

Article

Some Observations on the Demographic Variables of Marriage System in Greek Thrace: Evidence from Several Anthropological Populations

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Abstract: The examination of demographic patterns and their variables is essential for our understanding of the anthropological and cultural processes that shape modern societies. Greek Thrace plays an important role in such analyses due to the cultural and socioeconomic variability it presents. This study is based on vital registration data of the 20th century, derived by various populations that inhabit the Department of Rhodopi, which are defined by discrete socio-economic, cultural, and historic backgrounds. We analyze and present various aspects of the social lives observed in these populations: marriage patterns, mean age at marriage of the spouses, mean age of mothers at first and last child, reproductive span, the children ever born, as well as other parameters related to reproduction. Our analyses show that several changes in marriage patterns have been undertaken throughout time, indicating an ongoing fertility transition. In that way, this study contributes to our knowledge on the anthropological populations from this part of Greece in relation to their socio-economic environment and it proposes possible analogies and differences that affected the evolution of the embedded populations.



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1. Introduction

Analyzing marriage patterns within a population is a rather old and challenging venture. Since the time of [Davis and Blake \(1956\)](#), all of the attempts that tend to present a model concerning marriage, sexual behavior, and reproduction (see for example [Bongaarts 1978](#); [Campbell and Wood 1988](#); [Kirchengast et al. 1998](#); [Okonofua et al. 1990](#); [Pavelka and Fedigan 1991](#); [Stover 1998](#); [Walker et al. 1984](#); [Wood 1994](#)) are mainly based on the notion of proximate variables. In other words, on a group of parameters like marriage duration, contraception, lactation infecundity, and others, which affect fertility, the outcome of the biological process of reproduction is analyzed. As [Roth \(1999\)](#) notes, cultural anthropology shifts the focus of analysis from the proximate to the so-called distal variables. The latter act on the proximate variables and determine the outcome of fertility. Among them, culture, economy, environment, genetics, and physiology may be included. Thus, in anthropological demography, culture can be considered as a distal variable that determines the action of the proximate ones, which on their turn represent the biology of reproduction expressed in terms of age at birth of the first child, lactation duration, and others ([Roth 2004](#)). However, humans are opportunistic living organisms, which respond to the environmental stress and develop new adaptive reproductive strategies and behaviors ([Bates 2005](#); [Kaplan and Lancaster 2003](#); [Mosley and Chen 1984](#); [Mulder 1998](#); [Mueller 2001](#); [Potts 1997](#); [Retaroli 1990](#); [Scagy 1973](#); [Turke 1989](#)). In that way, culture is a crucial variable for understanding demographic behavior. Since it is the outcome of the biological evolution and adaptation to different environments, culture becomes a norm that governs and dictates social behavior in

an inter- and intra-family level, influencing characteristics such as marriage, reproduction, and fertility, etc.

Thus, in all cases, reproduction is considered to be a multivariate phenomenon, which embraces all aspects of human existence. Inevitably it is a matter of political economy (Hand 1981; Kertzer and Brettell 1987; Kertzer 1995), social and cultural institutions (McNicoll 1994; Hammel 1990), social networks (Barkow and Burley 1980; Cavalli-Sforza and Bodmer 1971), gender relations (Eaton and Mayer 1953; Goody 1996; Greenhalgh 1995), agency (Carter 1995), socioeconomic classes (Colleran and Mace 2015; Colleran 2016; Kertzer 1991), and others. Nevertheless, within the core of reproductive processes, the biological nature of our species is abutted, not only because procreation is a biological phenomenon but also due to the adaptive nature of the developed reproductive strategies and human culture. In that way, demographic behavior is an adaptive response of humans to the changes of the physical and anthropogenic environment. As for “adaptive”, it cannot be a linear unambiguous developmental process. On the contrary, it would keep its dynamic character in accordance with environmental alterations.

It is evident that demographic behavior can be more profoundly understood when research focuses on small populations, since in such cases it is easier to detect and isolate the agents that affect it. In this paper we examine the demographic characteristics of marriage system between populations located in the Department of Rhodopi, in Greek Thrace and a population from Pieria (Vlachs of Karitsa). The included, two Muslim populations from Rhodopi lowlands, two of Roma origin, two Christian, and two mountainous populations (Pomaks), exhibit many resemblances and dissimilarities.

