FORECASTING LIFE EXPECTANCIES FROM TIME SERIES FORMED BY USING POST-CHILDHOOD LIFE TABLES

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Regarded as one of the indicators of the level of development for societies, life tables are those which schematically show the information about age-specific death rate and life expectancies of the individuals in a society. A life table, which is current and constructed with healthy data, could supply making of the realist planning on relevant population. Today, in many countries, mortality statistics used as basic data in constructing a life table are not recorded exactly and correctly. However, these countries could have data of censuses conducted in regular period of time, and the post-childhood life tables could be estimated from the data related to these censuses. In this study, using data related to two consecutive censuses, a method is briefly explained which estimate a post-childhood life table from an age distribution and intercensal growth rates and life expectancy forecasts are covered. Furthermore, during the application, the life expectancies at age of 5 and age of 10 up to 2015 for both genders of Eskisehir, which is one of the big cities of Turkey, have been forecasted.

INTRODUCTION

Life tables having a special place in demographic analyses are tables showing what the life expectancy is for individuals at birth and at other ages. In constructing life tables, both data on death and population are needed. However, in such countries as Turkey where mortality statistics can not be recorded exactly and correctly, it is possible to estimate post-childhood life table from the data of two censuses with age and sex distributions and intercensal growth rates. Moreover, when there are many regular censuses conducted in a long period of time, more than one post-childhood life tables can be produced for the related period. Then, an opinion can be formed about life expectancies of the relevant society for the future years by taking into account general trend of life expectancies in this life tables.

In this study, using the method which estimates a post-childhood life table from an age distribution and intercensal growth rates, life expectancy forecasts are covered. During the application, by using the post-childhood life tables constructed from the general census data for 1965-2000 period, the life expectancies at age of 5 and age of 10 up to 2015 for both genders of Eskisehir have been forecasted.

METHODOLOGY

Age specific growth rates for an intercensal period to convert a non-stable age distribution (typically an average of a first and second census age distribution) into the corresponding stationary of life table population, from which expectations of life at each age can be derived. This method can be applied regardless of the intercensal interval, since age-specific growth rates are as easy to calculate for non-integer as for integer intervals. In addition, it provides smoothing by cumulating values above each age a. The methodology is based on a discrete approximation of the general

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equation for the age distribution of a population which is closed to migration and territorial coverage.

$$ {}_5\boldsymbol{L_a} \approx {}_5\boldsymbol{N_a} * \boldsymbol{exp}\,(2.5 *{}_5\boldsymbol{r_a} + 5 * \sum_{x=0}^{a-5} {}_5\boldsymbol{r_x}) $$

Expectation of life at age *a* is then estimated by dividing the sum of ${}_5L_x$ values above age *a* by an approximation of *l(a)* based on one fifth of the average of ${}_5L_{a-5}$ and ${}_5L_a$ (Hill, 2002).

Once the life expectancy figures have been calculated, the levels they imply in a model life table system can be found, and a final estimate of mortality can be obtained by averaging the most reliable estimates of mortality level. The best estimate of overall mortality may therefore be an average of the levels associated with e_a for a ranging from 10 to 30 (UN, 1983).

If a country has census data with 5-year intervals (with intervals as *t*, *t*+5, *t*+10, ...,*t*+50 years) through a long period of time (for example, between *t* and *t*+50 years), it is possible to apply the method stated above to the data obtained from the 5-year censuses (that is the censuses as to *t* and *t*+5, *t*+5 and *t*+10, ..., *t*+45 and *t*+50 years). In addition, the same method can be also applied to the data obtained from the data 10-year censuses (that is the censuses as to *t* and *t*+10, *t*+5 and *t*+15,.....,t+40 and t+50 years). Besides, the best final estimates may be also obtained by calculating the arithmetic mean of the most reliable mortality levels got for each life table. Final estimates of mortality levels determined for each term in 5-year and 10-year intervals correspond to different time periods. Thus, when the final estimates of mortality levels determined for each term in 5-year and 10-year intervals are arranged in order according to time, a time series can be obtained about the mortality levels for the specific time intervals.

It is possible to forecast mortality levels by taking into account time series trend of mortality levels. But, it is possible that the time series formed may have been affected from some events occurring in the relevant country. By calculating the values at certain time points of the time series in question from census data with longer intervals, it may be possible to purify the effects of those events on the time series. For this purpose, a new time series are formed by the way stated above from the data of the censuses conducted in 15-year and 20-year intervals. The new time series are used to smooth certain points of the time series formed for the 5-year and 10-year terms.

