile, which may be due to the fact that unhealthy women have less time for housework. On the other hand, men in the top quartile report better health until age 45 and men in the bottom quartile report better health after age 45. Additionally Figure 11 presents percentage in good health according to top and bottom quartiles of time spent on childcare. Although

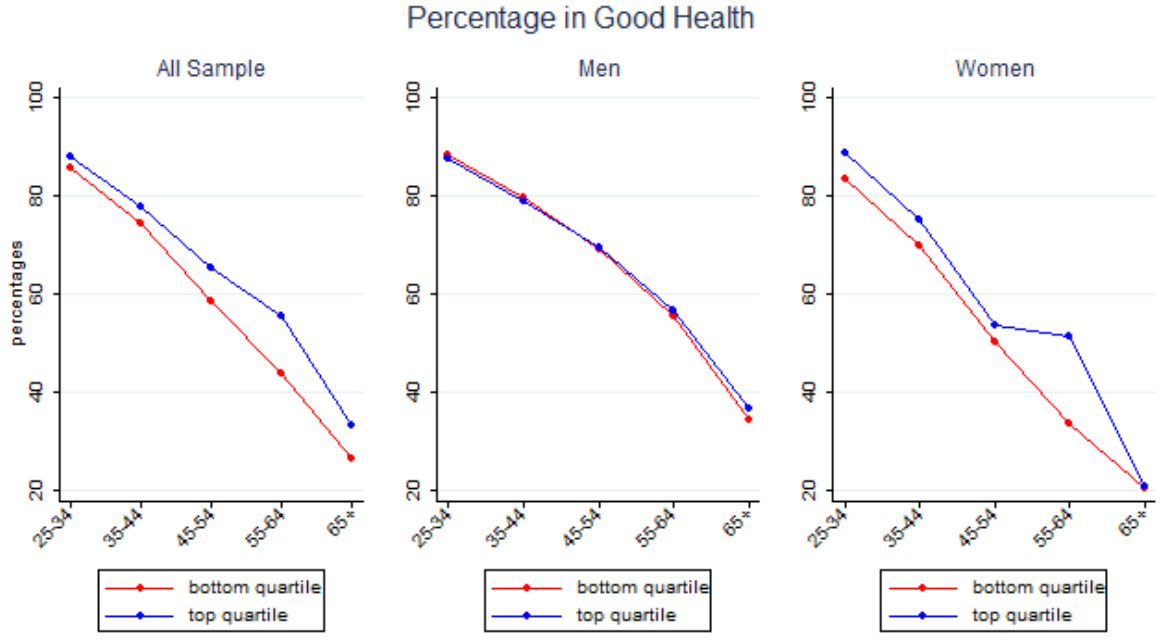
there is no obvious gradient, both men and women, in bottom quartiles generally report better health than their counterparts in top quartiles.

Figure 11: Subjective Health by Age According Time Spent on Child Care



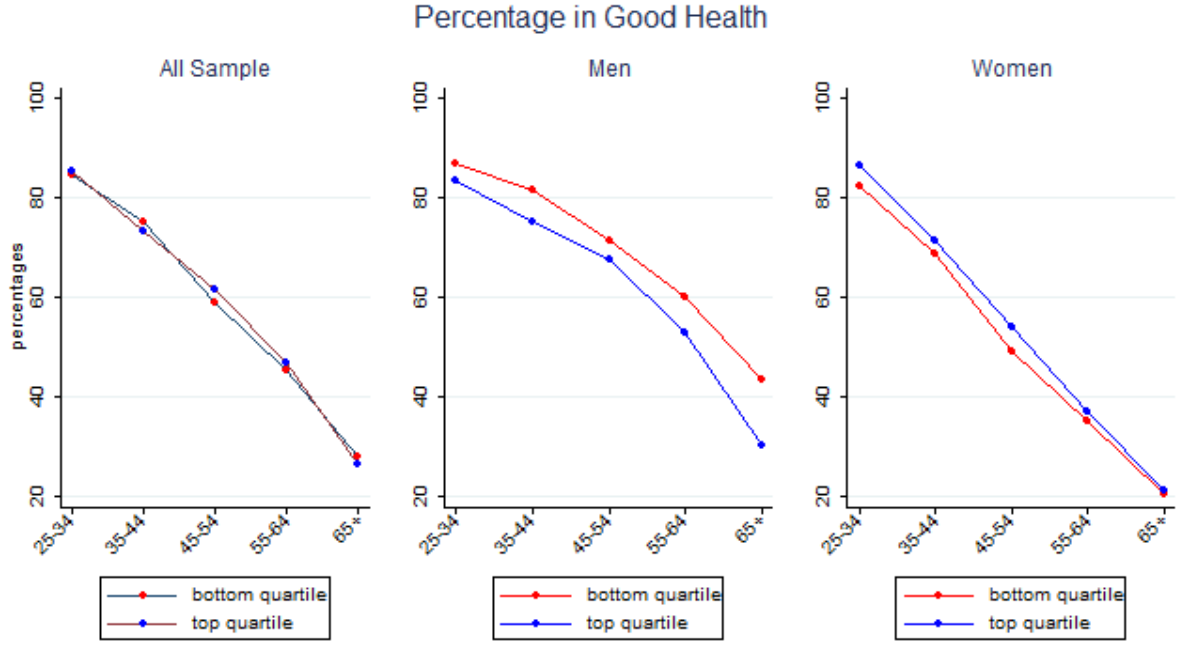
Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