The historic and sociopolitical alterations that took place during the last two centuries in Greece make demographic research a demanding but also an important goal (Gavalas and Baltas 2022). The present paper comes as a part of a greater effort to analyze the genealogical and demographic structure of the anthropological populations that inhabit the Greek mainland. The cultural, social, and economic variability observed in the Greek mainland not only turn all analyses into a demanding process, but at the same time they highlight the necessity to expand our knowledge on the demographic patterns of the mainland of Greece.

A previous paper, presented fertility transition of the Vlachic population of Metsovo (Zafeiris et al. 2015). Vlachs are an Aromunian (Latin)-speaking population, originating from the mountainous areas of the Balkan Peninsula. In Metsovo, a rapid fertility transition was observed during the 20th century, following the social and economic transformations that occurred in the local micro-society in its adaptive and assimilating course toward the rest of the population of Greece. An intense fertility transition was also found in Pomaks (Zafeiris 2020). This was probably related to the arsis of geographic isolation and their implication in market economy, whereas at the same time they were able to maintain their cultural and religious characteristics being part of the Muslim minority inhabiting the Greek Thrace. In northern Dion, *“the mechanism of fertility decline related to the gradual reduction of the mean age of the mother at last child, the parallel decrease in the mean age at childbearing and a shortening of the reproductive span. Fertility levels always maintained a dynamic character imposed by local cultural, economic and social structures, which, in turn, were part of broader national and international structures, in all the populations studied”* (see Zafeiris and Kaklamani 2019). Therefore, as observed in Greek Thrace, fertility is a result of a complex interaction of educational and socioeconomic factors (Zafeiris et al. 2021).

The scope of this paper is two-fold: (a) To extend further the analysis of the demographic characteristics of several anthropological populations integrating them into the socio-economic environment in which they live; and (b) to try to identify possible analogies and differences among them. To do so, we examined the major characteristics of the marriage system. In that way ages at marriage, age at first and last child, reproductive span, and children ever born are considered along with the dissolution of marriages. The analysis is grouped into cohorts of marriage (see below). Note that infant and child mortality will not be taken into consideration, since the rather small population numbers do not allow

the appliance of complicated statistical models to find a relationship between them and fertility. Nevertheless, further research based on a newly developed method, suitable for small-sized populations, will address such issues.

Within our research, all included populations (except for the Vlachs of Karitsa) are spreading over a limited area in Greek Thrace. Besides their geographic proximity, a first difference is related to their different religions. Muslim and Christian populations have developed themselves over time, based on different religious norms and rules embodying at the same time different cultural and religious-oriented adaptations. However, as it will be discussed later, the Muslim identity may embrace different religious sects, a fact which enhances the heterogeneity among them. Another factor of heterogeneity is related to the mountainous or lowland character of the studied populations. Except for Roma, all the other populations are rural, and historically, they based their means of existence to the cultivation of the land. However, mountainous life is hard, the winter there is harsh, and spring delays. Thus, cultivations were limited, and many people were either shepherds or woodcutters. Many people that belong to the Christian population of Karitsa were also shepherds and woodcutters, but in this case, they had a different cultural and religious background. Roma on the other hand present a different social and economic life. Thus, a multivariate scheme of resemblances and divergences emerges, imposing several questions about the demographic history of the studied populations and of the factors affecting this course.

The Geographic Setting

The under study populations live in three neighboring villages in the Rhodopi low-lands, those of Aratos, Bragia, and Anthohori (Figure 1).



Figure 1. The geographic distribution of the studied populations.

Anthohori village is inhabited by Christians originating from the Eastern Thrace, which nowadays is the Turkish part of the geographic territory of Thrace. As a rural population, its inhabitants settled here after the compulsory exchange of populations between Turkey and Greece, by the end of the Greek–Turkish war in Asia Minor and the sign of the Lasanne Treaty (see [Clogg 2002](#)). Nowadays many of them have migrated to Athens and to other major Greek cities, as well as to Germany and to several other European countries. Anthohori was acknowledged as an independent settlement in the Census of 1961. Before then it was part of the nearby village of Aratos.

