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Decrease of the Actual Fertility in Koplik. The Comparison of the Coming Population's Fertility with the Locals

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Abstract: ***The study is done in Koplik municipality .Koplik is a small town ,in the north of Albania .It is built a database for 20000 inhabitants of Koplik Municipality ,where it is included the year of birth ,the year of marriage and the year of death. These data , are used to built the genealogical trees .Using these data is calculated TFR and CEB 50+,for this population ,for 1970-2013 period .Comparison of these parameters concludes se TFR(variance 0.81) is more variable than CEB 50+(variance 0.069).Based in the calculated value of TFR and CEB 50+,for the period 1970-2013, is observed significant difference between TFR(actual fertility) and CEB 50+(past fertility).Regression analysis shows that the increase of mean age of marriage and decrease of infant mortality ,reduce fertility .Other factors that may have effect it ,are education and employment of women. Using the Anova analysis to compare the number of children ever born from five years old age groups, from 25-49 age groups for the entire population with that of the locals neighborhood of Koplik, results that there is no significant difference between the number of the children ever born by the women of the entire population with those of the locals. Also the number of the children ever born by women 50+ age which represents the past fertility , results more or less equal as for the population 3690 children for 1000 women, also for the locals, 3700 children for 1000 women.***

Keywords: TFR,CEB 50+,ANOVA,IMR,Mean age of marriage.

1. Introduction

ASFR- The age specific fertility rate. ASFR refers to the actual number of the children born by the women of a population on specific age groups for a fixed period of time. The age groups in which this parameter is calculated are: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44 and 45-49 years old. ASFR compares the fertility in different ages, when time passes. ASFR is used for the calculation of TFR- the total fertility rate. TFR is the average number of children that would have been born by a woman during her entire life if:
1-She gives birth to her children in accordance to a fertility, given for each age,for entire population
2-She survives from the birth to the end of her reproductive life

TFR is an artificial percentage, not based in the fertility of any special group, because that means waiting until they have finished the birth of their children, but it is based in the specific fertility by women ages in their reproductive age which is 15-49. TFR is usually a better indicator of the actual fertility because differently from CBR it is not affected by the age structure of the populations. Since it refers to the births for a woman, TFR is a method widely used which adapts the differences according to the age composition of the population. However the mistake of choosing the examples it's very high, because some age groups, include a small number of women and in TFR calculation it's supposed that there is the same number of women for each age group. Because it is based in the number of the births for a year, TFR may not show exactly the number of the births that a woman actually has. There is a big possibility that TFR underestimates the final fertility in the time when women have born their children later than predicted. This indicator represents the possibility for population changes in a place and it is affected by the effect of time ,if the birth age for the children goes up ,TFR will be smaller.

The fertility variance:
TFR can be used to determine the effect of fertility in the population increase, to show if the age with reproductive abilities is replacing itself or not.

High fertility: TFR over 5 children. The birth of over two children for a woman shows a growing population.

The replacement level: TFR about 2.1 children per woman. This is the average number of children that a woman must give birth to, in order to replace itself. This level is characteristic for developed countries. In undeveloped countries this level might also be 3.4 children for a woman, caused by high level of children´s mortality. In the world, the level of replacement is 2.33 children for a woman, 2 children to replace the parents and a third one considering that there are more born males than females. (3)(Espenshade TJ, Guzman JC, and Westoff CF (2003).

Under the level of replacement: TFR under 2.1 children per woman. The birth number of less than 2 children per woman shows a level lower than the replacement of population and this leads to the decrease of the population and aging of the population.

Very low fertility: under 1.3 children for woman. Anyway, the natural increase of population,is not affected only by

fertility , but also from the age structure and the sex-ratio of the population.

TFR is one of the important factors that affects the increase of the population.

The general factors that affect in fertility decrease: Fertility is in inversely proportional with the incomes,intelligence and the level of education for the women, the decrease of children mortality, the employment of women, the average age of women's marriage.

CEB 50+

Children ever born by women during their reproductive age. CEB is the average number of children ever born by women in that age group. It predicts a mass of measuring fertility. It is usable only if the age group of women is considerable. CEB for women over 50 is called the completed fertility It shows the average of children ever born, by a specific age group which has completed the fertility. When CEB 40-49 is much greater than TFR it shows that the fertility is decreasing. At the opposite case the fertility is increasing.