Figure 12: Subjective Health by Age According Time Spent on Active Leisure



Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

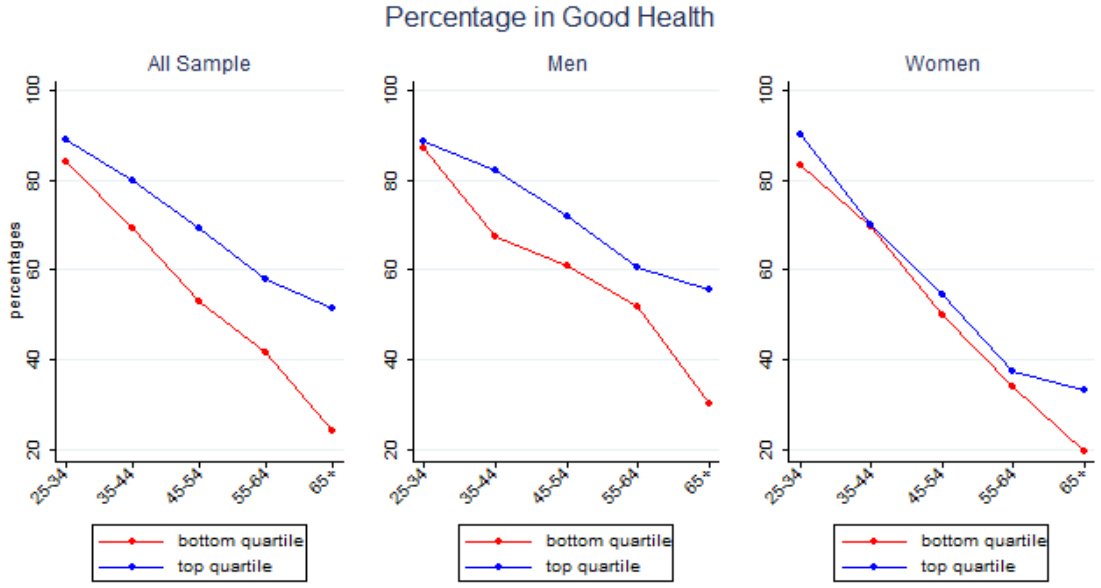
Figure 13: Subjective Health by Age According Time Spent on Passive Leisure



Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

Another indicator for gender roles would be time spent on active and passive leisure. We prefer to analyze leisure within two components since the structures of active and passive leisure, are different from each other. The first striking observation, according to Figure 12, is that there is no difference in men's health according to top and bottom quartiles of time spent in active leisure. On the other hand, the opposite is valid for passive leisure which is depicted in Figure 13. Men in the top quartile of time spent in passive leisure report better health than men in the bottom quartile while there is almost no difference between health reporting behavior of women according to time spent in passive leisure.

Figure 14: Subjective Health by Age According Time Spent on Employment



Source: Turkstat Time Use Survey 2006 and author's calculations. Sample weights applied.

Labor force status and time spent in employment could be attributed as an indicator of socio-economic status (SES). However, in this section we treat time spent in employment as a gender role indicator since women spend less time in employment on average. Figure 14 shows the percentage of good health according to time spent on employment. Men in the top quartile are always in better health than men in the bottom quartile and the pace of deterioration in health through ages is also smaller for men in the top quartile. The different health behaviors of men in the top and bottom quartiles of time spent in employment could be due to that men in worse health cannot work as much as their healthier counterparts. On the other hand, we observe no distinctive pattern for women in Figure 12.

In this section we present the SES gradient in health and how health gradients behave according to gender roles. However, due to data limitations the analysis we conducted above is restricted by selective mortality and justification bias. At older ages the most robust of the lower socio-economic groups survives given that mortality is firmly correlated with SES. This situation can explain why socioeconomic differences in health among those surviving in old ages appear to narrow (Smith 2007; Van Kipperluis et al. 2009, Van Doorslaer et al. 2008, Lynch 2003). In other words less healthy people who are socioeconomically disadvantaged are more likely to die at relatively younger ages which will obscure the SES-health gradient. One approach used to deal with selective mortality is to keep the dropouts in the sample and to impute their health scores by assigning a health score that is lower than the worst category or by imputing health scores for non-respondents from survivors with the same background characteristics (Van Doorslaer et al.2008). Another approach is to use panel data to estimate individual-specific health trajectories from within-individual variation and then average these variations across individuals (Van Doorslaer et al. 2008). Once again due to data limitations, we cannot observe selective mortality explicitly.

"Justification bias" would also be another issue in assessing the SES-Health gradient. For a given true but unobserved health state individuals will report health differently depending on conceptions of health in general, expectations for own health, financial incentives and strategic behavior (Bagod'Uva et al. 2006). For example people who retired early would exaggerate their health status in order to justify early exit

from the labor force.

5. Estimation Methodology and Results

In the first part of section 4, the attention was on the evolution of health over ages, and the extent to which this differs across socio-economic groups. The conclusion was that women's subjective health status is worse than men's in any socioeconomic group and age. In the second part of section 4, the difference in time uses of certain activities such as household work, childcare, employment, and leisure are presented. Time uses of these activities yield reliable measures for gender roles. Now, it is time to see whether the difference in gender roles have a significant effect on health over ages and socio-economic groups. We expect that spending more time in household work and childcare worsen health, while spending more time in paid employment and leisure improve health.