Aratos is inhabited by a large group of Roma which consisted of both a Christian and a Muslim group. Along with the other Muslims within this area, the Muslim Roma of Aratos were considered to be as non-exchangeable in the compulsory exchange of populations mentioned above. The Christian Roma are mainly refugees from eastern Thrace. They migrated to Greece during the same period as the population of Anthohori did, and they gradually settled at the edges of the village next to their Muslim counterparts. The demographic and genealogical structure of the Christian Roma has been published

elsewhere ([Zafeiris and Xirotiris 2002](#)), and data from this publication will be used here for comparative reasons. While the Muslim Roma of Aratos have preserved much of their traditional life, the Christian ones have undergone a significant socio-economic transition due to their great effort to integrate into the social and economic process of the area. Moreover, Muslim Roma live in the nearby Bragia Village. Unfortunately, since population sizes of the Muslim Roma in both villages are quite small and for reasons of comparisons, they will be presented as one, large, unified group called Muslim Roma.

The rest of the Muslim population of Aratos and Bragia consisted of lowland and no exchangeable Muslims as well as of mountainous Muslims who migrated there, called Pomaks. Some of the inhabitants originate from Bulgaria, a region from where their ancestors left during the beginning of the 20th century. Mainly they are land workers, farmers, construction workers. Some of them work in the tertiary economic sector, while others have migrated mainly to Komotini and Germany. These populations will be called Muslims of Aratos and Muslims of Bragia from now on.

Two other population groups will be added in this paper. The first of them is the mountainous population of Pomaks. They live in 23 isolated villages north-eastern of Komotini, the capital of the Rhodopi Department. Part of the results presented by a previous demographic analysis/work ([Zafeiris 2006](#)) will be cited here, grouped into two population groups, those of Organi and Kehros. Pomaks is a Slavic-speaking ex-Christian population that was Islamized by the 17th century ([Georgieva 2001](#); [Papachristodoulou 1958](#)). Even though they are Muslims, the majority of Organi's people are Sunnites while numerous Bektashi live in Kehros. As mentioned above, they have undergone a rapid demographic transition in the last fifty years which is mainly connected with the gradual arsis of the geographic and cultural isolation of the area they live in and their progressive integration to the market economy ([Zafeiris 2020](#)).

For reasons of comparison, the Vlachs of Karitsa will be part of our analyses ([Zafeiris and Xirotiris 2007](#)) in order to examine the demographic similarities between Rhodopi and more remote areas. They are Christians and they live almost 320 km away from Komotini. They are an ex-mountainous population which settled in Pieria's lowlands by the ends of the 19th century. Mainly they are employed in the primary economic sector but also in the secondary and tertiary ones.

2. Materials and Methods

In order to be able to identify possible inconsistencies of the data and to examine the family formation system (data collected refer to years up to 1994, corresponding to 1479 family registries and 5163 persons) we used the civil register records of Aratos, Bragia, and Anthohori villages, which formerly constituted the municipality of Aratos. These were used for the construction of the paternal genealogical trees of all of the members of the populations. Survey data have served this purpose, as well as the collection of anthropological, economic, and socio-cultural evidence which will outline the interpretative context of the demographic analysis.

Mean ages at marriage for both spouses, the age difference of the spouses, mean age of mother at first child, marriage—first-child chronological gap, mean age of mother at last child, children ever born per mother, proportion-divorced, and proportion-widowed were directly calculated from the data. Moreover, the reproductive span of the mothers was examined, calculated as the result (in years) of the subtraction of the birth date of the last child minus the birth date of the first child plus one year in order of the whole childbearing span of women to be taken into consideration ([Stevenson et al. 1989](#)). For the post World War II period, all the calculations were based on the exact dates—if known—of the demographic events. Since these calculations are based on sample data, nonparametric statistical tests were applied in order to test the mean age differences between the different marriage cohorts.

However, while dates were quite accurate (day precision) in the post-World War II period, in many of the cases dated in the pre-war one, only the year of the event was

known. In these cases, the event was considered to have taken place exactly in the middle of the known year. Moreover, a clear overestimation of the ages of the spouses is evident for the people married up to 1930; a usual phenomenon in the Greek archive data, which was confirmed during our field work in various populations. Due to the approximation of the ages of the spouses, all marriage cohorts before 1950 were unified in two broader study periods, that of 1900–1929 and 1930–1949. Note that this was a historically, politically, socially, and economically diverse period and the “creation” of such big cohorts diminishes enough the interpretation abilities of the findings. However, it must be mentioned that there is no precise method to examine the validity of all data acquired by the above distant periods of time. For that reason, Pre-World War II findings will be cited, but they will also be discussed as approximate measures wherever it is thought to be appropriate. In addition, the large chronological gap observed between marriage and first child in the 1900–1929 cohorts might be related to two parameters. First, the quality of the data in these marriage cohorts must be responsible for the above phenomenon. Second, this gap must be attributed to the historical and political alterations that followed Thrace’s integration in Greece (in the late 1920s) and the subsequent emergence of a feeling of insecurity that affected these populations.