2. Working Methods

To calculate TFR it's necessary to collect full information of women fertility from age 15-49, which includes questions about the number of children which were born and also the time of last child's birth. This information is pretty usable for the calculation of the actual fertility, but also the fertility in the past. The calculations for the actual fertility are directly gained by the information of the last child's birth date from the women from 15-49 years old. The calculations of the following parameters are made in excel,with the formulas: (John Wiley & Sons, 1958),(Peter A. Morrison,1971),(Norfleet W. Rives and William J. Serow,1984)

$$ASFR = \frac{Number\ of\ births\ from\ women\ in\ a\ specific\ age\ during\ a\ year}{The\ midyear\ population\ of\ women\ at\ a\ specific\ age\ group} \times 1000$$

TFR is equal to the sum of ASFR is for all age´s group and this is multiplied by 5, since the age groups are 5.
TFR =∑ASFR for the age groups, 15-49years old)x 5
CEB over 50 years old

The method of calculation for Koplik's population. Since the genealogical trees are build for all the inhabitants of Koplik,we can take information for the number of women over 50 years old who live in 2013 and for the number of the children ever born,by these women. With the same method of using the database the number of women over 50 years old and the number of their children can be calculated CEB,for every year from 1970-2013.

$$CEB\ 50+ = \frac{The\ number\ of\ childen\ ever\ born\ by\ women\ over\ 50\ years\ old}{Number\ of\ women\ over\ 50\ years\ old}$$

The information for the total number of children ever born by the women of these ages are suitable to calculate the past fertility.There are more possibilities that the average of the number of children ever born ,from the women of 45-49 years old age groups which shows the cumulative fertility will be higher than the TFR calculated from the actual data, because TFR is decreasing. The analysis of the TFR and CEB variation during these years is completed using ANOVA one factorial. (9)(Pallant,J.2007)

3. The Study Results

Table 1: ASFR for the population of Koplik for the 1960-2013 period

Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49	TFR-Koplik	CEB50+	MMG	IMR
1960	71.09	282.3	241.61	217.39	219.18	219.18	17.86	5.67	3.89		
1961	46.51	187.19	227.54	179.86	162.79	162.79	34.48	4.57	4.34		
1962	59.46	214.91	189.66	149.94	160	160	37.04	4.48	4.45		
1963	43.01	200.84	262.03	193.33	173.08	173.08	61.22	4.85	4.434		
1964	57.42	196.43	200	228.4	100	100	74.07	4.59	4.49		
1965	54.85	208.53	306.22	194.63	152.17	152.17	28.17	4.997	4.597		
1966	38.79	227.91	242.57	203.59	158.27	158.27	44.78	4.87	4.59		
1967	36.29	227.03	254.39	195.4	163.12	163.12	28.57	5.07	4.602		
1968	61.73	288.04	271.97	186.17	193.33	193.33	0	5.73	4.654		
1969	50.63	210.53	241.07	165	135.8	135.8	48.78	4.532	4.665		
1970	51.45	278.48	303.32	225.96	154.36	154.36	27.4	5.64	4.504	18.49	67.45
1971	14.45	224.14	186.05	148.51	162.65	162.65	11.63	4.02	4.4958	18.85	104.85
1972	33.24	250.259	259.46	197.37	98.27	98.27	50.51	4.98	4.486	18.58	70.03
1973	23.72	171.43	251.14	184.1	133.69	133.69	19.42	4.19	4.4586	18.08	50
1974	23.15	189.87	191.39	170.4	95.48	95.48	18.69	3.81	4.4408	19.45	60.15
1975	16.49	163.99	244.73	166.67	162.68	162.68	51.47	4.5	4.4719	19.57	57.75
1976	18.44	157.009	168.1	165.09	79.21	79.21	29	3.36	4.521	19.09	77.87
1977	17.4	146.07	181.45	114.43	131.58	131.58	14.29	3.43	4.501	20.24	59.83
1978	21.18	192.81	214	194.6	113.92	113.92	26.67	4.06	4.5135	19.72	65.97
1979	12.37	146.88	147.68	144.93	94.59	94.59	24.54	3.06	4.4961	20.24	64.81
1980	20.44	221.61	202.59	198.31	92.68	92.68	20.27	4.09	4.521	20.14	51.72
1981	11.11	131.51	187.74	108.23	56.87	56.87	6.02	2.66	4.53	20.19	57.14
1982	9.24	177.22	232.21	149.2	65.57	65.57	11.49	3.45	4.559	20.6	62.5
1983	18.31	158.16	173.2	98.77	70.65	70.65	10.87	2.89	4.57	21.81	44.84