Because the time series formed for the 5-year and 10-year terms are able to smooth, firstly, the type of function that will represent the trend of mortality levels in relevant series determine and trend equation is obtained using the Method of Least Squares (LS). Then, it can be decided whether to make any smooth for any of the time points (any year) of the relevant series. For this purpose, mortality level estimated for 15-year or 20-year intervals corresponding to an point in time series use in place of the original value of the series on that point, and, in a sense, time series is formed again. Trend equation for function type adopted for the new series determine and the determination of the equation (R^2 value) is examined. If there is a significant increase in the determination of the trend equation in proportion to the one before mortality level as to the time point in question is used, then it may be decided to be used mortality level determined for the 15 years' or 20 years' interval instead of the value of the series at that point. This process is repeated for all the values in the series of mortality level. Thus, it may be possible to smooth time series of the mortality levels at the time points seemed as necessary.

For the smoothed time series, trend equation is obtained by adopting suitable function type determined before the smooth. Mortality levels are forecasted using the trend equation. Afterwards, life expectancies for model life tables in question determine from the forecasts of mortality levels.

APPLICATION

During the application of the study, the life expectancies at age of 5 and age of 10 up to 2015 for both genders of Eskisehir will be forecasted. For this purpose, the census data of Eskisehir, a city in the Middle-Anatolia region, obtained from the general censuses conducted between 1965 and 1990 with 5-year intervals and in 2000 are used. However certain corrections on the data were made so that population would have a closed structure. Table 1 shows the corrected data to be used to calculate post-childhood tables and related mortality levels.

Table 1: Corrected Male and Female Populations in Eskisehir by Age Groups and Years for 1965-2000 Period

				FEMALE				
Age group	**1965 year**	**1970 year**	**1975 year**	**1980 year**	**1985 year**	**1990 year**	**1995 year**	**2000 year**
0 – 4	26 612	31 283	27 190	28 394	26 970	25 479	25 081	24 683
5 – 9	27 759	28 815	28 991	29 583	31 624	30 274	27 180	26 352
10-14	24 496	27 508	29 854	30 770	31 948	33 234	31 987	28 880
15-19	20 577	24 023	25 843	29 965	31 655	32 950	33 778	33 700
20-24	16 062	18 398	20 821	24 948	28 736	29 662	31 160	34 321
25-29	15 536	15 541	17 561	21 194	24 667	28 285	28 729	29 369
30-34	15 490	14 920	14 990	17 716	21 464	24 600	28 409	27 796
35-39	13 772	15 133	15 152	15 424	18 637	22 155	24 509	28 532
40-44	9 432	12 754	14 137	15 107	15 626	18 687	21 708	24 418
45-49	7 246	8 801	12 134	13 930	14 539	15 440	18 299	21 260
50-54	7 904	6 708	8 827	12 435	13 795	14 747	14 844	17 911
55-59	7 459	7 135	5 927	8 397	12 146	13 411	14 186	14 247
60-64	6 183	7 009	7 358	5 675	7 919	11 914	12 517	13 624
65-69	4 113	5 083	5 515	6 721	5 161	7 276	10 509	11 623
70-74	2 635	3 598	4 129	4 463	5 108	4 220	5 859	9 103
75 +	3 393	3 296	4 273	4 915	5 840	6 795	7 042	7 926
Total	**208 669**	**230 005**	**242 702**	**269 637**	**295 835**	**319 129**	**335 797**	**353 745**
				MALE				
Age group	**1965 year**	**1970 year**	**1975 year**	**1980 year**	**1985 year**	**1990 year**	**1995 year**	**2000 year**
0 – 4	27 549	31 495	28 435	29 345	28 662	26 518	26 393	26 268
5 – 9	28 449	29 151	29 911	30 755	32 636	31 843	28 423	27 443
10-14	26 410	28 894	32 454	31 608	33 897	34 571	33 637	30 328
15-19	22 083	24 678	27 504	32 160	32 172	33 618	33 789	35 430
20-24	15 205	18 347	21 382	24 983	27 020	28 076	31 712	33 007
25-29	15 815	16 130	20 596	23 327	25 887	28 693	27 529	29 805
30-34	15 988	14 697	16 179	18 924	23 052	25 900	28 428	26 982
35-39	14 546	15 329	15 190	15 517	19 183	23 469	25 586	28 163
40-44	11 039	13 536	15 090	14 758	15 828	19 190	22 871	25 272
45-49	7 269	10 104	13 553	14 607	14 810	15 761	18 412	22 272
50-54	9 665	6 514	10 203	12 936	14 439	14 276	14 819	17 634
55-59	7 783	8 478	6 025	9 177	12 242	13 583	13 255	13 877
60-64	6 202	6 721	8 107	5 241	8 307	10 950	11 982	12 234
65-69	3 492	4 906	4 989	6 331	4 398	6 975	9 033	10 381
70-74	1 638	2 849	3 636	3 909	4 797	3 328	5 311	7 116
75 +	1 910	1 832	2 617	3 517	4 232	5 177	5 276	6 052
Total	**215 043**	**233 661**	**255 871**	**277 095**	**301 562**	**321 928**	**336 456**	**352 264**