Note that a data truncation problem may exist for the last cohort of the analysis. Due to the nature of the data, this problem cannot be solved in an acceptable way; thus, any findings should be interpreted with caution.

3. Results

3.1. Comparison of Age at Marriage Trends

According to the official data presented by the Hellenic Statistical Authority, females’ mean age at marriage in Greece decreased from 24.5 years in 1956 to 22.6 years in 1980 and increased, once again, to 24.9 years (24.4 for the first marriage) in 1992. For males, age at marriage remained well above the 27.5 years and reached the 30 years of age in 1999. However, the paradigm of Greek Thrace is indicative of the possible variability that can be observed throughout the country. While brides in Thrace are constantly getting married between the 22nd and the 23rd years of their life (1961–1991), grooms’ mean age at marriage increased from 25.5 to 27.1 years in the same period, remaining well below the national average (own calculations). This variability becomes even greater if the analysis focuses on small populations. The observed repertoire of marriage patterns of the populations studied here, despite the universal character of marriage in all of them, is indicative of the range of diversification of their economic, social, and cultural characteristics (Table 1). This is in accordance with the findings presented in series of other studies, where it was shown that even if age at marriage hinges on economic variables (Wrigley and Schofield 1981), the distal effect of social and cultural parameters is of great importance too (Trumbach 1978), especially in small anthropological populations where it may be more essential than that of the economic ones (Kertzer 1995).

Age at marriage of the Christian population of Anthohori village is always higher in comparison to the rest of the included populations (Table 1). The brides of Anthohori are getting married around the 22nd and 23rd year of their life as seen in most of the examined post World War II marriage cohorts. Even though an increasing trend of mean marriage age is observed, especially for the 1980–1989 group, differences between the cohorts are not statistically significant. Grooms’ age at marriage seems to increase throughout time reaching gradually the ones observed in the national levels. This can be seen in the case of the Vlachs of Karitsa village after 1970–1979. However, differences between marriage cohorts are once again not statistically significant. A significant overestimation of the age at marriage is expected to be present within the first cohort, not only in the case of Anthohori but also within all of the other populations. This is related to the absence of official birth certificates, since all of the people that formed these cohorts were born in the Ottoman Empire’s territory which lacked a “western type” of registration system. This problem

persists within the next marriage cohort, but to a slightly lesser extent. That is why age at marriages for the pre-World War II period will not be included in our analyses.

Table 1. Mean age at first marriage in the under-study populations. First marriages.

