AN APPLICATION OF WORKING LIFE TABLES FOR MALES IN TURKEY: 1980-2000

Ayşe ÖZGÖREN *
İsmet KOÇ **

This paper aims to construct conventional abridged working life tables for males aged 15 and over with a breakdown of urban and rural for the years 1980, 1990 and 2000 for Turkey. Primary data of the study come from two different sources: 1980 Census of Population, household labor force surveys of 1990 and 2000 carried out by TURKSTAT. Our findings indicate that in Turkey, a male who enters the labor force at the age of 17.5 spends over 40 years of his life in the labor force. Inactive years are about 10 years longer among males living in urban areas, when compared with their counterparts in rural areas in year 2000. Low length of working life in the urban areas seems to result from low rates of accession to the labor force. The rise in the length of expected inactive years of males for all the periods of concern is associated with increase in years spent in education and training, especially in the urban, as well as ageing population. The results indicate that main reason for separations of males from the labor force in Turkey appears to be mainly retirement and not death. The rate of separation due to retirement accelerates among males particularly after the age of 50 in 1990 and onwards. The share of mortality rates in total separation rates is higher among males in rural areas. For males of the age group of 50-54 in the rural, 35 percent of separations from the labor market are due to mortality, which decreases to only 12 percent among males in the urban. Share of separations from the labor force through retirement, especially among young working-aged males, in urban areas are found to be higher, possibly as an outcome of early retirement policies regarding the public sector adopted in past periods.

INTRODUCTION

Life tables mainly aim to describe the most important aspects of the state of human mortality (Kpedekpo, 1969); moreover it is used by specialists from various disciplines in several ways. In its simplest form, the entire table can be generated from age-specific mortality rates where mortality, survivorship, and life expectation can be measured. As Shryock et al (1980) mention, in addition to studies of mortality and longevity, life tables are also used in studies of fertility, migration, population growth, population projections, widowhood, orphanhood, nuptiality, working life, disability-free life and contraceptive use. In the applications of the technique mentioned above, the mortality rates in the life table are combined with demographic data from other sources into a more complex model measuring the combined effect of mortality and other socioeconomic characteristics which are of concern. Among the applications of life tables, working life tables have been constructed by a combination of mortality rates with labor force participation rates. Working life tables, in general, model the history of work life of a *hypothetical* cohort, which is assumed to experience current labor force ratios. Multistate models of working life – life table of an increment-decrement type – describe labor force participation as a dynamic process, where individuals enter, leave and re-enter the labor market during their lifetimes (Siegeland and Swanson, 2004). A static multiple decrement life table, which has a single-state system on the other hand, takes mortality, retirement and sometimes disability as mechanisms for leaving the labor force. These tables, which are also called conventional working life tables, provide estimations of the expected average

* Research Assistant, Hacettepe University Institute of Population Studies, Ankara, Turkey.
** Professor Dr., Hacettepe University Institute of Population Studies, Ankara, Turkey.

number of working years at a given age by all persons or by each person in the labor force. Moreover information on accession to and separation from labor force can also be retrieved from these tables (Shryock et al, 1980; Willekens, 1980; Fullerton, 1971).

These measures have useful implications: they allow for studying growth and changes in labor force, activity rates and age-structure which give important economic information. Moreover estimated lifetime expectations of earnings and labor replacement for sectors, most importantly industry, in turn, are essential in forming labor policy, because they provide indications on determining the number of workers to be recruited in future years (in full employment). The labor replacement is equivalent to the total number of entries into the economically active population during the period in question and the estimate of the net increase after allowance is made for losses by death (rate of net accession to the labor force), can be used to predict labor replacement (UN, 1971). Moreover length of working life and size and structure of the economically active population give important information for setting plans for the labor market.

This paper aims to present static working life tables for males in Turkey with a breakdown of type of residence constructed for the years 1980, 1990 and 2000, and to discuss their implications. As will be mentioned in the methodology section, the calculations regarding conventional working life tables are based on the assumption of a unimodel curve of labor force participation, i.e. a curve that rises steadily to a maximum and then declines steadily, no withdrawals from the labor market before the peak age of labor force participation and no new entries to the labor market after the peak age (Schoen and Woodrow, 1980). Since the size and composition of the economically active female population are highly dependent on demographic factors such as marriage, fertility, widowhood and divorce; it can be derived that women have a more complex pattern[1] of entries and separation from the labor force (UN, 1971; Kpedekpo, 1969). Marriage and giving birth, indeed, are the main reason why women leave the labor market and remain outside the market at certain ages[2]. For the construction of working life tables, high-quality demographic and activity statistics must be available, which seems not to be the case for Turkey yet. Therefore we prefer not to present conditional working life tables for females in Turkey in this paper[3].

The tables provide with valuable information for Turkey and its labor market thereafter, especially when limitations of data are considered. Although studies on Turkey using life table technique to analyze mortality patterns particularly are high in number, mostly using indirect methods[4], its applications regarding other socioeconomic variables have been very limited. Only study which uses life table technique to estimate length of working life has been Kurtuluş (1999)'s study, where she estimates average expected active years for males and females in Turkey with specific reference to European Union countries. Taking into account the scarcity of such life table applications of Turkey and limited data, this study at hand becomes a rewarding one.

Corresponding data are retrieved from Turkish Statistical Institute (TURKSTAT)'s publications and demographic software, namely MORTPAK v4, was employed over the construction of the working life tables.

LITERATURE REVIEW

The literature on static working life tables has not been massive, especially in recent decades, although the issue has been a very old one[5]. It is seen that the subject has been very popular in 1960s and 1970s, especially as part of proceedings in national meetings for planning

purposes of policy makers (Siegel and Swanson, 2004). However there are also studies that appear in scientific journals, which are mentioned in this section.

Most of the studies on static working life tables have covered only males due to reasons stated in the previous section. Among these studies, one of the oldest one is Wolfbein (1949)'s on United States for the year 1940. He also uses results for other years to make comparisons. Wolfbein (1949) mentions the importance of the gap between total life expectancy and working-life expectancy (length of inactive years), which is an implicit indication of old-age dependency. His findings suggest that over the past decades before 1949, this gap has been increasing, which means in his own terms "there has been a tendency for gains in work-life expectancy to lag behind the progress in extending the biological life span" (Wolfbein, 1949:291). Numerically, his analysis indicated that in the US, young white males (of age 20) had remained for about three years outside the labor force in 1900 on average, while they remained for 6 years in 1940. Wolfbein (1949) also carries out analyses by race and type of residence. He finds that males living in rural areas have a longer working life on average, of about additional 2.5 years in the labor force when they are aged 20. Non-white youth at age at 20, on the other hand, is found to have 5.5 years less than a white worker on average. According to Wolfbein (1949), main reason for this difference is the differentiation in mortality rates between the two groups. As the conventional way, Wolfbein (1949) assumes separations from the labor force are due to death and retirement. It should be noted that retirement in his terms is a broad heading, which involves retirement due to disability, entry into an institution, voluntary retirement on a pension or annuity and lack of employment opportunities.

Another study on conventional male abridged working life tables is carried out by Swee-Hock (1965), for Malaya for three major ethnicities: Malays, Chinese and Indians, and all for year 1957. He uses 10-14 instead of 15-19 as the initial age group to enumerate the working population in his analysis. His findings show that average expected working life was 50.4 years for a male of age 10-14 in Malaya in 1957. This value is slightly lower for Malays and slightly higher for Chinese and Indians, mainly due to higher mortality rates among Malays. Consequently losses from the working population due to causes other than death (such as retirement, disability, etc.) are larger among Chinese and Indians, where the former has higher losses.

Kpedekpo (1969) constructs abridged working life tables for males in Ghana for year 1960. Kpedekpo (1969) finds that in Ghana in 1960, most of the separations from labor force have been due to death (with 89.9 percent) followed by causes other than death (with 10.1 percent). He also provides comparisons with data from different countries of USA, UK and Tunisia. At the first glance it is seen that labor force participation rates for males aged 65 and over in Ghana and Tunisia are almost twice as many as in USA and UK. However the expectation of working life of a male at age 15 is less in Ghana than in USA or in UK, which is expected to be due to higher mortality in Ghana. Kpedekpo (1969) also estimates losses from male working population in Ghana in 1960 in absolute numbers decomposed into causes of death and retirement. When compared with Malaya and Great Britain, Ghana seems to have lower losses than Malaya in absolute terms. However in percentages, total losses in the working population appear to be highest in Ghana, mainly due to death rather than retirement. Among 1000 losses, 20.9 occur due to death in Ghana, while this amount is 10.4 for Malaya and 8.4 for Great Britain.