1984	6.812	135.5	190.63	110.17	67.96	67.96	5.1	2.72	4.554	20.98	45.25
1985	18.18	138.08	229.28	199.13	89.36	89.36	4.85	3.49	4.583	20.79	55.97
1986	7.86	144.65	221.92	103.85	52.4	52.4	5.08	2.86	4.599	20.41	12.45
1987	7.5	138.43	223.36	120.3	69.39	69.39	9	2.98	4.578	20.89	15.94
1988	8.1	166.67	188.78	124.59	66.12	66.12	21.37	3.12	4.61	21.49	18.32
1989	9.51	171.53	177.57	171.88	46.81	46.81	0	3.06	4.60	21.17	45.3
1990	19.72	134.11	224.94	187.85	113.04	113.04	9.8	3.64	4.584	20.96	38.36
1991	12.66	101.018	241.09	104.11	57.69	57.69	4.81	2.74	4.599	21.42	44.83
1992	16.62	134.42	208.68	147.21	67.92	67.92	11.05	2.99	4.55	20.68	46.73
1993	19.2	127.52	188.79	102.05	45.6	45.6	5.49	2.53	4.53	20.83	38.73
1994	18.38	155.53	235.4	147.2	62.5	62.5	9.71	3.23	4.56	20.25	34.38
1995	21.21	149.72	231.18	154.02	49.59	49.59	0	3.12	4.491	21.1	26.39
1996	12.6	163.6	224.45	155.46	71.04	71.04	0	3.19	4.482	21.3	27.32
1997	21.05	143.93	202.07	91.1	40.61	40.61	4.1	2.55	4.4729	20.79	13.16
1998	25.72	142.43	235.19	121.95	51.02	51.02	0	2.93	4.434	21.09	23.74
1999	14.4	136.92	185.11	117.22	37.47	37.47	21.28	2.59	4.37	20.89	23.65
2000	40.2	157.8	242	130.59	64.88	64.88	4.33	2.27	4.33	19.93	5.51
2001	38.9	127.96	161.29	93.07	35.79	35.79	0	2.33	4.31	20.88	3.8
2002	32.2	137.25	205.3	93.59	58.09	58.09	0	2.7	4.251	20.75	16.45
2003	15.85	125.6	172.57	110.07	31.95	31.95	6.56	2.48	3.832	21.58	16.19
2004	20.93	129.6	162.84	80.31	40.29	40.29	0	2.19	4.236	21.14	12.55
2005	21.55	117.65	182.45	106	50.36	50.36	0	2.48	4.1408	21.61	4.31
2006	6.9	112.38	148.78	94.38	36.36	36.36	5.62	2.06	4.0946	21.6	4.31
2007	13.26	86.73	171.02	103.75	24.31	24.31	2.59	2.02	4.0422	20.81	5.24
2008	16.02	77.9	184.7	73.01	44.61	44.61	2.58	2.00	4.0469	21.19	5.32
2009	6.48	64.47	146.48	64.37	21.07	21.07	0	1.57	3.9375	21.61	6.54
2010	14.29	96.54	179.05	91.74	18.11	18.11	11.36	2.00	3.9626	21.24	10.75
2011	11.02	69.06	154.11	78.05	23.34	23.34	0	1.73	3.7832	21.98	13.25
2012	7.31	49.2	140.63	60.24	28.7	28.7	2.1	1.48	3.7975	21.52	14.39
2013	7.16	46.85	156.37	60.69	33.26	33.26	0	1.56	3.69	23	21.74