Anthohori (Christians)				Aratos (Roma-Muslims)			Aratos (Muslims)			Bragia (Muslims)		
Marriage	Mean	N	StD	Mean	N	StD	Mean	N	StD	Mean	N	StD
Cohort	Females											
1900–1929	21.7	32	4.62	20.3	13	3.76	21.1	84	5.13	20.0	42	3.55
1930–1949	19.8	51	4.74	17.8	38	2.61	19.4	98	3.53	19.3	59	2.74
1950–1959	21.8	35	2.93	17.9	39	3.29	20.2	89	3.36	20.1	48	3.87
1960–1969	23.0	60	3.36	17.8	63	3.28	21.1	91	3.81	21.2	88	3.57
1970–1979	22.9	54	5.96	18.0	75	3.32	20.8	112	3.16	22.1	71	4.67
1980–1989	24.5	40	5.80	17.4	104	3.51	20.2	100	3.54	20.6	37	3.32
>1990	22.6	6	2.17	18.6	28	4.15	21.2	25	2.99	21.0	13	7.13
Males												
1900–1929	27.2	29	6.60	27.1	14	8.08	28.6	79	6.30	25.7	42	6.32
1930–1949	25.3	41	6.61	21.6	32	5.27	24.5	88	4.7	23.0	58	3.30
1950–1959	25.4	28	3.23	21.7	29	4.79	23.4	68	4.05	23.1	34	3.63
1960–1969	26.8	35	2.78	19.9	42	2.96	22.6	60	2.58	22.2	44	3.31
1970–1979	26.7	26	3.75	20.4	45	3.00	22.3	66	2.89	22.1	38	2.76
1980–1989	29.7	30	6.31	19.8	56	3.34	23.4	59	2.67	22.9	25	4.38
>1990	29.0	7	6.40	21.7	13	3.24	25.1	16	2.67	23.6	9	3.19
Karitsa (Vlachs)				Organi (Muslims-Pomaks)			Kehros (Muslims-Pomaks)					
Females												
1930–1939	22.1	44	4.07							Kruskal–Wallis test		
1940–1949	22.1	45	3.36	19.0	110	2.59	17.6	14	2.44	x ² P		
1950–1959	22.8	61	3.31	20.5	360	2.75	20.0	59	2.95	Anthohori 5.53 0.237		
1960–1969	22.6	116	3.49	19.7	281	2.34	20.9	122	2.49	Roma (Mus) 4.1 0.393		
1970–1979	21.1	141	4.38	19.3	277	2.24	20.7	144	2.63	Bragia (Mus) 12.3 0.016		
1980–1989	20.1	89	4.55	19.4	314	2.17	20.7	151	2.71	Aratos (Mus) 8.81 0.066		
>1990	22.6	82	5.68	19.6	96	2.01	21.8	57	3.90	Post-World War II cohorts		
Males												
1930–1939	26.9	44	4.54							Kruskal–Wallis test		
1940–1949	28.0	45	4.39	23.6	120	3.72	21.6	19	3.63	x ² P		
1950–1959	26.7	61	2.76	23.0	380	3.12	22.3	64	2.76	Anthohori 7.2 0.126		
1960–1969	26.1	111	2.83	22.4	285	3.21	23.3	135	3.06	Roma (Mus) 6.9 0.139		
1970–1979	25.0	136	2.49	22.2	282	2.90	22.6	157	3.44	Bragia (Mus) 3.1 0.539		
1980–1989	26.0	85	3.03	21.7	322	3.00	22.6	169	3.15	Aratos (Mus) 14.0 0.007		
>1990	27.7	78	4.15	22.1	104	2.24	24.4	61	3.68	Post World War II cohorts		
Aratos (Roma-Muslims)												
Total Marriages			Official Marriage before the Birth of 1st Child				Official Marriage after the Birth of 1st Child					
Females												
<1940	21.6	21										
1940–1959	20.0	33	18.6	20			24.2	9				
1960–1979	18.9	76	18.1	47			20.8	16				
1980–1994	19.7	62	18.0	35			21.3	6				
Males												
<1940	31.0	21										
1940–1959	22.1	33	21.1	20			25.1	9				
1960–1979	21.7	64	20.9	47			25.2	13				
1980–1994	23.1	52	22.7	35			25.5	6				

If we assume that marriage signals the dawn of reproduction, Muslims predate Christians (Table 1). With a few minor exceptions, females' age at marriage tends to be 20–21 years, but it is worthy to note that females of Organi are getting married younger (less than 20 years old). Males are getting married later, when they are about 22–23 years

old. According to survey data, this is largely linked to the need of fulfilling their military obligations before marriage. In the last marriage cohort, there is a general trend, observed in all of the populations (including the Roma), of an increasing mean age at marriage for both males and females. However, sample sizes are very small, indicating that differences are not always statistically significant and the problem of data truncation persists.

The Muslims Roma exhibit a different strategy concerning the onset of marriage life. Mean age at marriage for both spouses is the lowest compared to the rest of the sample. For women in most of the studied cohorts it is only the 18th year or even less. On the other hand, many of them are getting married before their 16th birthday (31.4%, comparing with 1.5% for Christians and 5.0% for the other Muslims). This finding confirms the notion that the very early marriage is a common practice of the Roma culture. In Agia Barbara, a city in Attica, such unions constitute 28.5% of the total number of marriages. In Kato Achaia, a village in Peloponnese, the relevant percentage is 30.9% (Pavli and Sideri 1990), and in the neighboring population of the Christian Roma is 21.6%. Similar patterns can be found all over the world, as for example in the Roma population of Terbisov (Czechoslovakia 1950s), where girls entered marriage when they were 13–15 years old, while boys when they were 14–18 (Kalvoda 1991).