The model estimated is:

$$[1] \quad H_i^S = F(X'_i\beta_1 + SES'_i\beta_2 + GR'_i\beta_3 + \varepsilon_i)$$

where H_i^S is the subjective health status, X'_i represents demographic and household characteristics such as, age, gender, marital status and region. Since age is given in categories at the original data, age groups are used as dummies in the estimation process and the reference group is 15-24. We use a male dummy which is equal to 1 if the individual is a male. Marital status is measured by marital status dummies such as being married, divorced and widowed in which being single is the reference category. Moreover we use an urban dummy that is equal to 1 if the individual lives in an urban area.

SES'_i shows the socio-economic status indicator which is education in this study.[2] The effect of education on health status is captured by using education quartiles as binary variables in the estimation and the reference category is the bottom quartile. GR'_i is for gender roles proxied by time spent on household work, childcare, paid employment, and leisure. ε_i is the error term. The estimation methodology is probit with marginal effects. Time spent in paid employment would also cover the effect of employment on health which would also be included as an indicator of socio-economic status.

However, reporting heterogeneity would lead to biased estimation results. Although self-assessed health status is a convenient and informative indicator widely used in studies of health determinants as well as the economic consequences of bad health, heterogeneity in reporting of health potentially biases the measurement of health disparities. For a given true but unobserved health state, people will report health differently depending upon conceptions of health in general, expectations for own health, financial incentives and strategic behavior to report poor health and comprehension of the survey questions (Bagod'Uva et al., 2006).

In many contexts, reporting heterogeneity need not be a major concern provided that it is random.

[2]We do not use income as a SES indicator in the estimation in order not to cause further endogeneity problems. Standard theory predicts that individuals in good health will have higher labor force participation rates and also have higher wage rates, both of which lead to greater income. Hence, impact of income on health would be due to reverse causality which may lead over-estimated results. In other words theory predicts that the causality runs from health to income not the other way around.

However, reporting heterogeneity becomes a problem if there are systematic differences in the way in which health is reported across demographic and SES characteristics against which inequality is being assessed (Kerkhofs and Lindeboom, 1995). One of the approaches to solve reporting heterogeneity in ordinal variables is to obtain more objective indicators such as indices, doctor reports and mortality rates (Bound, 1991; Kerkhofs and Lindeboom, 1995; Kreider, 1999). One problem with this approach is that objective indicators may not be available. Another approach would be using vignettes. Rather than attempt to identify reporting behavior from variation in self-reported health beyond that explained by objective indicators, an alternative is to examine variation in the evaluation of given health states represented by hypothetical case vignettes (Kapteynet. al, 2007; Bagod'Uva et al., 2006). The vignettes represent fixed levels of latent health and so all variation in the rating of them can arguably be attributed to reporting behavior, which can be examined in relation to observed characteristics (Bagod'Uva et al., 2006).

Endogeneity between health status and SES would also arise due to reporting errors, unobserved factors and reverse causality. In the absence of state dependent errors the endogeneity problems boils down to standard problems that can be solved with IV approaches. However, the data used in this study does not allow correction for measurement error resulted from reporting heterogeneity due to lack of more objective measures of health and any vignettes. In this respect one should keep in mind that the further analysis conducted in the following sections only correct measurement errors due to endogeneity, not reporting heterogeneity.

A considerable weakness of self-assessed health status (SAH) is the potential endogeneity between respondents' answers and the socio-economic status which may lead to biased results. Not only does SES affect health, but health also may affect SES (Bender and Habermalz, 2005). In other words, one key issue in the broader area of health and SES is the possible endogeneity of SAH and, in particular, justification bias. For instance, it is possible that associations between SAH and employment occur because employment actually causes good health and alternatively it could be that, for a given level of true health, individuals who are not working report poorer health in order to justify their employment status (Au et al., 2005). To put differently the variable that may cause endogeneity bias in this study is time spent in employment.

In the model used there is one variable that may create endogeneity bias; time spent on employment. The problem may arise due to reverse causality; time spent on employment affects health but also health affects employment time, or omitted factors that might influence health and time spent on employment at the same time. In order to address this endogeneity problem we employ Two-Stage Residual Inclusion (2SRI) which is an instrumental variable approach. Two-stage residual inclusion (2SRI) is a common nonlinear modeling framework which is widely used in empirical research in health economics and health services research.

In the estimation process we employ the following nonlinear framework as in Terza et al. (2007):

$$[2] \qquad E[y/x_0, x_e, x_u] = M(x_0\beta_0 + x_e\beta_e + x_u\beta_u) + e$$

where M(.) is a known nonlinear function, x_0 is a 1×K vector of observable exogenous regressors, x_e denotes a 1×S vector of endogenous regressors and x_u shows unobservable omitted variables that influence the outcome and are correlated with the endogenous variables. e is the random error term. The

essence of the endogeneity problem is the correlation between x_e and x_u (Terza et al., 2007). To formalize the relationship between x_e and x_u and there by provide a means for dealing with endogeneity bias through the use of instrumental variables (IV), Terza et al. (2007) define the following linear reduced form equations:[3]

[3] $$x_{es} = w\alpha_s + x_{us}$$

where w is a 1xS vector of identifying instruments. α_s is a (K+ S)×1 column vector of parameters. The elements of w must satisfy the following three conditions: (1) they cannot be correlated with x_u; (2) they must be sufficiently correlated with x_e(i.e. they must not be "weak"); and (3) they can neither have a direct influence on y nor be correlated with the error term in (2) (Terza et al., 2007). In the first-stage, we obtain consistent estimates of the vectors α_s by applying the appropriate linear or nonlinear technique and then computethe predictors of x_e. In the second stage we estimate the following regression:

