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DEMOGRAFSKI TOKOVI
ZEMALJA
JUGOISTOČNE EVROPE**



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ZEMALJA JUGOISTOČNE EVROPE**

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КОРЕЛАЦИОНА ЗАВИСНОСТ ИЗМЕЃУ ЖИВОРОЂНИХ И БРАКОВА У МАКЕДОНИЈА И СРБИЈА

PhD Trajko Miceski¹, Msc Natasa Stojovska²

Резиме

Статистички подаци о природном кретању становништва показују постепено смањење броја живорођених у скоро свакој земљи у свету. Македонија и Србија нису изузетак од овог глобалног тренда.

Међу бројним економским, социјалним, психолошким и технолошких фактора који одређују кретање живорођених, сасвим значајан утицај имају бракове. Спроведена анализа корелација у овог рада ће показати интензитет утицаја који бракови имају на живорођених у Македонији и Србији у периоду од 2000 до 2012.

Кључне речи: рођених, бракова, корелације, зависности, фактори

CORRELATIVE DEPENDENCY BETWEEN LIVE BIRTHS AND MARRIAGES IN MACEDONIA AND SERBIA

Abstract

Statistical data about natural movement of population show gradual decrease in the number of live births in almost every country in the world. Macedonia and Serbia are not exception from this global trend.

Among numerous economic, social, psychological and technological factors that determine the movement of live birth, quite significant impact have marriages.

The conducted correlation analysis within this paper will show the intensity of influence that marriages have on live births in Macedonia and Serbia in the period from 2000 to 2012.

Key words: live births, marriages, correlation, dependency, factors

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Introduction

Numerous factors that have influence on birth rate appear as result of modern living expressed through better living conditions, wider and more available health service, better education and participation of women on labor market etc. In fact, the economic, cultural and social human development increases the needs for professional accomplishment, personal satisfaction and leisure time, on one hand, but also decreases the wish for marriage and having child, on the other hand.

Quite significant factors that influence on birth rate in less developed countries, including Macedonia and Serbia, are the lower standard of living and unemployment as economic factors, which together with the psychological factors and aspiration for professional accomplishment are delaying the marriage and birth of a baby.

Live births in Macedonia and Serbia

The trend of declining live births is common for both countries. The movements of live births in absolute (number of live births) and relative (birth rate) values in Macedonia and Serbia in the period from 2000 to 2012 are shown tabular and graphic.

Table 1. Live births in Macedonia and Serbia in the period 2000-2012

Year	Macedonia		Serbia	
	Number of live births	Birth rate, crude	Number of live births	Birth rate, crude
2000	29.308	14,5	73.764	9,8
2001	27.010	13,3	78.435	10,5
2002	27.761	13,7	78.101	10,4
2003	27.011	13,3	79.025	10,6
2004	23.361	11,5	78.186	10,5
2005	22.482	11,0	72.180	9,7
2006	22.585	11,1	70.997	9,6
2007	22.688	11,1	68.102	9,2
2008	22.945	11,2	69.083	9,4
2009	23.684	11,5	70.299	9,6
2010	24.296	11,8	68.304	9,4
2011	22.770	11,1	65.598	9,1
2012	23.568	11,4	67.257	9,3

Source: Eurostat, European statistics

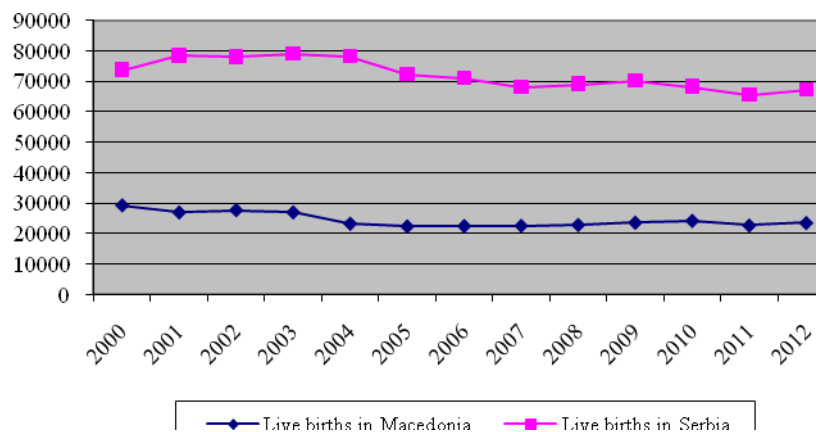


Figure 1. Live births in Macedonia and Serbia in the period 2000-2012

From tabular and graphic display we can notice that there is a reduction in the number of live births in 2012 compared to 2000. This declining trend is common for both countries, but it is more expressed in Macedonia. Thus, the percentage of decrease in Macedonia is 19.6%, while in Serbia it is 8.8%. Unlike Macedonia, where is seen continuous decline in the whole analyzed period (especially in 2004), Serbia has significant increase in the number of live births in the first five years and then a gradual decline starting from 2006 till the end of the analyzed period.