Undoubtedly, such practices are linked to strong cultural traditions concerning marriage and gender roles but their preservation in the modern era should be ascribed to the very low socio-economic status of the Roma populations. As Kaldova notes for Terbisov (1991), *“religious wedding ceremony was, in some families, merely a formality. Valid was only their own marriage ritual that was based on the fact that the collective of the Gypsy community approved that two individuals live as a man and wife, even though both of them were rather young”*. Within this framework, if two people share a common and stable, widely accepted cohabitation, their community would consider them as married. This acknowledgement did not presuppose the official legalization of their marriage, whereas according to their country’s civil laws they would remain unmarried.

This is a common finding within the demographic studies of Roma populations. In Andalusia for example, most of the conjugal unions of women born during the first two decades of the 20th century were mainly non-legalized marriages (Martin and Gamella 2005). This kind of unions diminished in the younger birth cohorts: 20% of women born between 1960 and 1969 did not possess an official matrimonial contract. On the other hand, official marriage usually followed the birth of the first child. This phenomenon, even if it was gradually diminished, may indicate that procreation triggered people to seek state’s recognition for their marriage, which simply suggests that there was a bureaucratic need for official recognition of progenies, as it was also found in the population of Christian Roma of Aratos (Zafeiris and Xirotiris 2002).

For the latter, the official, religious marriage mainly signaled the beginning of the partners’ reproductive phase. If the official marriage followed the birth of the children, these were acceptable by the local community according to the cultural norms. But even in that case, legalization of the “customary marriage” was essential for local people, because of the need of children’s registration to Registrar’s Office and their effort to integrate themselves to the social, economic, and political life of Thrace, not mentioning the receiving of child allowances. As a result, a main question is being raised. Can age at marriage be regarded as a proxy variable for age at first child, or as a starting point of observation of a woman’s reproductive history?

This could be rather acceptable in the cases that official marriage precedes the birth of the children. In the opposite situation, age at first child should be considered as a proxy variable of the age at marriage. Thus, marriage itself and age at marriage as characteristics of the reproductive history or as proximate variables of the observed levels of fertility lose their strength. This can be observed in the case of Christian Roma of Aratos. If marriage precedes the birth of children, mean age of women at marriage remains almost stable and low (about 18 years). On the contrary, it is quite higher in all other cases (Table 1).

On the other hand, except for the Christian Roma of Aratos (18.1%), childbearing before marriage is an extremely rare practice in all the under-study populations (only 2 cases in the population of Anthohori and 3 in the population of Muslim Roma). But considering that parturition comes, on average, 266 days after conception (Jones 1997), then in the 15.8% of the marriages of Christian population the bride was pregnant during the ceremony. This is also quite common in the population of Muslim Roma (14.6%), but rare enough in the other Muslim populations (3.2%) and mainly related to some cases of emigrants to Germany and Netherlands. It is unknown whether the forthcoming marriage triggered the reproductive process or, on the contrary, if the pregnancy of the future wife triggered marriage. However, it is rather obvious that there was a widespread tendency to avoid procreation outside marriage. This fact is linked to the strong cultural and religious norms and beliefs.

3.2. Religion's Role in Reproduction

Religion plays an important role in the formation of social identity. It imposes several moral rules to control reproductive behavior and it also defines the mechanisms by which these rules are diffused and consolidated (McQuillan 2004). As a result, religious identity impinges on demographic behavior (Lehrer 2004). Both Christianity and Islam forbid premarital sex as well as reproduction outside marriage; religious people must avoid both. But people's behavior is not always the result of the passive acceptance of cultural and social rules. On the contrary, people can act, and their actions are the results of a dialectic relationship between the actors and their environment (Carter 1995). In other words, the birth of a child must not only be addressed in relation to its environmental, socio-economic, and cultural setting but also in relation to the consequences of this birth.

Except for the Christian Roma group, procreation before marriage was avoided during those times, since an illegitimate child was acceptable neither in Christian nor in Muslim populations. On the contrary it would cause severe criticism and phenomena of social exclusion in the rural Rhodopi.