Schoen and Woodrow (1980) construct labor force status life tables for the US for 1972 using data from Population Surveys of 1972 and 1973. They calculate increment-decrement working life tables (for both males and females) in addition to conventional working life tables (for only males). They find that for males, the conventional table shows 1.4 years longer working life

expectancy at age 16 than does the increment-decrement table. They mention that the conventional table is influenced by the experience of earlier years, whereas increment-decrement life table reflects the retirement rates more fully. The increment-decrement working life tables the authors construct allow them to make comparisons between males and females: Labor force participation pattern of males has a single peak during their 30s, whereas females' working life pattern appears to be bimodal with peaks at ages of 22-23 (with 62 percent) and 40 (with 60 percent). Throughout their lives, males are expected to spend 57 percent of their lifetime in the labor force, and females, 32 percent. However despite the difference in the levels, males and females have similar age patterns of labor force participation. Another study that uses increment-decrement working life tables is of Hayward and Grady (1990)'s. The authors analyze the work and retirement among a cohort of old males in the US between 1966 and 1983. They use data from the National Longitudinal Survey of Mature Males (NLS). The main methodological difference of this study is the use of multivariate hazard models defined for each type of transition (from participation to retirement, disability and death, and from nonparticipation to labor force reentry and to death), where education, race, marital status, region of residence and rural-urban residence are controlled for. Once the transition rates are computed using these models, increment-decrement working life tables are constructed for different subpopulations. The main conclusion of this study is that the homogeneity assumed in traditional working life tables is not very realistic since the labor force experiences of these groups are stratified.

Working life tables have also been used as a tool for analyzing specific research questions as in Reimers (1976)'s study, where she investigates whether men in the US are retiring in younger ages based on the fact of declining labor force participation rates among older men. She concludes that conditional mean retirement age did not decline over time, but the variance decreased among four cohorts of males born in 1866-1900 (aged 50-75).

There are also studies based on the methodology of working life tables which cover the examples for countries of the United States for years 1982 and 1086, United Arab Republic for the year 1960 and Thailand for years 1966 and 1971 (Swansen et al, 2004; Shyrock et al, 1980; UN, 1971).

For Turkey, there is a unique study by Kurtuluş (1999) where she develops working life tables for males and females for 1975-1990 period and projects activity rates for Turkey compared with rates in European Union countries. Her findings indicate that average expected active years for survivors declined from 1975 to 1990 and the retirement rate increased during younger ages. For a male aged 35-39, average expected active years were 31.4 in 1975, 27.7 in 1980, 26.8 in 1985 and 27.2 years in 1990. As Kurtuluş (1999) emphasizes, the small increase in 1990 was due to increase in life expectancy for that age group. The non-unimodal and unclear pattern of labor force participation among females is once again mentioned by Kurtuluş (1999), where women in Turkey are found to leave labor market in ages of 20-39 and reenter in ages of 40-49.

DATA

A specific indicator which is needed to construct a working life table is the "age-specific labor force participation rate"s (w_x). Labor force participation rate is defined as the ratio of the labor force (employed and unemployed but seeking work) in a 5-year age group to the corresponding population in that age group. The number of persons employed includes those who "performed during the reference period (last week) some work (for at least one hour) for wage or salary, for profit or family gain, in cash or in kind and were temporarily jobless during the reference period but had a formal attachment to their job" by definition (SIS, 1990). It is seen that paid employment and

unpaid family labor are covered in this definition. "Unemployed but seeking work" includes the persons who were unemployed seeking a job for less than one month, for one to six months and more than six months during the reference period. The latter definition has changed after the revision which took place in 1988. After 1988, period for seeking job has been limited to last three months for defining the unemployed but seeking work.

Years selected for the analysis are 1980, 1990 and 2000. In Turkey, more sophisticated and comparable household labor surveys have been carried out periodically (twice later three and four times a year) since 1988. Therefore the year of 1988 is a break point for data on labor force participation rates in Turkey, where sampling, definitions and settlement types used in the surveys carried out by Turkish Statistical Institute (TURKSTAT) was transformed. This brings a major limitation to the analysis of working life tables for the years before 1988: for this study 1980. For 1990 and 2000, the LFP rates with a three-level breakdown (data on LFP rates for urban males and rural males by five-year age groups) were retrieved from TURKSTAT's database online without much effort.

Before 1988, on the other hand, information about the structure of economically active population in Turkey was compiled from Censuses of Population carried out every five-years *and* household labor surveys. Prior to 1985, household labor surveys were carried out in settlements with population 10,001 and over. Only the 1985 household labor survey covered both urban and rural areas in 302 settlements. Therefore for the year 1980, rural percentages should be retrieved from census results, instead of the survey. One further problem with the survey is that the LFP rates are provided by *ten-year* interval of age groups (SIS, 1983) for the year 1980 (and other years). Due to this limited data available from the household labor surveys prior to 1988, we used 1980 Census data for both urban and rural areas, which provide numbers for economically active population during the last week of the Census (reference period). Using data from Census for the year 1980 and data from labor force surveys for the years 1990 and 2000 do not cause serious problems in terms of comparability since the definitions are the same for all as mentioned in the Statistical Yearbooks of SIS (1990). One further thing to note about the data is that we excluded unknowns in the Census of Population of 1980. We also subtracted the number of unemployed persons seeking a job for more than six months from the computation of unemployed but seeking work because the period for seeking job has been limited to last three months for defining the unemployed but seeking work for 1988 and onwards.

One problem with application of working life table to real-world *data* is that the labor force participation (LFP) rate is assumed to have a peak value in middle age-groups (which will be set as 35-39 in this study; see the following section for details) and this may not be the case for real data (due to data inaccuracy or definition-related issues). For instance, LFP rates for males in the urban areas in 1980 and in 1990 reach a peak in the age-interval of 30-34 with values of 94.9 and 98.4, which necessitated smoothing for data at these points. We employed linear type of interpolation in these two cases[6].

METHODOLOGY

This study employs the procedure described in Shryock et al (1980). This method "distributes the life table stationary population according to the work status of the actual population at the same age". This necessitates that single decrement life tables should be constructed in the first instance, where decrement occurs only due to death.

Calculating Mortality Rates: Single Decrement Life Tables

Software Mortpak v4, which is written by the UN is used to construct single decrement life tables for: urban males and rural males for the years 1980, 1990 and 2000 in Turkey, adding up to six life tables[7]. As input data to be used in Mortpak application, infant mortality rates were needed for males with urban-rural breakdown. Infant mortality rates were retrieved from the corresponding surveys carried out by Hacettepe University Institute of Population Studies (HUIPS 1987; MoH et al, 1994 and HUIPS, 2004). These reports provided with infant mortality rates in the urban-rural breakdown, whereas only for both sexes combined (figures for the five years preceding the surveys). Although rates for males individually for annual basis cannot be calculated due to insufficient data, these can be estimated for five years preceding the survey as Toros suggests (2000). The procedure Toros uses, to separate combined infant mortality rates into males and females, makes use of sex-specific infant mortality rates (IMRs) (which are provided in the reports corresponding to ten years preceding each survey except 1983 Survey) and sex ratio at birth. Because of data limitation of 1983 Population and Health Survey, we could not apply Toros' method to this survey's IMR. Instead we assumed that IMR is proportional to population size in consideration such that urban infant mortality rate for both sexes is 58.4 per thousand (which we took as the average of sex-specific infant mortality rates for urban). In the age interval 0-1 there are 541853 male infants and 518322 female infants. When IMR is assumed to be directly proportional to size, IMR for males is estimated as 59.7 and for females as 57.1 and their average is 58.4. Although this is a very straightforward and simple approximation, when compared with Toros' estimations for years 1993 and 2003, the difference appears to be negligible. For years, 1990 and 2000; to apply Toros' method, sex ratio at birth is needed, which we retrieved from censuses of 1990 and 2000, respectively. One thing that should be noted is that we assumed sex ratio at birth to be the same in urban and rural to make calculations less complicated. Considering that practice of infanticide is not a characteristic of Turkey, it seems reasonable to assume sex ratio at birth is independent of the type of residence. When checked with data, this assumption is also verified (for instance for Turkey in 1980, sex ratio at birth is 1.04540, and for rural it is 1.04030 for the same year). Infant mortality rates for males are estimated as shown in Table 1:

Table 1. Estimated infant mortality rates for males in Turkey (per thousand)[8]

	Year		
Residence	**1980**	**1990**	**2000**
Urban	59.70	45.42	23.89
Rural	127.26	67.51	40.51

Moreover Mortpak MATCH application requires a model life table to choose. According to Toros (2000), least variations (indicated by index of similarity) are observed in the West family of model life tables for males in his analysis for Turkey in 1990-2000. Therefore we chose Coale-Demeny *West* model life table as the pattern for *males*[9].