[4] $$y = M(x_0\beta_0 + x_e\beta_e + x_u\beta_u) + e^{2SRI}$$

where e^{2SRI} is the regression error term. Note that the actual observed value of the endogenous regressors x_e are maintained in the second-stage regression model while the residuals from the auxiliary regressions are substituted for the unobserved confounders x_u (Terza et al., 2007).[4]

According to information above, the model to estimate the effect of SES on health becomes:

[5] $$H_i^s = F(X'_i\beta_1 + SES'_i\beta_2 + GR'_i\beta_3 + \varepsilon_i) = H_i^s = F(X'_i\beta_1 + SES'_i\beta_2 + SES'_e\beta_3 + GR'_i\beta_4 + e^{2SRI})$$

The efficiency of any IV approach relies on the fact that whether the instruments are sufficiently correlated with the endogenous variable. Not surprisingly, considerable evidence suggests that work hours (time spent in employment) are highly correlated with economic conditions. The strong positive association between regional unemployment rates and work hours is quite mechanical since higher unemployment rates suggest more people having zero work hours (Xu, 2013). In this respect we use the unemployment rate according to education levels as an instrument.[5] Furthermore, living quartiles per person in the household and whether the household owns a house also serve as instruments since they can serve as indicators for household wealth.

Specifically the following first stage reduced form equation is estimated in order to obtain instrumented variables:

[6] $$employment_i = \theta_1 + \theta_2 X_i + \theta_3 S_i + \theta_4 U_i + \theta_5 LQ_i + \theta_6 HO_i + u_i$$

$employment_i$ shows the time spent in employment during the working days, X_i is the vector of demographic and household characteristics, S_i is the vector of exogenous socio-economic status

[3]The auxiliary equation could also be in nonlinear form. See Terza et al., 2007.
[4]See Terza et al., 2007 for further information on consistency of 2SRI both in linear and nonlinear cases.
[5]Regional unemployment rates would better serve as an instrument, however due to data limitations we cannot use regional unemployment rate as an instrument.

indicators, U_i is the unemployment rate according to education level, LQ_i shows the living quartiles per member of the household and HO_i is a binary variable showing whether the household owns a house. Equation [5] and equation [6] form the model to be estimated.[6]

Table 4 shows the estimation results for the whole sample. The first two columns report marginal effects from Probit estimation, whereas the 3rd column reports marginal effects from 2SRI. Furthermore, the results in the first column do not take gender roles into account when assessing the impact of SES on health status. On the other hand, the second and third columns present results that incorporate gender roles without and with endogeneity correction respectively. According to the results in Table 4, the most effective variable in all estimation methodologies is age followed by education quartiles. Aging decreases the probability of being in good health whereas education increases the probability independent of inclusion of gender roles in the model. Being male raises the probability of good health by 27% when gender roles are not included in the estimation. On the other hand when we add time spent on household work, childcare, employment, active and passive leisure in the models the effect of being a male decreases but still stays positive. The effect of household work is negative while the impact of employment and passive leisure is positive according to 2SRI results. However, since we include interaction effects when we add gender roles in the estimation, interpretation of the coefficient of male dummy is altered. Interaction between being male and time spent on household work, childcare, employment, active and passive leisure is added to the model in order to test the hypothesis that the relationship between health and gender roles is different for men and women.

[6]See appendix for first stage estimation results.

Table 4: Probit Results (Whole Sample)

dep. var:health	(1) Probit	(2) Probit	(3) 2SRI
endogeneity correction	no	no	yes
age 35-44	-0.110***	-0.101***	-0.109***
	(0.0136)	(0.0139)	(0.0162)
age 45-54	-0.225***	-0.206***	-0.205***
	(0.0136)	(0.0144)	(0.0416)
age 55-64	-0.315***	-0.281***	-0.250***
	(0.0148)	(0.0161)	(0.0878)
age 65+	-0.430***	-0.387***	-0.340***
	(0.0171)	(0.0188)	(0.125)
male	0.2735***	0.172***	0.182***
	(0.00987)	(0.0268)	(0.0109)
urban	-0.0147	-0.00987	0.0280
	(0.00986)	(0.00999)	(0.0219)
married	-0.0236	-0.0366	-0.0371*
	(0.0217)	(0.0222)	(0.0220)
divorced	0.0121	0.00489	0.00496
	(0.0403)	(0.0404)	(0.0451)
widowed	-0.0674**	-0.0676**	-0.0535*
	(0.0293)	(0.0297)	(0.0309)
educquart2	0.111***	0.106***	0.116***
	(0.0124)	(0.0124)	(0.0197)
educquart3	0.129***	0.123***	0.119***
	(0.0201)	(0.0201)	(0.0329)
educquart4	0.222***	0.216***	0.200***
	(0.0157)	(0.0160)	(0.0475)
household work		-0.000215***	-0.000356***
		(4.76e-05)	(3.41e-05)
childcare		0.000298***	0.000405
		(9.37e-05)	(0.000369)
passive leisure		0.000143**	0.000259**
		(6.22e-05)	(2.82e-05)
active leisure		0.000110	0.000159
		(0.000263)	(0.000475)
employment		0.000329***	0.00241**
		(7.33e-05)	(0.00121)
employment^2		-2.69e-07***	-3.60e-06**
		(1.04e-07)	(1.72e-06)
householdwork*male		-0.000228**	-0.0003**
		(0.000073)	(0.000011)
childcare*male		-0.000587**	-0.000943***
		(0.000244)	(0.000325)
passive leisure*male		0.000312***	0.000496**
		(8.96e-05)	(3.24e-05)
active leisure*male		-7.56e-05	-6.86e-05
		(0.000282)	(0.000340)
employment*male		-8.40e-05	-7.97e-05
		(5.38e-05)	(5.48e-05)
Pseudo R^2	0.1639	0.1693	0.1644
Observations	8,458	8,458	8,458