The practice of premarital sexual intercourse was also avoided in the Muslim population but not in the Christian. It seems that for the latter, various socio-economic transformations either led to the revision of norms concerning "chastity", or to the expression of a moderated religiosity. Muslim Roma seem to have been integrated well enough into the cultural and religious system of Islam, adopting major characteristics of their Muslim—but not Roma—counterparts through several cultural diffusion processes. At the same time, they have abandoned some but not all the old habits and traditions. This is not a comment about their religiosity; it is rather a proposal that, as it is expected, the adoption of the Islamic religion may have caused several modifications in their original culture, without eradicating it. That is why procreation before marriage is avoided while pre-marital sex seems to be at least partly acceptable. These transformations are also present in the population of Christian Roma, where some of their major cultural characteristics are gradually abandoned in favor of their integration to the Christian majority of Thrace.

3.3. Comparison between Age at Marriage and Age of the First Child

In addition, despite the partial overlapping observed in some of the marriage cohorts, age distributions at marriage of males and females clearly formulate three distinct groups as seen in the scatterplot of Figure 2A. The most discrete between them is the Roma case (Figure 2A, 3). The intermediate group consists of the Muslim populations (Figure 2A, 2) and the last one of the Christians (Figure 2A, 1). The same classification is observed concerning the age of the bride and her age difference with the groom (Figure 2B), where a general tendency for greater differences is found in the Christian populations.

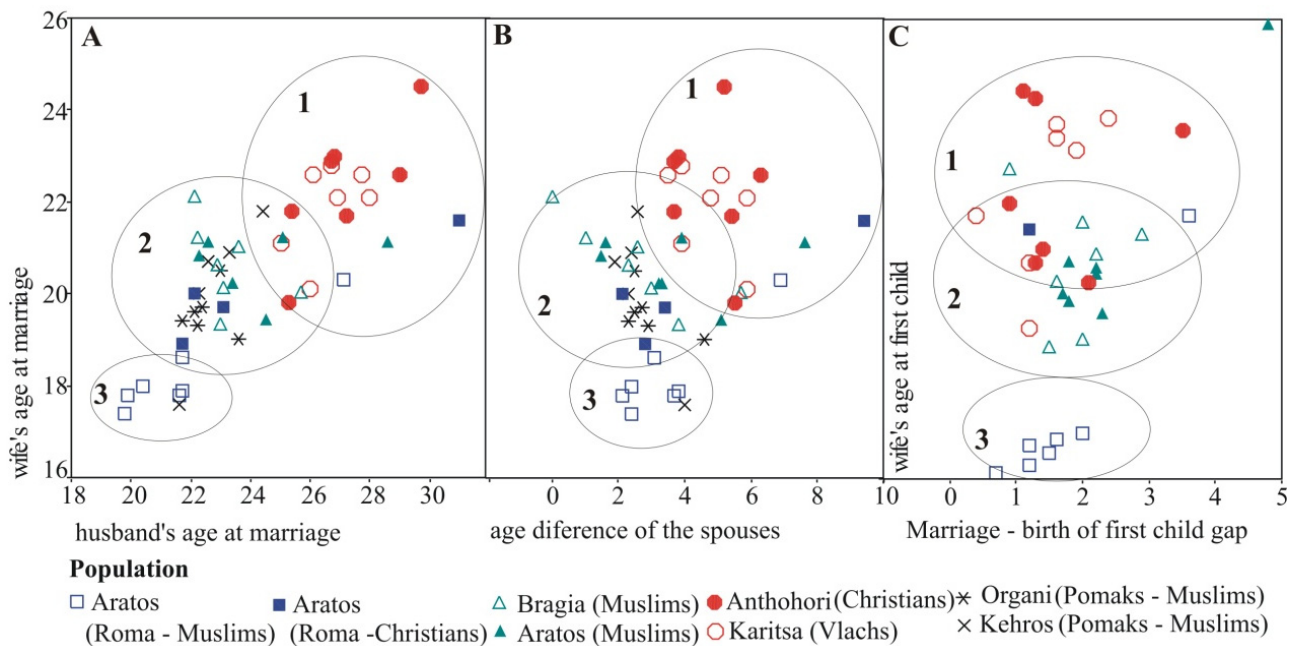


Figure 2. Scatterplot depicting 3 categories: the age of the spouses at marriage (A), age difference of the spouses (B) and age of mother at the birth of first child and chronological distance between this birth and marriage (C). Circles and numbers represent the population groups: 1 for Christians, 2 for Muslims and 3 for Roma. Example: A1: Marriage cohorts in Christian populations in Anthohori (red colored circles), Karitsa (red circles) and Aratos (blue colored squares)/A2: Marriage cohorts in Muslim populations in Bragia (green triangles), Aratos (green colored triangles), Organi (asterisk) and Kehros (x symbol)/A3: Marriage cohorts in Roma populations in Aratos (blue squares).