From each of the 5-year growth rates with respect to the corrected census data given in Table 1, life tables of Eskisehir population for 7 periods (1965-1970, 1970-1975, …….1995-2000) were estimated. Then from each of the 10 year growth rates with respect to the corrected census data given in Table 1, post-childhood life tables of Eskisehir population for 6 periods (1965-1975, 1970-1980, …….1990-2000) were estimated.

As stated above, for both of genders, total 14 tables with 5-year intervals and total 12 tables with 10 year intervals were constructed. Besides, from life tables for each of the periods, levels indicating Coale and Demeny "West" region model life tables were calculated (for Coale and Demeny "West" model life tables, see (Coale and Demeny, 1966)). In order to realize the purpose of the study, it is appropriate to determine one mortality level to represent each period. For this purpose, the tables in question and levels indicating life tables related to them are not mentioned here. Those who would like to see these tables and related levels may find them in the study by Fidan (2002).

In order to determine one mortality level which will represent each of the 5-year and 10-year periods, the average of the levels indicating Coale and Demeny "West" region model life table related to the life expectancies for the 10-35 age interval was calculated. Afterwards, the final estimates as to the mortality levels determined for each of the 5-year and 10-year periods were put in order with regard to time and mortality series having time series characteristic were formed. Table 2 gives time series obtained from mortality levels for the male and female populations in Eskisehir for 1965-2000 period.

Table 2: Time Series for Mortality Levels Obtained from 5 and 10 year Growth Rates for Male and Female Populations in Eskisehir for 1965-2000 Period

Years	Time series for Female	Time series for Male
1965	-	-
-	12.44	11.31
1970	13.63	16.89
-	14.20	21.81
1975	18.94	19.62
-	22.89	16.17
1980	21.98	19.67
-	22.65	21.22
1985	22.96	21.03
-	22.64	21.42
1990	21.85	20.86
-	20.63	18.99
1995	21.63	19.97
-	21.42	20.30
2000	-	-

From the table, it is shown that there is a sharp increase in mortality levels for women in 1975 and for men in 1970-1975. According to Shorter and Macura (1983), in 1960-1975 period, approximately one million persons left the country due to labour migration. On the other hand, some of the Turkish workers in Germany come to Turkey for holiday in 1975 didn't turn back due to the economic stagnation in Germany. The fact that mortality levels were high in that period may have been due to the fact that the workers migrated to Germany were counted in Turkey in 1975 census.

On the other hand, for both genders, relatively high mortality levels were obtained in the period between 1980 and 1990. The 1980 census were conducted in days following a military coup and thus may have had its effects. Further, after 1980, Turkey entered a new period of rapid economic progress and it had certain demographic consequences. The reason why high mortality levels were obtained in this period may have been this progress.

It is certain that the time series formed may have been affected from this events lived in Turkey. By calculating the values at certain time points of the time series in question from census data with longer intervals (15-year or 20-year intervals), it may be possible to purify the effects of those events on the time series. For this purpose, by using the growth rates as to the corrected census data with 15-year and 20-year intervals given in Table 1, time series similar to those obtained from the mortality levels calculated for each of the 5 and 10 year periods were found. Table 3 was arranged to see together the times series for the mortality levels estimated from the growth rates in the intercensal period with 5 and 10 year intervals and 15 and 20 year intervals in 1965-2000 period for females and males.