Working Life Tables: Multiple Decrement Life Tables

As mentioned previously, the methodology described in Shryock et al (1980: 456-458) and this section mainly drives upon this source. We constructed abridged working life tables with five-year age intervals, with a minimum of 15-19 and a maximum of 65+ groups of age. The constructions of working life tables are based on some assumptions, which may not seem to be realistic but they attempt to simplify the actual situations (taken from UN, 1971:36):

i. All entries into the economically active population occur before the age at which activity rates attain their maximum value, i.e., generally between ages 35 and 39;
ii. There are no separations from the economically active population before this age for reasons other than death, i.e., no survivors retire at an age at which new entrants are still being recruited;
iii. After this age, separations may be due to retirement or death;
iv. There is only one entry and one separation per worker, i.e, no entry is followed by a separation and subsequent re-entry;
v. Age-specific mortality rates are the same for active and inactive persons, i.e. age-specific mortality rates of the general population and the labor force are the same.

The first assumption is not always satisfied with real data, as occurred to be the case with the data used in this study in two instances. We carried out needed smoothing to overcome this problem. It should be noted that these assumptions seem to be applicable to male populations and the adjustments did not affect the patterns at all.

The functions of a working life table are represented below:

${}_nw_x$: age-specific worker rate or activity rate, or the percentage of the population in the labor force for any age group.

${}_nL_x$: the number of persons in the stationary population *who at any moment* are living within the indicated *age interval*.

${}_nLw_x$: the labor force under the prevailing activity rates, or the number of persons in the stationary population expected to be in the labor force at each age group.

$$ {}_nLw_x = {}_nL_x \cdot {}_nw_x $$

${}_nLw_x$*: the number of persons in the stationary population who would hypothetically be active if the worker rate in every age group under the age group of 35-39 years were the same as in the age interval of 35-39 years.

$$ {}_nLw_x^* = {}_nL_x \cdot {}_5w_{35} $$

l_x: The number living per 100,000 population born alive, that is, the number of survivors *at* age *x* from 100,000 live births.

lw_x: The number living, per 100,000 born alive, who form part of the economically active population, that is, the percentage of the economically active population multiplied by the number of survivors at age *x* per 100,000 live births;

$$ lw_x = l_x \cdot {}_nw_x $$

lw_x*: the number of survivors at age x who would hypothetically be in the labor force if the activity rate *at x* under 35-39 years (where the activity rate reaches a peak) were the same as in the age interval of 35-39 years;

$$ lw_x^* = l_x \cdot {}_5w_{35} $$

T_x: the number of persons in the population who at any moment are living within the indicated age interval and all higher age intervals, i.e. after the beginning of the indicated age interval.

$$T_x = \sum_{x=15}^{65+} {}_5L_x$$

Tw_x: the number of economically active persons in the population who at any moment are living and are economically active within age x and all higher ages, i.e. the remaining man-years in the labor force in the year of age and later years.

$$Tw_x = \sum_{x=15}^{65+} {}_5Lw_x$$

Tw_x*: the remaining years in the labor force at age x including the hypothetical ${}_nLw_x$* values for ages under 35-39 years (under 35 years).

$$Tw_x^* = \sum_{x=15}^{65+} {}_5Lw_x^*$$

e^0w_x*: the average remaining number of years of working life for economically active or for all (expectation of working life) survivors at the beginning of year of age, it is computed from the values of Tw_x* and the numbers of economically active survivors at ages under 35 (35-39 interval) (lw_x*):

$$e^0w_x^* = \frac{Tw_x^*}{lw_x^*}$$

For ages (and age intervals) 35 and over

$$e^0w_x^* = \frac{Tw_x}{lw_x}$$

e^0_x: the average number of years of life (complete expectation of life) remaining at the beginning of year of age x

$$e_x^0 = \frac{T_x}{l_x}$$

e^0w_x**: the average remaining number of inactive years of life for persons in the labor force *At age x*, it is calculated as the difference between e^0_x and e^0w_x*

$$e^0w_x^{**} = e_x^0 - e^0w_x^*$$

1,000 ${}_nQ_x$: mortality rate for 1,000 persons in an age group during an interval of one year (calculated as the central death rate, age-specific death rate, ${}_nM_x$ in another notation)

$$1{,}000\ {}_nQ_x = \frac{l_x - l_{x+n}}{{}_nL_x} \cdot 1{,}000$$

1,000 ${}_nA_x$: the rate of net accessions to the labor force between consecutive age intervals, i.e. the probability that persons in the age interval will enter the labor force over the next interval. The rate is derived as the net increase in the stationary labor force per 1,000 persons in the stationary population after allowing for mortality or workers during the year ($lw_x.{}_nQ_x$)

$$1{,}000\ {}_nA_x = \frac{lw_{x+n} - lw_x + lw_x \cdot ({}_nQ_x)}{{}_nL_x} \cdot 1{,}000$$

1,000 ${}_nQ^s{}_x$: the separation rates from the stationary labor force due to all causes, i.e. separations from the economically active population (number, rate per 1,000 of economically active population) due to all causes. It presents the probability that persons in the age interval will leave the labor force over the next interval. It is computed as a ratio of the difference between the stationary labor-force between consecutive age intervals to the labor force in the age interval:

$$1{,}000\ {}_nQ^s{}_x = \frac{lw_x - lw_{x+n}}{{}_nLw_x} \cdot 1{,}000$$

For ages under 35 (under 35-39 age group), it is assumed that death is the only cause of labor force separations as mentioned in assumption ii, therefore

${}_5Q^s{}_{15}$ *to* ${}_5Q^s{}_{35} = {}_5Q_{15}$ to ${}_5Q_{35}$

1,000 ${}_nQ^d{}_x$: the rates of separation from the labor force due to death under the assumption that the age-specific death rates for persons in the labor force are the same as those for all persons (assumption v), i.e. separation from the economically active population (number, rate per 1,000 of economically active population) through death.

$${}_nQ^d{}_x = \frac{{}_nQ_x(2 - {}_nQ^s{}_x)}{2 - {}_nQ_x}$$

Deaths following retirement during the interval are excluded in ${}_nQ^d{}_x$, which is its difference from ${}_nQ_x$.

1,000 ${}_nQ^r{}_x$: the rates of separations from the labor force through retirement (retirement is assumed to occur after age 35; assumption iii).

$${}_nQ^r{}_x = {}_nQ^s{}_x - {}_nQ^d{}_x$$

The six working life tables, urban male and rural male life tables for the years 1980, 1990 and 2000 are constructed according to the functions explained above. Summary tables for the abridged life tables are given in the following section where findings are discussed.

RESULTS AND DISCUSSION

Descriptive figures for years 1980, 1990 and 2000 that represent the smoothed labor force participation rates for males by five-year age groups between ages 15 and 65 (and over) are presented in Figure 1, Figure 2 and Figure 3, respectively. Labor force participation rates were smoothed so that the rate reaches a peak in the age interval of 35-39 and a linear trend was assumed to correct for the outliers.

The main trend observed is that for males, in 1980, labor force participation rates in the rural were higher than the rates for males in the urban for all age groups. This situation changed onwards: In 2000, for the age group of 25-39 years, male urban rates became higher than the corresponding rural rates. This is also verified by the declining level in rural areas from 1980 to 2000. Urban male labor force participation rates, on the other hand, declined slightly for most age groups, whereas for ages of 25-44, the rates remained more or less at the same level. Increasing migration from rural to urban areas, especially among young males, may be responsible for these changes in urban-rural patterns.