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Marginal effects are reported

According to columns (2) and (3) the coefficients of being male are 0.172 and 0.182 respectively. Nonetheless we should consider interaction effects in order to interpret male coefficients correctly. For

instance we look at 2SRI results; we observe that the interaction between household work and male dummy and childcare and male dummy are significant and negative. Moreover, the interaction between passive leisure and male dummy is significant and positive. Thus the effect of being male on the probability of good health is 0.182 - 0.0003 - 0.000943 + 0.000496 which is equal to 0.181. Although there is a slight decrease in the coefficient of the male dummy, we should take the impact of interactions when interpreting the coefficients.

Furthermore, time spent in employment has a positive effect on health while the square of employment minutes is negative indicating that the positive effect of employment hours decreases as the time spent on employment increases. Additionally interaction terms between employment minutes and male dummy is positive implying that time spent in employment raises the probability of good health for men.

Table 5 shows marginal effects from probit estimation for men and women without and with endogeneity correction respectively. Getting older has the biggest impact on health for both men and women. Education also has an important impact on the probability of good health. Both the effect of aging and level of education are greater for women. When gender roles are included in the estimation, results in columns (2) and (4) show that time spent on household work decreases the probability of good health for both men and women while passive leisure increases the probability of good health for men and active leisure increases the probability of good health for women. Time spent on employment has a positive effect on health for men and this positive effect diminishes as the time spent on employment rises.

Table 6, Table 7 and Table 8 present the probit results according to age for the whole sample, men and women respectively. According to the results in Table 6, the effect of being male is positive except in the age group 55-64. Being a male aged between 55-64 decreases the probability of good health. The effect of education is significant and positive at young and middle ages where as its impact is insignificant at older ages. Time spent on household work and child care decreases the probability of good health if the coefficients are significant.

Table 7 shows the results according to age for men. The significance of education coefficients depend on the age group but have a positive impact when they are significant. Time spent on household work decreases the probability of good health for the men aged 35-44 and 55-64 and time spent on child care decreases the probability of good health at younger ages. Furthermore time spent on passive leisure increases the probability of good health for men at younger and older ages.

Table 8 shows the results according to age for women. We observe that education has more effect on health of women than health of men. Time spent on household work decreases the probability of good health at first three age groups. Time spent on child care has a negative impact on health for women aged between 25 and 44. Moreover time spent on active leisure increases the probability of better health for women at age groups 25-34, 45-54 and 55-64. Lastly, we observe that employment time has no remarkable influence on women's health status.

Table 5: Probit Results According to Gender

dep. var:health	(1)	(2)	(3)	(4)
	men		women	
	probit	2SRI	probit	2SRI
endogeneity correction	no	yes	no	yes
age 35-44	-0.0867***	-0.102***	-0.126***	-0.115***
	(0.0201)	(0.0234)	(0.0184)	(0.0176)
age 45-54	-0.177***	-0.179***	-0.263***	-0.237***
	(0.0201)	(0.0471)	(0.0183)	(0.0488)
age 55-64	-0.261***	-0.220**	-0.364***	-0.312***
	(0.0211)	(0.0967)	(0.0208)	(0.110)
age 65+	-0.398***	-0.342**	-0.459***	-0.387**
	(0.0233)	(0.146)	(0.0253)	(0.167)
urban	-0.0158	0.0584**	-0.0117	-0.0191
	(0.0138)	(0.0275)	(0.0140)	(0.0320)
married	-0.0302	-0.0450	-0.0230	-0.0296
	(0.0291)	(0.0336)	(0.0321)	(0.0341)
divorced	0.0553	0.0542	-0.00745	-0.0133
	(0.0716)	(0.0766)	(0.0517)	(0.0582)
widowed	0.00182	0.0103	-0.0808**	-0.0733*
	(0.0520)	(0.0532)	(0.0395)	(0.0397)
educquart2	0.106***	0.123***	0.107***	0.100***
	(0.0215)	(0.0247)	(0.0156)	(0.0210)
educquart3	0.118***	0.121***	0.139***	0.123**
	(0.0279)	(0.0392)	(0.0327)	(0.0494)
educquart4	0.209***	0.193***	0.231***	0.223***
	(0.0244)	(0.0518)	(0.0220)	(0.0658)
household work		-0.000319***		-0.000308**
		(7.46e-05)		(4.47e-05)
childcare		-0.000939		0.000295
		(0.000660)		(0.000495)
passive leisure		0.000655**		0.000206
		(6.77e-05)		(0.000376)
active leisure		-0.000149		0.000933***
		(0.000624)		(5.41e-05)
employment		0.00371**		-0.000118
		(0.00144)		(0.00194)
employment^2		-6.38e-06***		7.79e-07
		(2.27e-06)		(2.71e-06)
Pseudo R^2	0.1297	0.1338	0.1776	0.1793
Observations	4,077	3,747	4,381	4,026