Table 3: Time Series of the Mortality Levels Estimated from the Growth Rates in Various Periods for Male and Female Populations in Eskisehir for 1965-2000 Period

	Female		Male	
Years	5 and 10 year period	15 and 20 year period	5 and 10 year period	15 and 20 year period
1965	-	-	-	-
-	12.44	-	11.31	-
1970	13.63	-	16.89	-
-	14.20	16.97	21.81	16.57
1975	18.94	18.73	19.62	18.50
-	22.89	20.62	16.17	20.94
1980	21.98	21.96	19.67	20.94
-	22.65	22.78	21.22	21.05
1985	22.96	22.51	21.03	21.52
-	22.64	22.22	21.42	21.31
1990	21.85	22.62	20.86	21.19
-	20.63	22.12	18.99	21.30
1995	21.63	-	19.97	-
-	21.42	-	20.30	-
2000	-		-	-

In order for the time series formed for both genders from the 5-year growth rates to be smoothed, the type of function that represents the trend of mortality levels in relevant series is determined. First, the graphic of the related time series is drawn in order to determine the suitable type of function. Figure 1 and Figure 2 show the trend of the series obtained for male and female population.

Figure 1: Trend of the Mortality Level Series Formed for Female Population in Eskisehir

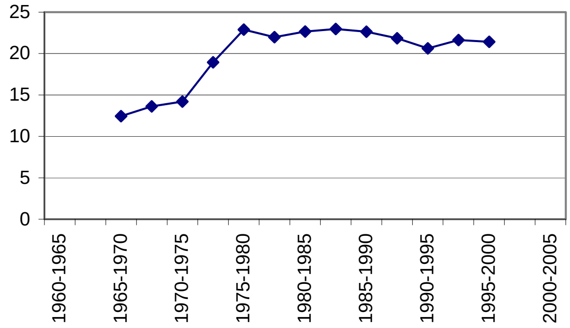
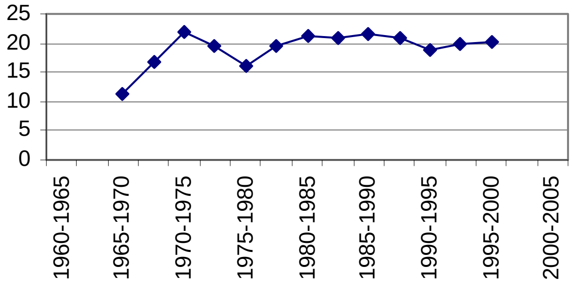


Figure 2: Trend of the Mortality Level Series Formed for Male Population in Eskisehir



As it can be seen from the graphics in Figure 1 and Figure 2, although it is thought that linear function, expressed as $Y = a + bt$, or multiplicative function, expressed as $Y = at^b$, may be suitable for the trend of the time series obtained for both male and female population, it was also decided to try exponential, expressed as $Y = \exp(a + bt)$, and reciprocal function, expressed as $\frac{1}{Y} = a + bt$. The four different types of the functions were adopted, and by using LS method to the determined time series, the results obtained were shown in Table 4.

Table 4: Trend Equations Obtained by Adopting Various Trend Functions for Time Series of Mortality Levels Formed for Male and Female Populations in Eskisehir for 1965-2000 Period

Gender	Trend Function	Trend Equation	Correlation coefficient	R^2 (%)	Standard deviation
Female	Linear	$\hat{Y} = 14.8812 + 0.7077\ t$	0.7204	51.90	2.7715
	Multiplicative	$\hat{Y} = 12.5693 + t^{0.2512}$	0.8756	76.66	0.1108
	Exponential	$\hat{Y} = \exp(2.6780 + 0.0413\ t)$	0.7321	53.60	0.1562
	Reciprocal	$\hat{Y} = (0.0699 - 0.0025\ t)^{-1}$	-0.7395	54.68	0.0091
Male	Linear	$\hat{Y} = 16.3415 + 0.4046\ t$	0.5433	29.52	2.5430
	Multiplicative	$\hat{Y} = 14.0583 + t^{0.1713}$	0.7345	53.95	0.1265
	Exponential	$\hat{Y} = \exp(2.7633 + 0.0253\ t)$	0.5521	30.48	0.1555
	Reciprocal	$\hat{Y} = (0.0651 - 0.0016\ t)^{-1}$	-0.5527	30.55	0.0100

In table 4, it appears that the type of the function with the highest coefficient of determination and correlation coefficient for female population is the multiplicative function. Besides, the lowest standard deviation of the forecasts is calculated by reciprocal function. In literature, it is stated that selecting the type of function with low standard deviation is a solution to determine suitable type of function (Mendenhall and Reinmuth, 1978). However, when the case is evaluated from the point of its quality, it is concluded that multiplicative function is better in explaining the changes the in mortality levels.