Figure 1. Labor force participation rates for males in urban and rural areas Turkey, 1980, by age groups

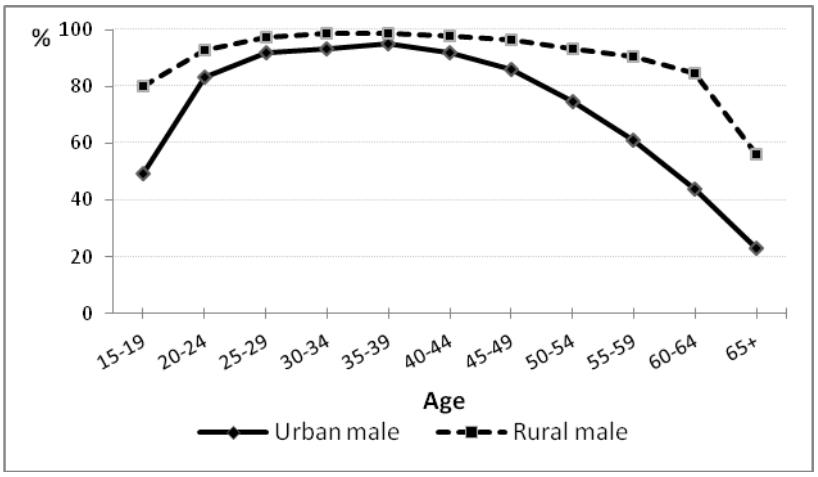


Figure 2. Labor force participation rates for males in urban and rural areas Turkey, 1990, by age groups

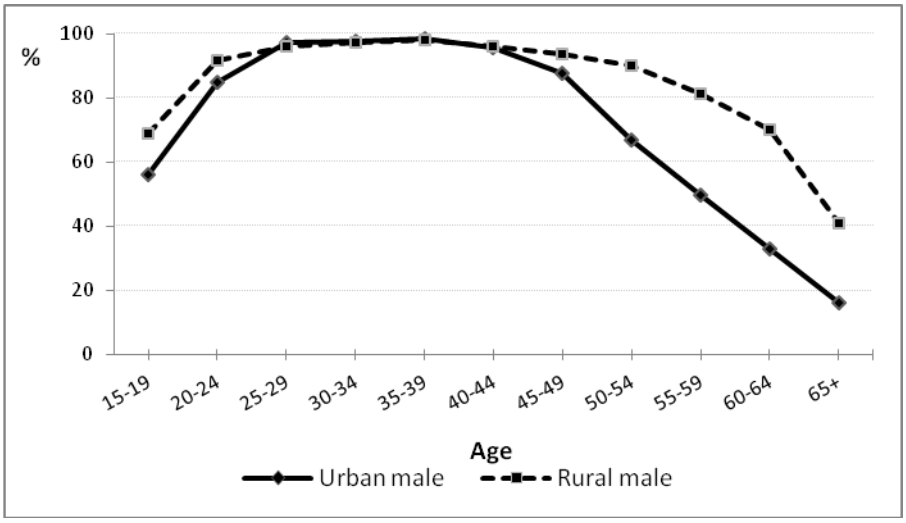
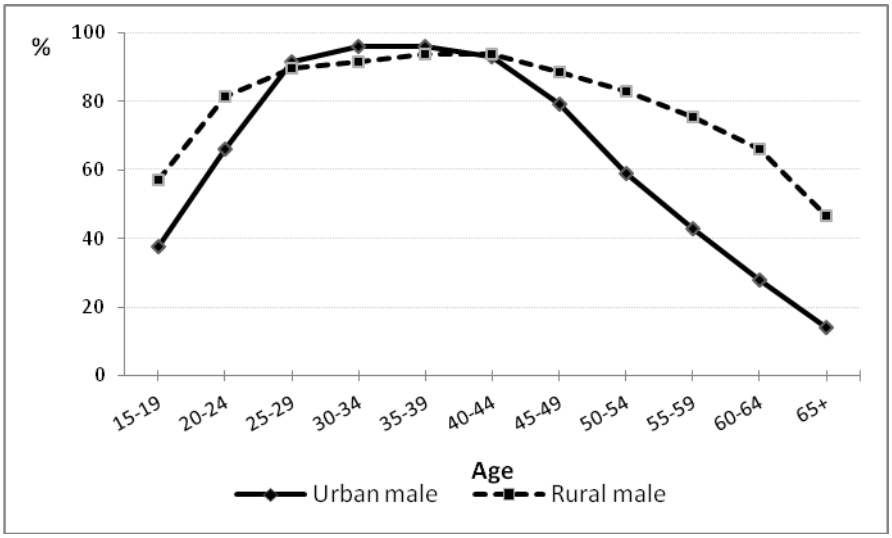


Figure 3. Labor force participation rates for males in urban and rural areas Turkey, 2000, by age groups



The following two tables give information on the length of working lives which is a measure for improving the data on the dynamics of the labor force and is determined by the level and duration of labor force participation and by mortality. The indicator presented in the following two tables (Table 2 and Table 3) is the net years of working life, which also takes into account losses due to mortality. One advantage about this indicator's measurement is that it requires only population numbers and activity rates (UN, 1971:38). The age limits of the working life span are set at fifteen and sixty-five years. It should be noted that, in the life tables we constructed we had the final age group open, which led to "0" inactive years remaining for the oldest age group, i.e. the most elderly group turned out to be expected to be economically active until they die, which seems to have no logical interpretation. The expected average working life (active years) becomes less meaningful at the upper ages as Wolfbein (1949) also notes, when a high proportion of the population has already left the labor market. The age group 60-64 already satisfies the upper age limit for the definition of being "economically active" in demographic terms. Therefore we do not present average net years of working life and inactive years for the open-age group in the tables or figures.

"The measure of average net years of working life, taking into account both the level of economic activity and the mortality rate; represents the number of working years for a generation including persons whose working life is curtailed by death before they reach retirement age." (UN, 1971: 39). The average net years of working life for survivors at age 62.5 are found to be around 11 (±2). This seems to be a high figure for that age group. However the definition of "labor force" should also be considered when interpreting the results. As to note, unpaid family workers, and the unemployed seeking job are also included in the economically active population. This may be one of the reasons for this high value.

Table 2. Years of working life for males living in the urban areas, Turkey 1980, 1990 and 2000

Ages (x and x+n)	*Activity rate between ages x and x+n (percent)*	*Survivors between ages x and x+n* ($_nL_x$)	*Survivors at exact age* (lw_x*)	*Years of working life of survivors between ages x and x+n* ($_nLw_x$*)	*Total years of working life remaining at exact age x* (Tw_x*)	*Average net years of working life remaining at exact age x* (e^0w_x*)	*Inactive years (Complete expectation of life (minus) expectation of active life)*
(1)	**(2)**	**(3)**	**(4)**	**(5) = (2)*(3)**	**(6)**	**(7) = (6)/(4)**	**(8)**
				1980			
15	49.5	452,950	86,383	429,971	3,633,941	42.068	10.945
20	83.1	447,615	85,547	424,907	3,203,970	37.453	11.051
25	92.0	441,314	84,380	418,926	2,779,063	32.935	11.204
30	93.5	434,660	83,176	412,609	2,360,136	28.375	11.366
35	**94.9**	426,883	81,833	405,227	1,947,527	23.799	11.553
40	91.7	416,957	77,487	382,452	1,542,300	19.904	11.118
45	86.0	403,425	70,646	346,769	1,159,848	16.418	10.395
50	74.6	384,382	58,905	286,602	813,079	13.803	8.985
55	61.0	357,523	45,430	218,038	526,477	11.589	7.418
60	43.7	320,345	29,818	140,115	308,439	10.344	5.181
65+	22.8	738,034	13,583	168,324	168,324	..	..
				1990			
15	55.9	465,984	91,929	458,062	3,747,936	40.770	13.923
20	84.7	461,749	91,244	453,899	3,289,874	36.056	14.027
25	97.4	456,809	90,288	449,043	2,835,975	31.410	14.176
30	97.9	451,657	89,320	443,979	2,386,932	26.723	14.330
35	**98.3**	445,570	88,242	437,995	1,942,953	22.018	14.505
40	95.6	437,532	84,508	418,280	1,504,958	17.809	14.240
45	87.7	425,955	75,863	373,563	1,086,677	14.324	13.369
50	66.9	408,775	55,993	273,470	713,115	12.736	10.796
55	49.8	383,433	39,613	190,949	439,645	11.098	8.523
60	32.9	347,102	24,169	114,196	248,695	10.290	5.737
65+	16.2	830,238	10,519	134,499	134,499	..	..
				2000			
15	37.8	482,882	92,986	464,050	3,789,898	40.758	17.200
20	66.0	480,466	92,603	461,728	3,325,848	35.915	17.271
25	91.5	477,711	92,074	459,080	2,864,120	31.107	17.370
30	95.9	474,872	91,553	456,352	2,405,040	26.269	17.469
35	**96.1**	471,442	90,969	453,056	1,948,688	21.421	17.581
40	92.9	466,599	87,206	433,470	1,495,632	17.150	17.158
45	79.1	458,825	73,307	362,931	1,062,162	14.489	15.227
50	58.8	446,064	53,326	262,285	699,231	13.112	12.195
55	43.0	425,416	37,616	182,929	436,946	11.616	9.522
60	27.9	393,531	22,964	109,795	254,017	11.061	6.235
65+	14.0	1,030,154	10,446	144,222	144,222	..	..