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Marginal effects are reported

Table 6: Probit Results According to Age (All Sample)

	(1) age 25-34 2SRI	(2) age 35-44 2SRI	(3) age 45-54 2SRI	(4) age 55-64 2SRI	(5) age 65+ 2SRI
male	0.145*	0.177**	0.179**	-0.0527***	0.184
	(0.134)	(0.0180)	(0.0283)	(0.0018)	(0.327)
urban	0.0769**	-0.0170	0.0371	-0.0476	0.0925
	(0.0375)	(0.0417)	(0.0566)	(0.0708)	(0.104)
married	-0.0201	-0.0353	0.00765	-0.202	0.170
	(0.0233)	(0.0545)	(0.106)	(0.446)	(0.669)
divorced	-0.0423	-0.00776	0.00574	0.0961	0.504
	(0.0515)	(0.0836)	(0.128)	(0.453)	(0.668)
widowed	-0.104	-0.121	-0.0279	-0.229	0.231
	(0.0852)	(0.0988)	(0.118)	(0.457)	(0.666)
educquart2	0.106***	0.156***	0.148***	0.0462	0.0496
	(0.0300)	(0.0342)	(0.0475)	(0.0581)	(0.0485)
educquart3	0.153***	0.167***	0.123	-0.0491	0.0180
	(0.0471)	(0.0581)	(0.0917)	(0.116)	(0.125)
educquart4	0.168***	0.339***	0.240*	-0.119	0.212
	(0.0573)	(0.0806)	(0.125)	(0.168)	(0.144)
household work	0.000276	-0.000615***	0.000124	-0.00295**	0.000876
	(0.000433)	(0.000054)	(0.000865)	(0.00118)	(0.000971)
childcare	0.000403	-0.000669*	-0.000686	0.00313**	0.000378
	(0.000463)	(6.36e-05)	(0.00105)	(0.00140)	(0.00124)
passive leisure	0.000298***	0.000580**	9.96e-05	0.00239**	0.000564
	(0.000081)	(0.000068)	(0.000760)	(0.000988)	(0.000864)
active leisure	1.81e-05	-0.000719	-0.000370	0.00364*	-0.000176
	(0.000589)	(0.000972)	(0.00139)	(0.00194)	(0.00477)
employment	0.00460**	-0.00227	0.00250	0.00617	0.00453
	(0.00203)	(0.00229)	(0.00320)	(0.00404)	(0.00620)
employment^2	-7.61e-06***	1.38e-06	-4.36e-06	-1.43e-06	-6.35e-06
	(2.88e-06)	(3.36e-06)	(4.58e-06)	(6.12e-06)	(9.63e-06)
householdwork*male	8.56e-05	0.000161	-0.000685***	0.00112	-0.000395***
	(0.000718)	(0.000746)	(0.000093)	(0.00112)	(0.000097)
childcare*male	0.00157***	0.000453***	0.000110	-0.000309	0.000684
	(0.000506)	(0.000644)	(0.00112)	(0.00118)	(0.00170)
passive leisure*male	0.000961**	0.000698***	0.000426***	0.00173***	0.000647
	(0.000398)	(0.000051)	(0.000079)	(0.00012)	(0.00112)
active leisure*male	-0.000191	-0.000711	0.000377	0.000851	0.000228
	(0.000410)	(0.000838)	(0.00102)	(0.00116)	(0.00443)
employment*male	0.000208**	0.000178***	4.57e-05*	-0.000231	0.000286
	(8.96e-05)	(0.000011)	(0.000014)	(0.000219)	(0.000446)
Pseudo R^2	0.0494	0.0435	0.0531	0.0757	0.0799
Observations	2,257	1,957	1,589	1,088	882

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Marginal effects are reported

Table 7: Probit Results According to Age (Men)

	(1) age 25-34 2SRI	(2) age 35-44 2SRI	(3) age 45-54 2SRI	(4) age 55-64 2SRI	(5) age 65+ 2SRI
urban	0.102	0.0238	0.0598	0.0136	0.174
	(0.399)	(0.0521)	(0.0675)	(0.103)	(0.139)
married	-0.0162	0.00658	0.0774	-0.315	0.111
	(0.0963)	(0.0598)	(0.119)	(0.896)	(0.875)
divorced	-0.100	0.0896	0.300*	0.0097*	0.120**
	(0.139)	(0.121)	(0.168)	(0.0012)	(0.0202)
widowed	0.165	0.0955	0.0619	-0.315	0.232
	(0.135)	(0.142)	(0.187)	(0.919)	(0.863)
educquart2	0.126	0.186***	0.225***	0.0410	0.0238
	(0.0922)	(0.0685)	(0.0821)	(0.0838)	(0.0943)
educquart3	0.215	0.121	0.237**	-0.125	0.00617
	(0.306)	(0.0833)	(0.115)	(0.144)	(0.215)
educquart4	0.241	0.246**	0.364**	-0.250	0.0375
	(0.438)	(0.109)	(0.167)	(0.244)	(0.283)
householdwork	-0.00105**	-0.000812	-0.00196***	-0.00491	-0.00182
	(0.00055)	(0.00150)	(0.00021)	(0.00324)	(0.00366)
childcare	-0.00229**	-0.000386**	-0.00202	0.00299	0.00208
	(0.000928)	(0.00013)	(0.00175)	(0.00291)	(0.00307)
passive leisure	0.00200**	-9.44e-05	-0.00170	0.00465***	0.00116***
	(0.00035)	(0.00129)	(0.00179)	(0.000304)	(0.000334)
active leisure	-0.00133	-0.000118	-0.00116	0.00530*	0.00118
	(0.00532)	(0.00117)	(0.00167)	(0.00275)	(0.00333)
employment	0.00423**	0.00127***	0.00327	0.0103*	0.00782
	(0.00029)	(0.00027)	(0.00377)	(0.00535)	(0.00829)
employment^2	-9.69e-06**	-1.73e-06*	-7.85e-06**	-7.16e-06	-8.73e-06
	(3.87e-07)	(4.14e-07)	(5.57e-07)	(7.76e-06)	(1.14e-05)
Pseudo R^2	0.0565	0.0474	0.0345	0.0370	0.0587
Observations	1,047	942	774	557	417