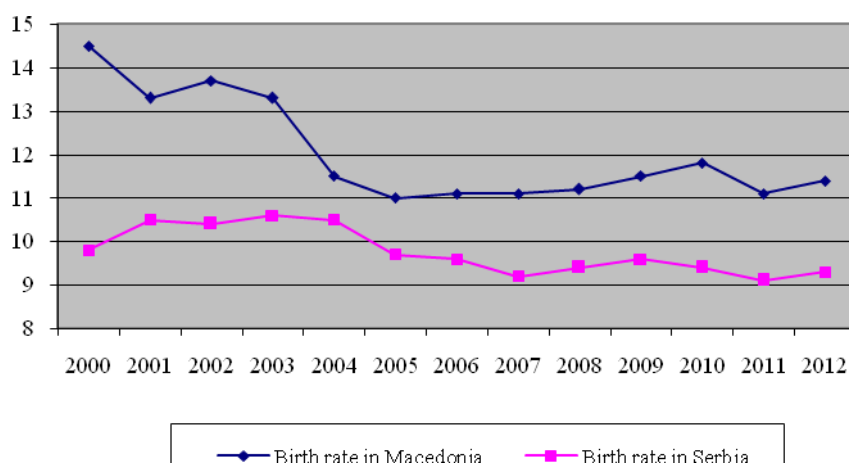


Figure 2. Birth rate in Macedonia and Serbia in the period 2000-2012

Graphic display of the birth rate (relative values) also confirms the negative natural movement of the population in these two countries. But, from this analysis can be made real comparison and conclusion that Macedonia, despite greater percentage of decline in the birth rate, has higher birth rate in all analyzed period. Macedonia, in 2012 with 11.4 births per 1000 inhabitants is in a better position compared to Serbia where this number is 9.3 births per 1000 inhabitants in 2012.

Marriages in Macedonia and Serbia

Despite the decreased live births, the trend of decreased marriages is also common for both countries. The movements of marriages in absolute (number of marriages) and relative (rate of marriages) values in Macedonia and Serbia in the period from 2000 to 2012 are shown tabular and graphic.

Table 2. Marriages in Macedonia and Serbia in the period 2000-2012

Year	Macedonia		Serbia	
	Marriages	Rate of marriages	Marriages	Rate of marriages
2000	14.255	7,0	42.586	5,7
2001	13.267	6,5	41.406	5,5
2002	14.522	7,1	41.947	5,6
2003	14.402	7,1	41.914	5,6
2004	14.073	6,9	42.030	5,6
2005	14.500	7,1	38.846	5,2
2006	14.908	7,3	39.756	5,4
2007	15.490	7,6	41.083	5,6
2008	14.695	7,2	38.285	5,2
2009	14.923	7,3	36.853	5,0
2010	14.155	6,9	35.815	4,9
2011	14.736	7,2	35.808	4,9
2012	13.991	6,8	34.639	4,8

Source: Eurostat, European statistics

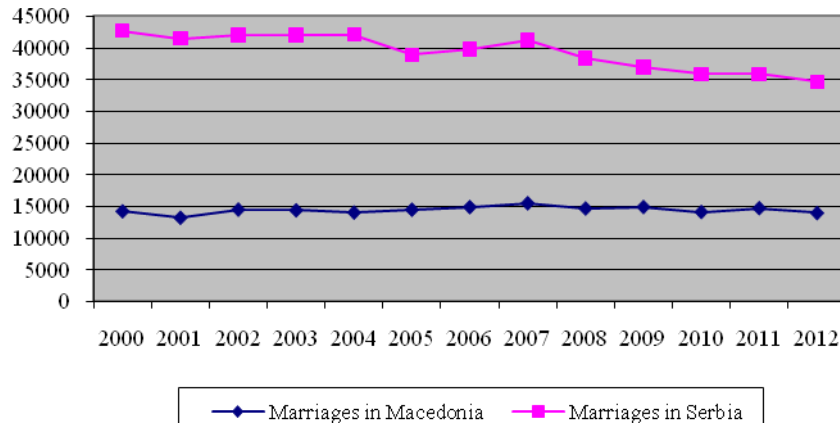


Figure 3. Marriages in Macedonia and Serbia in the period 2000-2012

Tabular and graphic display of marriages also show a declining trend, but the intensity of changes is different. Thus, in 2012, Macedonia shows 1,9% decline in the number of marriages compared to 2000, while the percentage of decline in Serbia for the same period is 18.7%.