When the results about the male population given in Table 4 are considered, it is noticed that the type of function with highest coefficient of determination and correlation coefficient is again multiplicative function. The standard deviations of the forecasts obtained by adopting the multiplicative function also have relatively low values. Therefore, it may be concluded that multiplicative function is the best type of function for time series as to the male population.

As the most suitable type of function which explains the changes in time series of the mortality levels for both genders is multiplicative function, it was adopted to smooth the time series formed for the 5 and 10 year periods in Table 3 and the determination of the equation obtained was taken into consideration. Instead of the value (14.20) corresponding to 1970-1975 period for time series of mortality levels formed from 5 and 10 year growth rates for female population, the first value (16.97) of time series of mortality levels formed from 15 and 20 year growth rates is used. For the related time series, multiplicative function is adopted, and using LS method, trend equation is determined. If the determination of this trend equation is higher than the first, it is decided that the value obtained from the mortality levels determined for the 15 and 20 year intervals should stay in the related time series. If not, the value of time series formed from 5 and 10 year growth rates is maintained. The process is repeated for all of the values of the related time series. Thus, only one time series is obtained to calculate the trend equation with highest determination from the combination of time series of mortality levels formed from the 5 and 10 year intervals and 15 and 20 year intervals. The same processes are carried out for male population. Thus, the smoothed time series shown in Table 5 is obtained.

Table 5: Smoothed Time Series of the Mortality Levels for Male and Female Populations in Eskisehir for 1965-2000 Period

Years	Smoothed time series for Female	Smoothed time series for Male
1965	-	-
-	12.44	11.31
1970	13.63	16.89
-	16.97	16.57
1975	18.73	18.50
-	20.62	20.94
1980	21.96	19.67
-	22.65	21.05
1985	22.51	21.03
-	22.22	21.31
1990	21.85	20.86
-	20.63	21.30
1995	21.63	19.97
	21.42	20.30
2000	-	-

The results as to the trend equations obtained by adopting multiplicative function in the smoothed time series formed by using the growth rates of Eskisehir population for both genders are given in Table 6.

Table 6: Trend Equations Obtained by Adopting Multiplicative Function in the Smoothed Time Series for Male and Female Populations in Eskisehir for 1965-2000 Period

Gender	Trend Equation	Correlation coefficient	R^2 (%)	Standard deviation
Female	$\hat{Y} = 14.9444\,t^{0.2353}$	0.9156	83.84	0.0826
Male	$\hat{Y} = 13.2937\,t^{0.2047}$	0.8858	78.46	0.0857

By using the trend equations given in Table 6, mortality levels for male and female populations in Eskisehir for 1965-2015 period were determined. Table 7 displays the smoothed time series formed for female and male populations in Eskisehir and the forecasts calculated with using of trend equation obtained by adopting multiplicative function in these series.

Table 7: Smoothed Time Series and Forecasts for the Mortality Rates Formed for Female and Male Populations in 1965-2015 Period in Eskisehir

	Female		Male	
Years	Smoothed time series for the mortality levels	Forecasts for the mortality levels	Smoothed time series for the mortality levels	Forecasts for the mortality levels
1965	-	-	-	-
-	12.44	12.94	11.31	13.29
1970	13.63	15.24	16.89	15.32
-	16.97	16.76	16.57	16.65
1975	18.73	17.94	18.50	17.66
-	20.62	18.90	20.94	18.48
1980	21.96	19.73	19.67	19.18
-	22.65	20.46	21.05	19.80
1985	22.51	21.11	21.03	20.35
-	22.22	21.71	21.31	20.84
1990	21.85	22.25	20.86	21.30
-	20.63	22.76	21.30	21.72
1995	21.63	23.23	19.97	21.11
-	21.42	23.67	20.30	22.47
2000		24.09		22.82
-		24.48		23.14
2005		24.85		23.45
-		25.21		23.74
2010		25.55		24.02
-		25.88		24.29
2015		26.19		24.55

As seen in Table 7, the forecasts of mortality levels for female population are higher, except for the first two forecasts of the mortality levels obtained by using trend equation for male population. Accordingly, it might be said that the average life expectancy of females is longer than that of males. Moreover, the fact that the forecasts both for males and for females get increasingly higher shows that the average life expectancy for both genders gets higher with each year. Furthermore, although regional model life tables associated with life expectancies are composed of 24 separate tables (24 different levels), in this study, it is forecasted values higher than the 24th level, which casts certain doubts in mind. However, the improvements in the standards of healthcare and better nutrition have resulted in higher life expectancies in many countries and, consequently, average life expectancies exceeding the 24th level of the model life tables. By 2015, it wouldn't be wrong to forecast that average life expectancies will be higher for Turkey and also for Eskisehir.