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Probit Results According to Age (Women)

	(1) age 25-34 2SRI	(2) age 35-44 2SRI	(3) age 45-54 2SRI	(4) age 55-64 2SRI	(5) age 65+ 2SRI
urban	0.0518	-0.0813	0.00558	-0.147	0.217
	(0.0486)	(0.0743)	(0.0927)	(0.121)	(0.304)
married	-0.0119	-0.0836	-0.134	-0.104	0.883
	(0.0391)	(0.0854)	(0.463)	(0.828)	(47.61)
divorced	0.00371	-0.0697	-0.252	0.183	1.024
	(0.0755)	(0.108)	(0.492)	(0.830)	(47.62)
widowed	-0.141	-0.233*	-0.189	-0.174	0.997
	(0.108)	(0.122)	(0.468)	(0.835)	(47.61)
educquart2	0.0882**	0.166***	0.101	0.0482	0.0602
	(0.0344)	(0.0512)	(0.0616)	(0.0764)	(0.0642)
educquart3	0.0743	0.310***	0.00448	0.116***	-0.0766
	(0.0593)	(0.105)	(0.134)	(0.0210)	(0.208)
educquart4	0.101	0.494***	0.144***	0.0755	0.288**
	(0.0798)	(0.137)	(0.019)	(0.274)	(0.030)
household work	0.000962*	-0.00163*	0.000768**	0.00197	0.00147
	(0.000558)	(0.000948)	(0.00014)	(0.00195)	(0.00266)
childcare	0.00114*	-0.00177*	6.69e-05	0.00205	0.00113
	(0.000645)	(0.00105)	(0.00168)	(0.00230)	(0.00298)
passive leisure	0.000855*	-0.00147*	0.000598	0.00153	0.00121
	(0.000514)	(0.000832)	(0.00118)	(0.00163)	(0.00235)
active leisure	0.000861**	-0.00191	0.000444***	0.00225**	0.000550
	(0.000085)	(0.00122)	(0.00019)	(0.00025)	(0.00349)
employment	0.00497*	-0.00721*	0.000982	-0.000870	0.0139
	(0.00286)	(0.00370)	(0.00569)	(0.00748)	(0.0206)
employment^2	-5.92e-06	6.74e-06	5.81e-07	7.98e-06	-2.08e-05
	(4.05e-06)	(5.88e-06)	(7.46e-06)	(9.76e-06)	(2.88e-05)
Observations	1,208	1,012	815	530	461

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6. Conclusion

The main objective of this paper is to assess the relationship between health and socio-economic status (SES) across ages by including gender roles for men and women. Gender roles are proxied by the time spent in household work, childcare, active & passive leisure and employment. Health-SES gradient shows that women's subjective health status is worse than men in any socioeconomic group and age. Furthermore women spend more time in household work and childcare and less time in leisure and employment. Estimation results without controlling for gender roles reveals that being male has a positive effect on health. However when gender roles are controlled in the estimation process the effect of being male is still positive but decreases and turns to negative in some cases. The results suggest that if

gender roles were to be more equal, the gap in health status between men and women would diminish.

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APPENDIX

Table A.1 Description of The Variables in Tuskstat Time Use Survey 2006

Variable	Description	Range and/or Values	Percentage or Mean (sd)
employment type	categorical variable	0:non-working	51.02
		1:wage earner	27.78
		2:employer	2.50
		3:self-employed	10.82
		4:unpaid family worker	7.88
occupation	categorical variable: job, job description and duties related to actual work are covered according to ISCO 88	0:unoccupied	51.02
		1:managers	6.17
		2:professionals	2.87
		3:assoc. prof.	2.62
		4:office clerks	2.36
		5:service workers	5.59
		6:agriculture workers	12.92
		7:artisans	7.48
		8:skilled workers	3.96
		9:unskilled workers	5.02
sector	categorical variable: work sector codes accoring to NACE Rev.1	0:non-working	51.02
		1:agriculture	14.14
		2:mining	0.31
		3:manufacturing	9.34
		4:electiricity, gas, water	0.16
		5:constraction	3.18
		6:trade	10.36
		7:transportation	1.87
		8:fire	1.93
		9:services	7.69
firmsize	categorical variable	0:non working	51.02
		1:<10	32.25
		2:10-24	4.76
		3:25-49	2.60
		4:50+	9.36
public	binary indicator	0:private	94.28
		1:public	5.72
workplace	categorical variable categorized only for workers in the private sector	0:non working	56.75
		1:field/garden	13.49
		2:regular workplace	24.33
		3:market place	0.23
		4:non-mobile or fixed workplace	3.83
		5:home	1.37
hours worked	based on normal weekly working time at actual job	0-99	24.70 (28.06)
parttime	binary indicator an individual is employed parttime if weekly working hours is less than 34	0:not parttime	92.60
		1:parttime	7.40
second job status	categorical variable	0:non working	51.02
		1:yes	2.72
		2:no	46.25
second job work time	based on normal weekly working time at second job	0-84	0.65 (4.76)
house type	categorical variable	1:detached house	45.64
		2:apartment	52.68
		3:slum	1.58
		4:other	0.10