Table 3. Years of working life for males living in the rural areas, Turkey 1980, 1990 and 2000

Ages (x and x+n)	*Activity rate between ages x and x+n (percent)*	*Survivors between ages x and x+n* ($_nL_x$)	*Survivors at exact age* (lw_x*)	*Years of working life of survivors between ages x and x+n* ($_nLw_x$*)	*Total years of working life remaining at exact age x* (Tw_x*)	*Average net years of working life remaining at exact age x* (e^0w_x*)	*Inactive years (Complete expectation of life (minus) expectation of active life)*
(1)	**(2)**	**(3)**	**(4)**	**(5) = (2)*(3)**	**(6)**	**(7) = (6)/(4)**	**(8)**
			1980				
15	80.0	392,564	78,197	387,297	3,376,069	43.174	3.356
20	93.0	382,992	76,628	377,854	2,988,772	39.004	3.425
25	97.6	371,481	74,443	366,497	2,610,918	35.073	3.526
30	98.5	359,149	72,124	354,330	2,244,422	31.119	3.639
35	**98.7**	345,209	69,556	340,578	1,890,091	27.174	3.773
40	97.8	328,824	66,003	321,519	1,549,513	23.477	3.732
45	96.3	309,327	61,530	297,750	1,227,994	19.958	3.630
50	93.5	285,486	55,777	266,880	930,244	16.678	3.408
55	90.7	256,060	49,271	232,173	663,364	13.463	3.337
60	84.7	219,752	40,539	186,155	431,191	10.637	3.091
65+	56.1	437,164	22,308	245,036	245,036	..	..
			1990				
15	68.7	445,886	88,019	437,860	3,993,040	45.366	6.780
20	91.7	439,979	87,060	432,060	3,555,180	40.836	6.854
25	96.0	432,973	85,722	425,180	3,123,120	36.433	6.961
30	97.3	425,542	84,333	417,883	2,697,941	31.992	7.076
35	**98.2**	416,901	82,782	409,397	2,280,058	27.543	7.208
40	96.2	406,024	79,258	390,595	1,870,661	23.602	6.895
45	93.7	391,533	74,869	366,867	1,480,066	19.769	6.596
50	89.9	371,603	68,803	334,071	1,113,199	16.180	6.230
55	81.4	344,075	58,491	280,077	779,128	13.320	5.376
60	69.9	306,619	45,745	214,327	499,051	10.909	4.361
65+	41.1	692,759	23,351	284,724	284,724	..	..
			2000				
15	57.2	469,669	88,482	441,019	4,238,332	47.901	7.309
20	81.6	465,788	87,881	437,375	3,797,313	43.210	7.359
25	89.6	461,273	87,045	433,135	3,359,938	38.600	7.430
30	91.6	456,545	86,200	428,696	2,926,803	33.954	7.502
35	**93.9**	450,925	85,251	423,419	2,498,107	29.303	7.586
40	93.9	443,402	84,059	416,355	2,074,688	24.681	7.694
45	88.7	432,368	77,815	383,510	1,658,334	21.311	6.670
50	82.9	415,764	70,494	344,668	1,274,823	18.084	5.699
55	75.3	390,977	60,993	294,406	930,155	15.250	4.585
60	66.1	355,101	49,588	234,722	635,749	12.821	3.384
65+	46.6	860,575	31,019	401,028	401,028	..	..

A summary table (Table 4) is provided below where e^0w_{15}* values are given for males. It indicates that a male who enters the labor force at the age of 17.5 spends over 40 years of his life in the labor force. The urban values are lower, which may be due to lower activity rates in the urban. This finding has two implications: if the low values are due to high mortality among the economically active population -which is less likely to be relevant to urban Turkey- precautions should be taken such as improving general health and social conditions in the urban, which are the main determinants of mortality in most developing countries. If it is due to low accession rates to the labor force (or low activity rates), reasons behind this pattern should be investigated further, such as "why are urban activity rates lower than rural activity rates for men?". For instance this may be due to exogenous factors in the economy as well as the structural difference of agricultural work when compared with works of other sectors.

When the values are high as in rural areas, (close to 50 in 2000, which mean full employment for a person through his/her lifetime), this labor supply necessitates such a labor market that can absorb such a big labor demand. Otherwise unemployment in the country would be higher, which would have some other unpleasant consequences for the economy as well as the society.

Table 4. Summary table for average net years of working life (e0w15*) and inactive years remaining at exact age 15

	Average Net Years of Working Life		Inactive Years	
Year	*Urban*	*Rural*	*Urban*	*Rural*
1980	42.068	43.174	10.945	3.356
1990	40.770	45.366	13.923	6.780
2000	40.758	47.901	17.200	7.309

The gap between total life expectancy and working life expectancy, i.e. inactive years, which reflects the problem of old-age dependency (Wolfbein, 1949), among males has widened in Turkey in three decades between 1980 and 2000. This trend may be due to the structural transformation of the economy and occupations, where more capital based production schemes have been employed in rural areas, which in turn have given way to internal migration from rural to urban areas. On the other hand, the larger increase in inactive years among males living in urban areas may be due to exogenous factors such as unemployment or business cycles in line with increasing complete expectation of life among males and high retirement rates. A 17.5 year old male working in an urban area had, on average, an additional life span of 55 years in 1990, or about three years less than in 2000. His expected working life, on the other hand, were the same in 1990 and 2000 with 41 years. Hence, on average, he could expect 14 years outside the labor market in 1990 as compared with 17 years in 2000. Same tendency is also observed among males in rural areas.

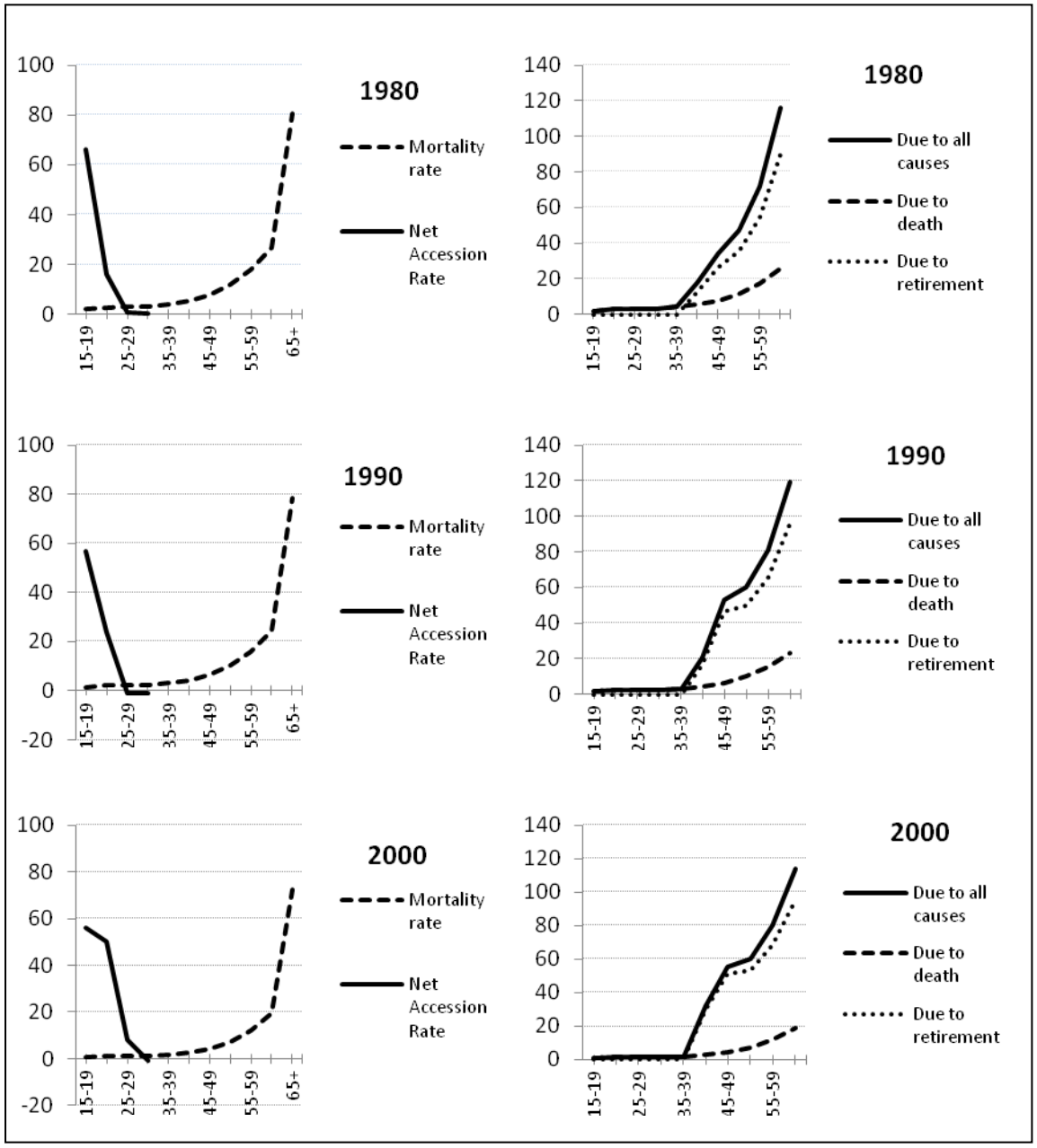
The comparison by type of residence indicates that inactive years are about 10 years longer for a male aged 17.5 living in an urban area, when compared with his counterpart in a rural area in year 2000. This difference may be due to structural differences between urban and rural occupations, where men in rural areas begin working at an earlier age and leave the labor market (retire) at older ages than urban workers and hence retire at lower rates during high-middle ages. As Wolfbein (1949) argues the farm work is much more flexible, therefore workers in rural areas work unless they die or have serious disabilities. Another explanation seems to be higher rates of participation in higher education and training programs for jobs in urban areas. This difference does not appear to be due to longetivity since the complete expectation of life for a male living in urban areas in the 15-19 age group is three years longer and not shorter than of the life of the one residing in the rural.