By using life expectancies on Coale and Demeny "West" model life tables, it is possible to make a transition from forecasts of mortality levels given in Table 7 to life expectancies. Table 8 shows life expectancy forecasts at age of 5 and 10 in 1965-2015 period for male and female populations.

Table 8: Life Expectancy Forecasts at Age of 5 and 10 Determined by Using Growth Rates for Female and Male Populations

Years	Female		Male	
	e_5 values	e_{10} values	e_5 values	e_{10} values
1965	-	-	-	-
-	55.78	51.94	54.07	50.11
1970	59.05	54.93	56.71	52.55
-	61.32	57.01	58.46	54.17
1975	63.08	58.63	59.83	55.44
-	64.54	59.98	60.96	56.49
1980	65.81	61.16	61.93	57.39
-	66.94	62.21	62.79	58.20
1985	67.97	63.19	63.56	58.92
-	69.03	64.20	64.26	59.57
1990	70.00	65.14	65.00	60.27
-	70.90	66.00	65.74	60.98
1995	71.73	66.81	66.43	61.63
-	72.52	67.57	67.07	62.24
2000	73.26	68.28	67.67	62.82
-	73.97	68.90	68.24	63.37
2005	74.63	69.60	68.78	63.88
-	75.27	70.21	69.29	64.38
2010	75.88	70.80	69.78	64.85
-	76.46	71.36	70.25	65.30
2015	77.02	71.90	70.70	65.73

When the table in analyzed, it is noticed that life expectancy forecasts at age of 5 and 10 for females are higher than those of men. Life expectancy forecasts at age of 5 and 10 for female in 2000-2005 period is found to be 73.97 years and 63.37 years, respectively. Consequently, it is forecasted that 5 years old female children in Eskisehir today have an average of 73.97 years' life expectancies, while it is 68.90 years for male children. As for 10 years old female children, the average life expectancy is 68.90 and for male children, it is 63.37. On the other hand, in 2015, life expectancies at age of 5 and 10 for females forecast to be 77.02 years and 71.90 years, respectively. As for males, while life expectancy at age of 5 forecasts to be 70.70 years, life expectancy at age of 10 forecasts to be 65.73 years.

RESULT AND DISCUSSION

Thinking that comparing the findings we obtained in our study to those obtained by other researchers would be suitable, certain comparison have been made here. For this purpose, comparisons of the forecasts as to e_5 values have been given in Table 9 and Table 10. Further, in order to be able to see the comparison better, Figure 3 and Figure 4 have been drawn, which show our findings and those obtained by other researchers in the same coordinate axis.

Table 9: Comparing the Findings for e_5 Values for Female Population

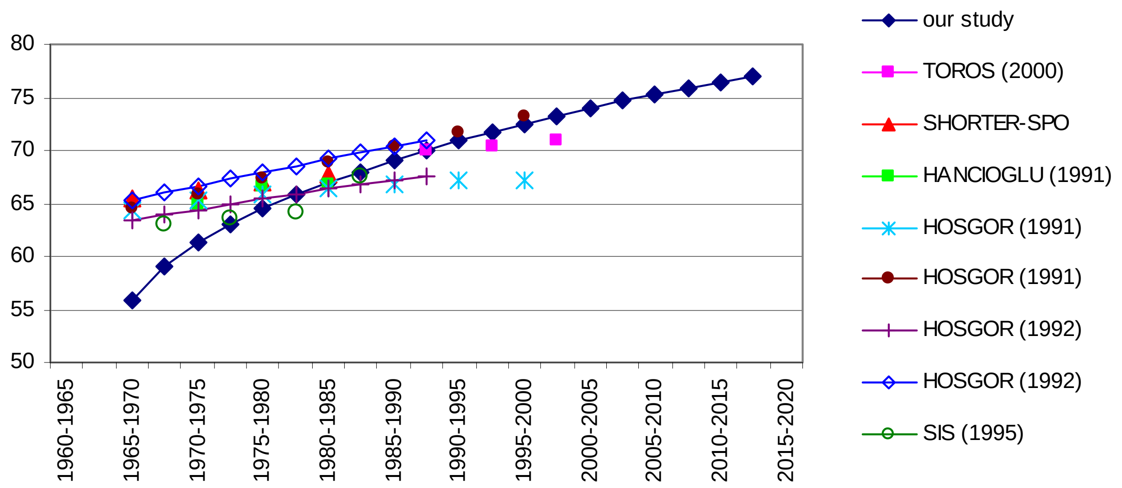
YEARS	e_5 VALUES OF ESKISEHIR	e_5 VALUES OF TURKEY							
	e_5 values in our study	Dincer[1] (1988)	Shorter-Spo[2]	Hancioglu (1991)	Hosgor (1991)	Hosgor (1992)	SIS (1995)	Hosgor (1997)	Toros (2000)
1965									
-	55.78		65.5			62.78-64.53	62.9		
1970	59.05				64.38-64.54	63.34-65.20			
-	61.32		66.2	64.9		63.88-65.99	63.1		
1975	63.08				65.25-65.92	64.39-66.66			
-	65.54		66.9	66.6		64.90-67.29	63.5		
1980	65.81				65.84-67.34	65.39-67.90			
-	66.94		67.7	66.7		65.87-68.55	64.2		
1985	67.97	68.97			66.36-68.84	66.33-69.18			
-	69.03					66.78-69.78	67.6	68.0	
1990	70.00				66.83-70.33	67.21-70.35			69.98
-	70.90					67.63-70.90			
1995	71.73				67.24-71.78				70.33
-	72.52								
2000	73.26				67.23-73.28				70.88
-	73.97								
2005	74.63								
-	75.27								
2010	75.88								
-	76.46								
2015	77.02								