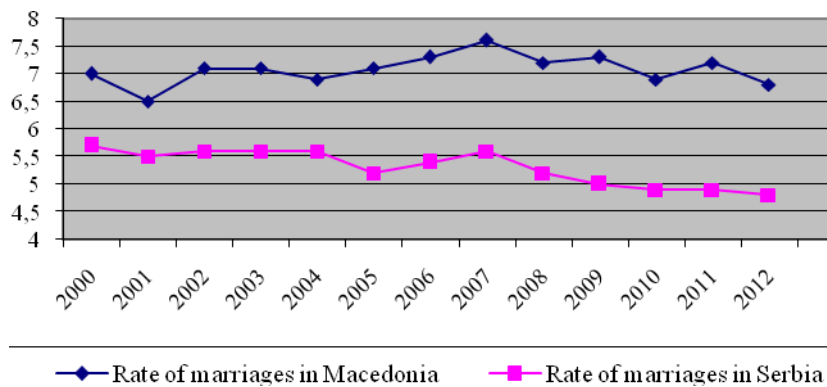


Figure 4. Rate of marriages in Macedonia and Serbia in the period 2000-2012

Graphic display of the relative values (rate of marriages) also confirms the trend of declining. This graph allows comparison from which we can conclude that Macedonia with 6.8 marriages per 1,000 people is in a better position from Serbia with 4.8 marriages per 1000 inhabitants. Contribution for this situation has the better starting position of Macedonia (7 marriages per 1000 inhabitants compared

with 5.7 marriages per 1000 inhabitants in Serbia), as well as the significantly smaller percentage of decline of this variable (1.9 %) in all analyzed period than in Serbia (18.7 %).

Factors that contribute to declining marriage rate

The rapid pace of living imposed by modern trends (globalization, information and technological innovation, greater involvement of women in the business world and others) leads to marriage delay, and consequently to decreased number of marriages [1, p.14]. Nowadays, young people have increased desire for professional achievements, trips and hedonism, despite decreased interest in marriage and childbearing.

Among the factors that determine the number of marriages, most important are:

- Increased participation of women in the labor market

Today, women's level of education, intelligence and productivity is equal to that of the men, which allows the same jobs, pay and gender equality in employment, on one hand, but also reduces the interest in marriage, on the other hand. Women, motivated by earnings in the labor market, tend to work hard, and because marriage brings costs, they more often decide to delay the marriage or to not marry.

- Lower men's relative income

Higher employment of women compared to the past means more equal income of men and women i.e. increase in women's relative earnings and decrease in men's relative income. To feel superior and powerful, men first want to ensure a reliable and stable source of income before marriage. Achieving this goal requires time and that is why they delay marriage.

- Reduced benefits of family formation

Unlike before, when for women entering into marriage meant accepting the role of housewife, mother and wife, today, in front of all these, stands up the role of career woman. This change in priorities indirectly influence on the number of marriages. Woman, in choosing a partner sets higher criteria in terms of education, intelligence and financial condition that the potential husband should possess i.e. he should be appropriate to her status [2, p.257]. The search for appropriate spouse takes time, and this leads to delaying the marriage or not getting married.

- Lower cost of alternatives

Besides marriage between man and woman, today, more frequent are marriages between persons from the same sex in countries where this is legal. Although in Macedonia and Serbia such marriage is not allowed, there are many

same-sex couples who live together or have a relationship. This trend affects on reduction in the number of heterosexual marriages, and the impact would be even more intense if gay marriages are legally allowed.

- *Better access to contraception and abortion*

Technological development in medicine has allowed young and married couples to plan and control the number of children and the time of their birth. Unlike traditional unreliable methods as counting the fertile days, abstinence and others, today are used far more reliable methods, such as contraceptive pills, condoms, surgical sterilization and various injections and implants. From all these, contraceptive pills are the most attractive method for younger women even though they are aware of their negative effects on the health and future reproductive capacity [3, p.56].

- *Hedonism - desire for personal satisfaction*

Human being, as a rational creature, tends to get maximum satisfaction with minimum invested funds, minimal spent time and minimum risks. In terms of growth of disposable income, stressful lifestyle and lack of time, changing requirements, tastes and desires indicate the need for more enjoyment, small pleasures and better leisure time. In fact, the desire for pleasure and enjoyment is becoming more intense, while willingness to share time, opportunities and satisfaction with spouse and children is getting lost. In this respect, human being emerges as selfish and egoistic creature whose priority is personal pleasure, not sacrificing and giving pleasure to own child.