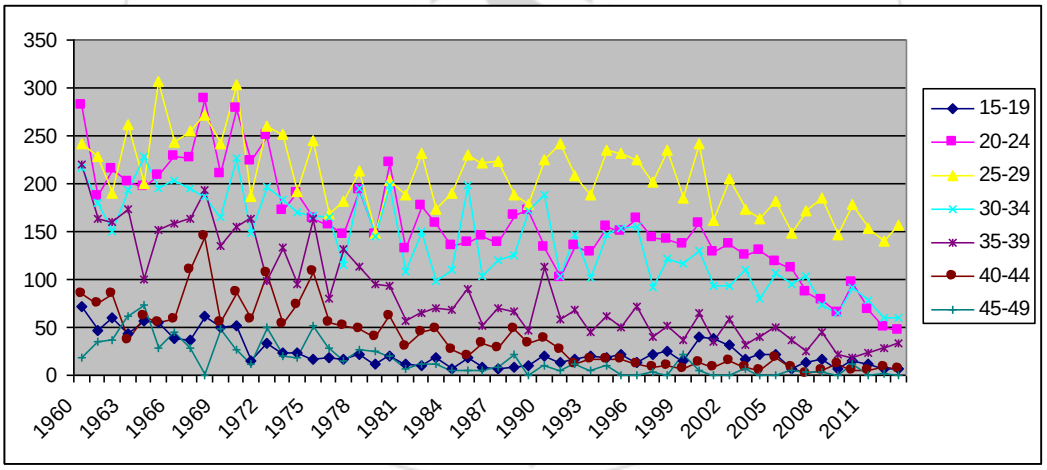

Figure 1: Graphical representation of ASFR for the Koplik population for the 1960-2013 period

TFR in different years shows a great variance, 0.81 compared to CEB 50, which shows a variance 0.0688. This shows that TFR in the 1970-2013 period, has changed more than CEB 50+ has changed, so the actual fertility varies a lot in different years compared to the variance of fertility in the past. There are significative differences between TFR that shows actual fertility and CEB over 50 years old, which shows the past fertility. This is actually seen clearly, based on the fact that TFR is coming to a decrease and the fertility in the past has been continuously high.

The factors which have affected the change of TFR(actual fertility) and CEB 50+, the fertility of the past years:

- The mean age of women's marriage. The increase of the age of marriage at women from 18.64 in 1970, to 23 years in 2013. The correlation between the age of marriage and TFR is -0.79, which shows that the increase of the age of marriage decreases fertility.
- The children's mortality

The children's mortality for the 1970-2013 period has a huge variation , but the trend has been the decrease of the children's mortality, where we have the situation of 100 deaths per 1000 births in 1971, in no deaths in 2014. The children's mortality is another factor which affects the fertility. The correlation between these parameters is 0.75 which means that the decrease of the children's mortality also decrease the fertility.

Table 2: Mean-parity of the entire population of Koplik with that of the locals of Mehaj neighborhoo

Age groups	Kopliku	Locals
25-29	1.98	1.9
30-34	2.36	2.3
35-39	2.66	2.63
40-44	2.77	2.68
45-49	2.8	2.7
50+	3.77	3.77

Let's analyze by Anova, the differences between the average number of children,born by 5 years old age´ group, from 25-49 years old.

Table 3

ANOVA						
Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.016133	1	0.016133	0.043173	0.839571	4.964603
Within Groups	3.736933	10	0.373693			
Total	3.753067	11				

The result of Anova, shows that the difference between mean-parity for the entire population and the mean-parity for the locals has no significative statistical difference, which means that there is no difference in the number of the children born by the women of the locals.That makes us think that the population of Koplik and also that of its' surroundings may have come in the same time in Malesi e Madhe, from Albanian lands outsise the border, mainly Kosovo and Montenegro, they have almost the same customs and traditions and in general the population of this land is an endogamus population, that means closed and its' population represents continuously scientific interest.

We reach in the same conclusion, if compare the fertility of main tribes of Kopliku by Anova.

Table 4: The fertility according to the age groups,for the main tribes of Koplik

Mosha	Mehi	Bajramaj	Hoti	Ramçaj
25-29	1.7	2	1.78	2
30-34	2.49	2.6	2.64	2.33
35-39	2.52	2.33	2.82	2.25
40-44	2.68	2.69	2.63	2.86
45-49	2.7	2.58	2.64	2.8
50 +	3.77	3.65	3.3	3.24

Even from the comparision of the number of children ever borned by women over 50 years old of the entire population of Koplik and locals it's observed that there is not any difference, so also the fertility of the past years represented by CEB 50+ has not any difference between the entire population and the locals of Koplik.

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