Variable	Description	Range and/or Values	Percentage or Mean (sd)
homeownership	categorical variable	1:homeowner	70.22
		2:renter	20.79
		3:housing	1.54
		4:other	7.46
number of rooms in the house	categorized as the number of rooms in the house	1	0.36
		2	8.56
		3	41.28
		4	41.62
		5 or 5+	8.18
household income group	categorical variable	1:less than 300TL	9.68
		2:301-450	14.74
		3:451-600	17.94
		4:601-750	10.90
		5:751-1000	18.59
		6:1001-1250	7.75
		7:1251-1750	9.49
		8:1751-2500	6.79
		9:2501-4000	3.12
		10:more than 4000	1.00
main source of income	categorical variable	1:wage earner	49.86
		2:non-agr entrepreneur	13.65
		3:agriculture	14.46
		4:real estate	1.20
		5:assets	0.15
		6:transfers	20.68
person's relation	categorical variable to reference person	1:household head	36.09
		2:spouse	30.12
		3:son/daughter	26.23
		4:mother/father	2.09
		5:sibling	0.94
		6:mother/Father in law	0.18
		7:son/daughter in law	2.90
		8:grandson	0.62
		9:other relative	0.57
		10:employee	0.02
		11:not a relative	0.25
household size	Categorized as the number of household members		1:2.19
			2:12.98
			3:20.04
			4:24.96
			5:16.63
			6:9.63
			7:4.97
			8:3.10
			9:1.89
			10+:3.60
number of disabled	Categorized as the total numberof disabled people in the household		0:87.45
			1:11.12
			2:1.43

Variable	Description	Range and/or Values	Percentage or Mean (sd)
number of children	Categorized as the total number of children in the household		0:29.64 1:24.75 2:24.10 3:12.35 4:4.57 5:2.34 6:1.06 7:0.42 8:0.41 9:0.14 10:0.11 11:0.11
health status	categorical variable	1:very well 2:well 3:medium 4:bad/very bad	14.43 59.31 19.14 7.12
health probem	categorical variable	1:no problems 2:permanent illness 3:mental problems 4:bone/muscle disease 5:eye disease 6:ear disease 7:speech defect 8:mental retardation 9:other	89.68 1.00 2.46 1.02 0.30 0.07 0.02 3.66 1.79
personal care	total weekly time spent on personal care	minutes	161.43 (60.11)
employment	total weekly time spent on employment	minutes	81.25 (167.82)
education	total weekly time spent on education	minutes	3.47 (29.23)
household chores	total weekly time spent on hh chores	minutes	151.77 (161.79)
household management	total weekly time spent on hh man.	minutes	14.26 (38.19)
repair	total weekly time spent on repair	minutes	1.16 (10.87)
childcare	total weekly time spent on childcare	minutes	16.52 (42.30)
seekcare	total weekly time spent on seekcare	minutes	4.79 (30.84)
sports	total weekly time spent on sports	minutes	5.04 (23.41)
social activities	total weekly time spent on social activites	minutes	168.19 (131.23)
leisure	total weekly time spent on leisure	minutes	72.12 (98.75)
reading	total weekly time spent on reading	minutes	5.38 (19.49)
arts	total weekly time spent on arts	minutes	0.07 (1.36)
travel	total weekly time spent on travel	minutes	63.11 (70.92)
sleeptime	total weekly time spent on sleeptime	minutes	544.49 (140.79)
other	total weekly time spent on other	minutes	145.53 (123.98)

Table A.2 First Stage Estimation Results

dep. var: employment minutes	(1)
unemployment rate	300.0***
	(50.7)
living quartiles	0.143***
	(0.017)
house owner	-17.27***
	(4.648)
age 35-44	-6.077
	(5.736)
age 45-54	-56.00***
	(6.461)
age 55-64	-126.5***
	(7.568)
age 65+	-190.5***
	(8.873)
male	165.9***
	(8.637)
urban	1.186
	(4.416)
married	11.73
	(8.463)
divorced	17.42
	(16.49)
widowed	2.117
	(12.21)
educquart2	33.33***
	(11.64)
educquart3	53.63***
	(13.52)
educquart4	89.50***
	(17.19)
household work	-0.523***
	(0.0189)
childcare	-0.582***
	(0.0372)
passive leisure	-0.434***
	(0.0265)
active leisure	-0.615***
	(0.114)
householdwork*male	-0.441***
	(0.0719)
childcare*male	-0.125
	(0.103)
passive leisure*male	-0.445***
	(0.0370)
active leisure*male	-0.213*
	(0.122)
Constant	336.8***
	(15.17)
Observations	7,773
F-stat	358.54
R-squared	0.516

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1