The findings represented onwards in Table 5, Table 6, Figure 4, and Figure 5 further dig into these dynamics by type of residence by providing the rates of mortality, accessions to the labor force and separations from the labor force due to death, retirement and their composite: due to all causes. The rates are given in “per thousand” (‰) terms. Under each table, two graphs are provided to see the rates and their relative values more clearly. The final open age group of 65+ is excluded from the graphs due to reasons mentioned in endnote numbered 15.

Table 5. Mortality rates, rates for accession to and separation from labor force for males living in the urban areas, Turkey 1980, 1990 and 2000 (‰)

Ages (x and x+n)	*Activity rate between ages x and x+n (percent)*						*Separations from the labor force per 1,000 in the labor force in year of age*		
x	${}_nw_x$	*Average remaining years of active life* e^0w_x*	*Complete expectation of life* $e^0{}_x$	*Inactive years* e^0w_x**	*Mortality rate per 1000 living in year of age* $1{,}000{}_nQ_x$	*Accessions to the labor force per 1000 living in the year of age* $1{,}000{}_nA_x$	*Due to all causes* $1{,}000{}_nQ^s{}_x$	*Due to death* $1{,}000{}_nQ^d{}_x$	*Due to retirement* $1{,}000{}_nQ^r{}_x$
					1980				
15	49.5	42.068	53.012	10.945	1.9	66.1	1.9	1.9	0.0
20	83.1	37.453	48.504	11.051	2.7	15.9	2.7	2.7	0.0
25	92.0	32.935	44.139	11.204	2.9	0.8	2.9	2.9	0.0
30	93.5	28.375	39.742	11.366	3.3	0.5	3.3	3.3	0.0
35	**94.9**	23.799	35.352	11.553	4.0	..	4.0	4.0	0.0
40	91.7	19.904	31.022	11.118	5.5	..	17.9	5.5	12.4
45	86.0	16.418	26.813	10.395	7.9	..	33.9	7.8	26.1
50	74.6	13.803	22.788	8.985	11.7	..	47.0	11.5	35.5
55	61.0	11.589	19.007	7.418	17.7	..	71.6	17.2	54.4
60	43.7	10.344	15.525	5.181	26.9	..	115.9	25.7	90.2
65+	22.8	..	12.392	..	80.7	..	80.7	80.7	0.0
					1990				
15	55.9	40.770	54.693	13.923	1.5	56.7	1.5	1.5	0.0
20	84.7	36.056	50.083	14.027	2.1	23.8	2.1	2.1	0.0
25	97.4	31.410	45.586	14.176	2.2	-0.8	2.2	2.2	0.0
30	97.9	26.723	41.053	14.330	2.4	-1.0	2.4	2.4	0.0
35	**98.3**	22.018	36.523	14.505	3.1	..	3.1	3.1	0.0
40	95.6	17.809	32.049	14.240	4.3	..	20.7	4.3	16.4
45	87.7	14.324	27.693	13.369	6.6	..	53.2	6.4	46.8
50	66.9	12.736	23.532	10.796	10.2	..	59.9	9.9	50.0
55	49.8	11.098	19.621	8.523	15.9	..	80.9	15.3	65.5
60	32.9	10.290	16.027	5.737	24.6	..	119.5	23.4	96.1
65+	16.2	..	12.786	..	78.2	..	78.2	78.2	0.0
					2000				
15	37.8	40.758	57.958	17.200	0.8	56.0	0.8	0.8	0.0
20	66.0	35.915	53.186	17.271	1.1	50.2	1.1	1.1	0.0
25	91.5	31.107	48.477	17.370	1.1	7.9	1.1	1.1	0.0
30	95.9	26.269	43.738	17.469	1.3	-0.6	1.3	1.3	0.0
35	**96.1**	21.421	39.003	17.581	1.7	..	1.7	1.7	0.0
40	92.9	17.150	34.309	17.158	2.6	..	32.1	2.5	29.5
45	79.1	14.489	29.716	15.227	4.3	..	55.1	4.2	50.8
50	58.8	13.112	25.308	12.195	7.2	..	59.9	7.0	52.9
55	43.0	11.616	21.138	9.522	12.1	..	80.1	11.7	68.4
60	27.9	11.061	17.297	6.235	19.6	..	114.0	18.6	95.4
65+	14.0	..	13.806	..	72.4	..	72.4	72.4	0.0

Figure 4. Mortality rates, rates for accession to and separation from labor force for males living in the urban areas, Turkey 1980, 1990 and 2000 (‰)



Rates for males living in the urban areas indicate that accession rates follow an expected pattern. Retirement is the main factor for separation from the labor force in all ages among males in Turkey working in the urban. The rate of separation due to retirement accelerates after the age of 50 in 1990 and onwards, where the slope of this function changes. In 2000, among separations of males in the age group of 50-54 from the labor market in the urban, 88 percent occurs due to retirement and 12 percent due to death. For urban males of the age group 60-64, 16 percent of separations are due to mortality and 84 percent due to retirement. The share of mortality rate in total separation rate is clearly higher among males in rural areas: For males of the age group of 50-54 in the rural, 35 percent of separations from the labor market are due to mortality, which increases to 39 percent in the age group 55-59. The high rate of separations from the labor force through retirement among males in urban areas is also reflected in long inactive years when compared to

rural males. 30 in 32 separations from the labor market in 1000 economically active population are due to retirement among urban males in the age group of 40-44. The rates are 11 per thousand and 15 per thousand for males aged 40-44 residing in the rural. The main reason for high retirement rates among young working-age urban males seems to result from the early retirement policies regarding the public sector that were in effect until 2002 (Tunalı, 2004). Prior to 2002, women, who worked continuously for 20 years, could become retired at the age of 38 and males could retire once they worked for 25 years and became at least 43 years old. According to the new law, minimum age at retirement is increased to 60 for males and to 58 for females (*ibid*).

Considering the window of opportunity in terms of Turkey's stage in demographic transition, employment opportunities for the working-age population are crucial in shaping future outcomes (Koç et al, 2010). The potential benefit from the high number of working-age population that can be made use of in Turkey can lead to actual benefits provided that unemployed population participate the labor force. The high separation rates from the labor force through reasons other than death, especially in the urban, indicate the high potential of unemployed workers in Turkey, which one may call "missing workers".