[1]The findings for Dincer (1988) are based on data related 1975-1986 period.
[2]The findings for Shorter-Spo are taken Hancioglu (1991).

e_5 values forecasted for female population in 1975-1980 period are lower than those found by Shorter-SPO and Hancioglu (1991), and higher than those found by SIS (1995). e_5 interval obtained for the same period in a study by Hosgor (1992) almost is the same as the ones values we have forecasted.

e_5 value forecasted for female population in the study for 1985 is lower than the one Dincer (1988) obtained in Eskisehir context from the data in 1976-1986. However, the study conducted by Dincer (1988) involves only Eskisehir city centre and town centres, excluding villages and other small countryside settlements. Average life span in countryside regions is shorter than city centres, and if they had been included in the study by Dincer (1988), e_5 values would certainly have been lower. Besides, the value we have forecasted in our study as to 1985 is also included in the e_5 interval in the studies by Hosgor (1991) and Hosgor (1992).

Figure 3: e_5 Values for Female Population



In 1985-1990 period, e_5 value forecasted in this study is very close to the values obtained in the studies by SIS (1995) and Hosgor (1997), and included in the e_5 interval in the study by Hosgor (1992).

The e_5 value we have forecasted for 1990 is the same as the one determined in a study by Toros (2000). As for the period after 1990, the values determined by Toros (2000) are a little lower than ours, but values forecasted in our study are included in the e_5 interval obtained by Hosgor (1991). Moreover, the fact that e_5 values we have forecasted found in the context of our study are closer to top limit of the e_5 values interval determined by Hosgor (1991) may have been due to the facts that Eskisehir is a developed city and average life span there is higher than the average in Turkey.