Correlative dependency between marriages and birth rate in Macedonia

To determine the degree of influence that marriages have on the live births in Macedonia in the period 2000-2012, it is necessary to calculate the correlation coefficient using double-logarithmic model:

$$Y_i^* = \hat{\beta}_0^* + \hat{\beta} X_i^* + \varepsilon_i$$

where Y is the number of live births (dependent variable), X is the number of marriages (independent variable), i.e. to examine whether and how much the size marriages influence on live births.

Table 3. Calculation of the correlation coefficient between live births and marriages in Macedonia

Year	Live births Y	Marriages X	Y*=lnY	X*=lnX	Regression line \hat{Y}_i	Residual values ε_i^2
2000	29.308	14.255	10.2856	9,5649	10,1206	0,027
2001	27.010	13.267	10,2040	9,4930	10,2024	0,000
2002	27.761	14.522	10,2314	9,5834	10,0995	0,017
2003	27.011	14.402	10,2040	9,5751	10,1089	0,009
2004	23.361	14.073	10,0588	9,5520	10,1352	0,006
2005	22.482	14.500	10,0205	9,5819	10,1012	0,007
2006	22.585	14.908	10,0250	9,6097	10,0696	0,002
2007	22.688	15.490	10,0296	9,6479	10,0260	0,000
2008	22.945	14.695	10,0409	9,5953	10,0860	0,002
2009	23.684	14.923	10,0726	9,6107	10,0684	0,000
2010	24.296	14.155	10,0981	9,5578	10,1286	0,001
2011	22.770	14.736	10,0332	9,5980	10,0828	0,002
2012	23.568	13.991	10,0676	9,5462	10,1419	0,006
Total	319.469	187.917	131,3712	124,5159	131,3712	0,07898

The coefficient of determination is 0.22, i.e. marriages affect 22% on live births, which means weak correlative dependency between these two variables. The remaining 78% are due to the influence of other social, economic and psychological factors (standard of living, unemployment, professional development, mortality rate).

Correlative dependency between marriages and birth rate in Serbia

To determine the degree of influence that marriages have on the live births in Serbia in the period 2000-2012, we should calculate the correlation coefficient on the same way as we did it for Macedonia.

Table 4. Calculation of the correlation coefficient between live births and marriages in Serbia

Year	Live births Y	Marriages Y	Y*= $\ln Y$	X*= $\ln X$	Regression line \hat{Y}_i	Residual values ε_i^2
2000	73.764	42.586	11,2086	10,6593	11,2462	0,001
2001	78.435	41.406	11,2700	10,6312	11,2257	0,002
2002	78.101	41.947	11,2658	10,6442	11,2351	0,001
2003	79.025	41.914	11,2775	10,6434	11,2346	0,002
2004	78.186	42.030	11,2668	10,6461	11,2366	0,001
2005	72.180	38.846	11,1869	10,5674	11,1791	0,000
2006	70.997	39.756	11,1704	10,5905	11,1960	0,001
2007	68.102	41.083	11,1288	10,6233	11,2200	0,008
2008	69.083	38.285	11,1431	10,5528	11,1685	0,001
2009	70.299	36.853	11,1605	10,5147	11,1407	0,000
2010	68.304	35.815	11,1317	10,4861	11,1199	0,000
2011	65.598	35.808	11,0913	10,4859	11,1198	0,001
2012	67.257	34.639	11,1163	10,4527	11,0956	0,000
Total	939.331,0	510968,0	145,4177	137,4977	145,4177	0,01853

The coefficient of determination is 0.64, i.e. marriages affect 64% on live births, which means relatively strong correlation between these two variables. The remaining 36% are due to the influence of other factors (standard of living, unemployment, professional development, mortality rate, divorces).

Conclusion

From the conducted comparative analysis of live births and marriages, we can conclude that the situation in Macedonia and Serbia is worrying. The trend of decrease in the number of marriages and live births in these countries indicates the need for urgent measures.

Tabular and graphic display about the movement of live births and marriages over the years show that Macedonia is in better position.

From the calculation of the correlation coefficient can be concluded that marriages in Serbia have bigger impact on live births (64%) compared to marriages in Macedonia (22%). These different percentages mean that in Macedonia other economic, social and psychological factors have more impact on live births than marriages, while in Serbia the impact of marriages on live births is bigger than that of the other factors.

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