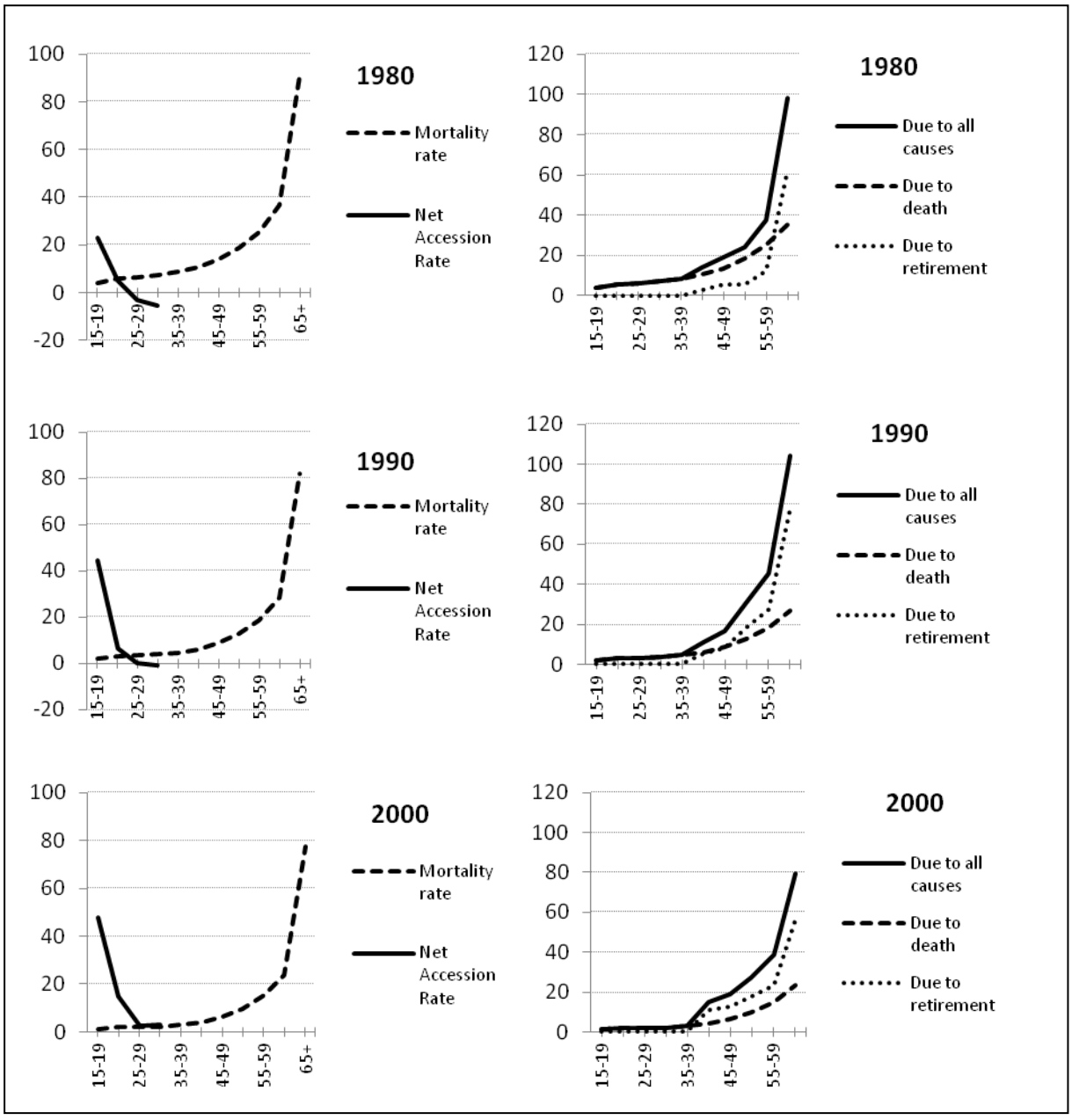
The rates of net accessions to the labor force between consecutive age intervals are much lower among males in the rural. Among this group, accession rates are sometimes negative and decline steeper. One possible explanation for this fact is the internal migration from rural to urban areas especially among young males. It should be noted that since migration is an event that we cannot control for by employing a static working life table, this interpretation can only be made intuitively. The figures provide evidence for this explanation to some extent: Since 1980s, employed export-oriented growth policies caused increased need for more labor force for the industrial sector located in the peripheries of urban areas and the services sector deployed in urban areas. Therefore labor force migration from rural to urban areas increased more rapidly. This structural transformation bringing forward rural-to-urban migration has been the main cause of urbanization in Turkey (Koç et al, 2010). First half of 1980s witnessed relatively high figures for rural-to-urban migration. Among all internal migration flows, rural-urban migration constituted 22.5 percent in 1980-1985 period, whereas it leveled off at 18.0 and 17.5 percent for the periods of 1985-1990 and 1995-2000, respectively (Eryurt, 2010). Male migration outnumbered female migration: 53.7 percent of the population who migrated from rural to urban areas were males for the 1985-1990 period. For the same period, percentage of male migrants of the working age population, were highest at the age groups of 15-19, 25-29 and 20-24, respectively with 16.2, 13.0 and and 12.7 percent (Kocaman, 1997). However the highest negative accession rates we find are for the age group of 30-34. Hence internal migration does not seem to explain the negative accession rates *per se*. Another explanation for these rates can be problems related to labor force data from the 1980 Census, which may be less accurate than data from the household labor surveys.

Life expectancies are shorther and separation rates from the labor force due to mortality are higher among males in the rural compared to males in the urban, especially in the year 1980. This suggests that health and social conditions should be improved in the rural areas that could have a deteriorating affect on the labor force population. Another explanation for the distinguishing pattern for separation factors in 1980 among rural males can be due to the data of the Census of 1980, which may be biased and inaccurate relative to household labor force surveys.

Table 6. Mortality rates, rates for accession to and separation from labor force for males living in the rural areas, Turkey 1980, 1990 and 2000 (‰)

Ages (x and x+n)	*Activity rate between ages x and x+n (percent)*						*Separations from the labor force per 1,000 in the labor force in year of age*		
x	${}_nW_x$	*Average remaining years of active life* e^0w_x*	*Complete expectation of life* $e^0{}_x$	*Inactive years* e^0w_x**	*Mortality rate per 1000 living in year of age* $1{,}000{}_nQ_x$	*Accessions to the labor force per 1000 living in the year of age* $1{,}000{}_nA_x$	*Due to all causes* $1{,}000{}_nQ^s{}_x$	*Due to death* $1{,}000{}_nQ^d{}_x$	*Due to retirement* $1{,}000{}_nQ^r{}_x$
					1980				
15	80.0	43.174	46.530	3.356	4.1	23.2	4.1	4.1	0.0
20	93.0	39.004	42.429	3.425	5.8	4.8	5.8	5.8	0.0
25	97.6	35.073	38.598	3.526	6.3	-3.1	6.3	6.3	0.0
30	98.5	31.119	34.758	3.639	7.2	-5.4	7.2	7.2	0.0
35	**98.7**	27.174	30.947	3.773	8.7	..	8.7	8.7	0.0
40	97.8	23.477	27.208	3.732	10.9	..	13.9	10.9	3.0
45	96.3	19.958	23.588	3.630	13.8	..	19.3	13.7	5.6
50	93.5	16.678	20.086	3.408	18.7	..	24.4	18.6	5.8
55	90.7	13.463	16.801	3.337	25.3	..	37.6	25.2	12.4
60	84.7	10.637	13.727	3.091	36.7	..	97.9	35.5	62.4
65+	56.1	..	10.984	..	91.0	..	91.0	91.0	0.0
					1990				
15	68.7	45.366	52.145	6.780	2.2	44.5	2.2	2.2	0.0
20	91.7	40.836	47.690	6.854	3.1	6.3	3.1	3.1	0.0
25	96.0	36.433	43.394	6.961	3.3	0.1	3.3	3.3	0.0
30	97.3	31.992	39.068	7.076	3.7	-1.1	3.7	3.7	0.0
35	**98.2**	27.543	34.751	7.208	4.6	..	4.6	4.6	0.0
40	96.2	23.602	30.497	6.895	6.1	..	11.2	6.1	5.1
45	93.7	19.769	26.364	6.596	8.6	..	16.5	8.6	8.0
50	89.9	16.180	22.409	6.230	12.6	..	30.9	12.5	18.4
55	81.4	13.320	18.696	5.376	18.6	..	45.5	18.4	27.1
60	69.9	10.909	15.271	4.361	28.1	..	104.5	27.0	77.4
65+	41.1	..	12.193	..	82.0	..	82.0	82.0	0.0
					2000				
15	57.2	47.901	55.210	7.309	1.4	48.0	1.4	1.4	0.0
20	81.6	43.210	50.569	7.359	1.9	14.7	1.9	1.9	0.0
25	89.6	38.600	46.029	7.430	2.0	2.6	2.0	2.0	0.0
30	91.6	33.954	41.456	7.502	2.2	3.0	2.2	2.2	0.0
35	**93.9**	29.303	36.889	7.586	2.8	..	2.8	2.8	0.0
40	93.9	24.681	32.375	7.694	4.0	..	15.0	4.0	11.0
45	88.7	21.311	27.982	6.670	6.2	..	19.1	6.2	12.9
50	82.9	18.084	23.783	5.699	9.7	..	27.6	9.6	17.9
55	75.3	15.250	19.835	4.585	15.3	..	38.7	15.1	23.6
60	66.1	12.821	16.205	3.384	23.8	..	79.1	23.1	56.0
65+	46.6	..	12.928	..	77.3	..	77.3	77.3	0.0

Figure 5. Mortality rates, rates for accession to and separation from labor force for males living in the rural areas, Turkey 1980, 1990 and 2000 (‰)



CONCLUSION

This study constructed abridged working life tables for males aged 15 and over with a breakdown of urban and rural for the years 1980, 1990 and 2000. The data come from three different sources: 1980 Census of Population, household labor force surveys of 1990 and 2000 carried out by TURKSTAT and Surveys carried out by HUIPS. The duality of data sources used to retrieve labor force participation rates is a limitation of this study, further a limitation of the statistics of Turkey. Luckily the details, accuracy and periodicity of the statistics and data in Turkey have been improved after the second half of 1980s, when it comes to labor force surveys.