Figure 4: e_5 Values for Male Population

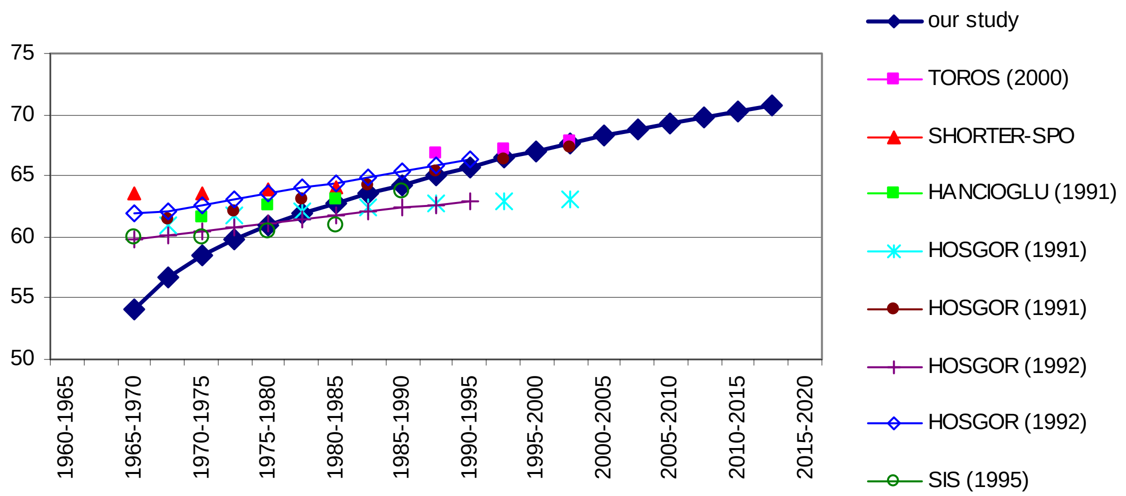


Table 10: Comparing the Findings for e_5 Values for Male Population

YEARS	e_5 VALUES OF ESKISEHIR	e_5 VALUES OF TURKEY							
	e_5 values in our study	Dincer[1] (1988)	Shorter - Spo[2]	Hancioglu (1991)	Hosgor (1991)	Hosgor (1992)	SIS (1995)	Hosgor (1997)	Toros (2000)
1965									
-	54.07		63.5			59.82-61.89	59.9		
1970	56.71				60.96-61.46	60.19-62.06			
-	58.46		63.6	61.6		60.53-62.60	60.01		
1975	59.83				61.84-62.06	60.86-63.10			
-	60.96		63.9	62.6		61.19-63.57	60.4		
1980	61.93				62.16-63.12	61.49-64.02			
-	62.79		64.0	63.0		61.78-64.45	61.0		
1985	63.56	63.36			62.44-64.19	62.08-64.94			
-	64.26					62.36-65.43	63.7	63.9	
1990	65.00				62.70-65.31	62.63-65.88			66.84
-	65.74					62.89-66.34			
1995	66.43				62.92-66.34				67.23
-	67.07								
2000	67.67				63.12-67.31				67.83
-	68.24								
2005	68.78								
-	69.29								
2010	69.78								
-	70.25								
2015	70.70								

[1] The findings for Dincer (1988)] are based on data related 1975-1986 period.
[2]The findings for Shorter-Spo are taken Hancioglu (1991).

When Table 10 and Figure 4 are analyzed, e_5 values we have forecasted for males in 1965-1970 period are a little lower than the ones obtained in other studies, and in the period after 1970, this dif ference almost disappears. In the period after 1975, the values obtained are very similar to the ones in other studies.

In our study, expanding the comparison made for e_5 values to e_{10} values is possible, but because similar explanations would be given, comparisons for e_{10} values will not be made.

As a result, in the context of the study, e_5 and e_{10} values we have forecasted for 1980-2000 period for both genders are very similar to the values obtained by other researchers. This proves the accuracy of the forecasts made for the period after 2000.

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ÖZET

ÇOCUKLUK SONRASI YAŞAM TABLOLARI KULLANILARAK ELDE EDİLEN ZAMAN SERİLERİNDEN YAŞAM ÜMİDİ ÖNGÖRÜLERİNİN YAPILMASI

Toplumlarin gelişmişlik düzeyinin bir göstergesi olarak değerlendirilen yaşam tabloları bir toplumdaki bireylerin yaşa özel ölüm hızlarına ve yaşam ümitlerine ilişkin bilgileri şematik olarak gösteren tablolardır. Güncelliğini koruyan ve sağlıklı veriler kullanılarak hazırlanan bir yaşam tablosu ilgili olduğu nüfus üzerinde gerçekçi planlamaların yapılmasını sağlayabilir. Günümüzde pek çok ülkede, bir yaşam tablosunun hazırlanmasında temel veri olarak kullanılan ölüm istatistikleri doğru ve eksiksiz olarak tutulamamaktadır. Buna karşın, bu ülkeler düzenli olarak yapılan nüfus sayımı verilerine sahip olabilirler ve bu nüfus sayımı verilerinden çocukluk sonrası yaşam tabloları kestirilebilir. Bu çalışmada, ard arda yapılan iki nüfus sayımında elde edilen veriler kullanılarak sayımlar arası büyüme hızları ve yaş dağılımından çocukluk sonrası yaşam tablosunu kestiren metot kısaca tanıtılmakta ve yaşam ümidi öngörülerinin yapılması üzerinde durulmaktadır. Ayrıca uygulama aşamasında, Türkiyenin büyük illerinden biri olan Eskişehir için cinsiyet ayırımında 2015 yılına kadar 5 ve 10 yaşındaki yaşam ümidi öngörüleri yapılmaktadır.