Some recommendations may be suggested according to the findings of this study. First separation rates due to mortality are higher in the rural than in the urban areas for males, which was much higher in 1980. The reasons for this should be investigated and some therapeutic measures should be taken in the rural areas, if necessary, such as improving the environmental and health conditions in the rural as well as social indicators. The negative accession rates to the labor force, especially for the year of 1980 in the rural, indicate that either there is a problem with the data or with assumptions of the static model employed in the analysis. The reason for this can be internal migration from rural to urban areas, particularly among young males. The figures support this interpretation albeit to a limited extent, which brings forward further considerations: Urbanization is an expected transformation as a trait of the modernization process, which brings about various concerns such as the share of informal sector in the urban, coverage of workers, employment opportunities provided to the working-age population, infrastructure in urban areas, especially metropolitan cities. Increasing investments in urban areas due to urbanization may also contribute to relatively inferior status of rural areas.

The length of working life is long, in general, however the length among males aged 15-19 in the urban areas are lower than the length among males in the rural areas. Inactive years are about 10 years longer for among urban males than among rural males aged 15-19. This is an expected situation as the complete expectation of life has been increasing as a consequence of demographic transition. However there seems to be that low length of working life in the urban areas is not due to high mortality rates, but instead, low rates of accession to the labor force. The rise in the length of expected inactive years of males in both urban and rural for all the periods of concern is associated with increase in years spent in education and training, especially in the urban, as well as ageing population in Turkey. A 17.5 year-old male living in an urban area had, on average, an additional life span of 55 years in 1990, or about three years less than in 2000. His expected working life, on the other hand, was the same in 1990 and 2000 with 41 years. Hence, on average, he could expect 14 years outside the labor market in 1990 as compared with 17 years in 2000. These results indicate the problem of old-age dependency in Turkey reflected in increasing inactive years for males in the urban. The increase is a rapid one when compared to Wolfbein (1949)'s estimations on the US for the period of 1900-1940, which indicates only three years increase in inactive years of white males of age 20.

Main reason for separations of males from the labor force in Turkey appears to be retirement and not death. As shown in Kpedekpo (1969)'s study, the indicator of retirement due to death appears to reflect level of development to some extent. The retirement rate due to death was higher in rural areas in Turkey for the 1980-2000 period as expected. However this rate is low in general in Turkey suggesting that mortality has not been dramatically high in Turkey affecting employment of young males of the working-age.

The rate of separation due to retirement accelerates after the age of 50 in 1990 and 2000. However separation rates through retirement among young working-age males in urban areas need further emphasizing: 30 in 32 separations from the labor market in 1000 economically active population are due to retirement among urban males in the age group of 40-44. The main reason for this fact seems to be early retirement policies regarding the public sector that were in force until 2002.

When we compare our findings with those of Kurtuluş (1999)'s study on Turkey for the overlapping periods 1980 and 1990; we find that our estimations of expected active years for a male aged 35-39 are lower. However our findings of the decline in the expected active years of males

and of the rise in the retirement rate at younger ages (especially in the urban) for the overlapping period comply with Kurtuluş (1999)'s.

Low accessions and high separations due to retirement among young males imply a waste of potential labor force to Turkey. The reasons that are keeping people away from the labor force may be due to cyclical forces such as periods of reduced job opportunities –causing lower labor demand- or structural developments in the labor market, where the latter would be alarming for the potential growth of economy. Among the structural and demographic influences on males' lower accessions to the labor market; increasing share of working-age population –from 56 to 65 percent from 1980 to 2000 (Koç et al, 2010)- may be at work. Considering the fact that Turkey has been passing through the window of opportunity accompanied with increasing share of working age population, creating employment opportunities for the increasing labor supply is crucial. Any young male of the working-age population, who do not participate in the labor force and who are "missing" from the labor market, is foregone benefit to the economy. Creating job opportunities for these "missing workers" is an important challenge that policy makers should deal with in the coming years.

Notes:

[1] Schoen and Woodrow (1980) found that female pattern was bimodal for the United States in 1972, where the figure was 62 percent active in the labor force at ages 22-23 dropping to 52 percent at ages 28-29 and again rising to 60 percent at the age of 40.

[2] See for instance Abbasoğlu (2009) for a causal analysis between female labor force participation and fertility in Turkey covering the period 1968-2006. Kurtuluş (1999) also mentions the negative impact of fertility and hence childcare on labor force participation among females.

[3] There are studies on conventional working life tables for females in Ghana (Kpedekpo, 1969) and in Nigeria (Iro, 1976) despite the data problems. We also carried out our analyses for females for data in Turkey for years 1980, 1990 and 2000. Our findings once again proved how the model of conventional working life tables do not fit to female data: Negative accession rates to the labor force and fluctuating patterns, especially for women living in rural areas indicated either a problem with the data or assumptions of the static model employed. As UN (1971) also mentions, for females the assumptions of the model are not relevant due to specific events to females, like fertility and mother-roles. In Turkey marriage is also an effective factor, not only for its leading to fertility, but also as a separation factor from the labor force due to economic violence the woman is experiencing by her husband or family (KSGM et al, 2009). These factors seem to be hard to account for.

[4] These studies of mortality life tables on Turkey are: Gürtan (1966), Alpay (1969), Oral (1969), Özsoy (1970), Öcal (1974), Demirci (1987), Hancıoğlu (1991), Duransoy (1993), Hoşgör (1992; 1997), Toros (2000), Demirbüken (2001), Coşkun (2002), Kırkbeşoğlu (2006), Eryurt and Koç (2010).

[5] See, for instance, Woytinsky (1938)'s estimations of the expected period of work for gainful workers in the US.

[6] UN (1983) describes the procedure of linear interpolation in a simple way: "Any two points define a line uniquely. Therefore if three points are to lie on a straight line but only one of the coordinates of the third is known, the other one is uniquely determined and can be calculated."

[7] MATCH application of the Mortpak software, which needed only infant mortality rates as input data, was chosen due to limited data.

[8] For calculating male IMR values for 1990 and 2000, procedures used are as explained in Toros (2000), which are not presented here.

[9] The life tables constructed with Mortpak are not presented in this paper.

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ÖZET

ERKEKLER İÇİN ÇALIŞMA HAYAT TABLOLARI UYGULAMASI: TÜRKİYE, 1980-2000

Bu çalışmanın amacı, Türkiye için 1980, 1990 ve 2000 yıllarında kır-kent ayrımında 15 ve daha yukarı yaşlardaki erkekler için çalışma hayat tabloları oluşturmaktır. Çalışmanın temel verileri iki farklı kaynaktan gelmektedir: TÜİK'in gerçekleştirmiş olduğu 1980 Nüfus Sayımı, 1990 Hanehalkı İşgücü Anketi ve 2000 Hanehalkı İşgücü Anketi. Çalışmanın bulguları, Türkiye'de 17,5 yaşında işgücüne dahil olan bir erkeğin yaşamının yaklaşık 40 yılını işgücü içinde geçirdiğini göstermektedir. Kentsel yerleşim yerlerinde yaşayan erkeklerin işgücü içinde olmadığı sürenin kırsal yerleşim yerlerinde yaşayan erkeklere göre 2000 yılı için 10 yıl daha uzun olduğu görülmektedir. Kentsel alanlardaki çalışma hayatının daha kısa olmasının temel olarak düşük işgücüne katılım hızlarından kaynaklandığı görülmektedir. İncelenen tüm dönemlerde erkek nüfusun işgücünde olmadığı sürenin artması, nüfusun yaşlanması ile olduğu kadar özellikle kentsel alanlarda eğitimde kalma süresinin uzaması ile ilişkilidir. Çalışmanın sonuçları, Türkiye'de erkeklerin işgücünden ayrılmalarının temel olarak ölümler ile değil emeklilik ile ilişkili olduğunu göstermektedir. Erkekler arasında emeklilik nedeniyle işgücünden ayrılma hızlarının 1990 ve sonrasında özellikle 50 yaşından sonra arttığı görülmektedir. İşgücünden ayrılma hızlarında ölüm hızlarının payının kırsal yerleşim yerlerinde yaşayan erkekler için daha yüksek olduğu gözlenmektedir. Kırsal alanlarda yaşayan 50-54 yaş grubundaki erkekler arasında gözlenen işgücünden ayrılmaların yaklaşık yüzde 35'i ölümlülükten kaynaklanırken, bu oranın kentsel alanlarda yaşayan erkekler için sadece yüzde 12 olduğu görülmektedir. Özellikle çalışma çağındaki genç erkekler arasında emeklilik nedeniyle işgücünden ayrılmaların payının, muhtemelen kamu kesiminde geçmiş dönemlerde yürürlüğe sokulan erken emeklilik politikalarının etkisi ile kentsel yerleşim yerlerinde daha yüksek olduğu görülmektedir.