It is obvious that due to the observed variability in family formation processes, in the onset of sexual intercourses and in the timing of first birth in comparison to marriage, the most accurate index of the starting point of a woman's actual reproductive period is the mean age at first birth. Additionally, mean age of the mother at last child and reproductive span will provide an accurate measure for the endpoint and the duration of reproduction, i.e., they will provide a mechanistic model for the interpretation of the final outcome of the procreation, the number of children that a mother gives birth to.

The effects of socio-economic and cultural diversification in family formation processes can be seen via the comparison of mean age of mothers at the birth of the first child and the chronological distance between this birth and the date of marriage. Within this context and despite the partial overlapping, the same major groups as before are being formed (Figure 2C, Table 2). The most discrete of them is the Muslim Roma, where in most of the cohorts the average age at first birth stands between 19 and 20 years, 1 to 2 years after marriage ceremony (Figure 2C, 3).

In addition, even more different are: (a) the last marriage cohort (1990–1994) that concerns the marriage–first birth gap and correlates to censoring effects, and (b) the first cohort, where an overestimation of both variables is present. Except for these two cohorts, the second group is formed by the Muslim populations of Aratos and Bragia (Figure 2C, 2). The less different of them is that of the Aratos Muslims, where the mean age at first birth fluctuates around the 22 years and the gap marriage–first child around the 2. On the other hand, mean age at first birth fluctuates a lot—from 21 to 23 years—in the Bragia Muslims while the chronological gap is limited between 1.5 and 2.2 years.

Table 2. Chronological gap between marriage and birth of first child. Mean age of mother at the birth of first child. First marriage of the mother.

Chronological Distance between Marriage and Birth of the First Child				Mean Age of Mother at the Birth of 1st Child		
Marriage		Anthohori (Christians)				
Cohort	Mean	N	StD	Mean	N	StD
1900–1929	3.5	28	4.04	24.3	30	5.09
1930–1949	2.1	42	1.75	22.0	43	5.03
1950–1959	1.4	25	1.36	22.5	25	2.95
1960–1969	1.3	29	0.75	24.8	28	3.60
1970–1979	1.3	25	1.18	22.3	24	5.11
1980–1989	0.9	22	0.92	23.2	21	4.52
>1990	1.1	3	1.07	24.9	3	2.42
Kruskall Wallis (1950–1994)	$\chi^2 = 17.396, p = 0.001$			$\chi^2 = 8.255, p = 0.041$		
Aratos (Roma-Muslims)						
1900–1929	3.6	10	4.72	23.0	12	6.90
1930–1949	2.0	32	2.59	19.7	36	3.32
1950–1959	1.2	31	1.05	19.5	31	3.31
1960–1969	1.5	41	1.46	19.4	41	3.22
1970–1979	1.2	42	2.14	19.2	39	2.73
1980–1989	1.6	54	1.44	19.6	54	4.18
>1990	0.7	14	0.46	19.1	14	3.93
Kruskall Wallis (1950–1994)	$\chi^2 = 26.358, p = 0.000$			$\chi^2 = 0.045, p = 0.997$		
Aratos (Muslims)						
1900–1929	4.8	73	5.18	25.9	77	7.01
1930–1949	2.3	84	1.79	21.5	86	3.46
1950–1959	1.7	59	1.40	21.8	61	3.37
1960–1969	1.8	55	1.08	22.3	54	3.20
1970–1979	2.2	62	1.71	22.2	62	3.09
1980–1989	1.8	55	1.15	21.7	55	3.24
>1990	2.2	6	0.64	22.1	6	1.33
Kruskall Wallis (1950–1994)	$\chi^2 = 74.429, p = 0.000$			$\chi^2 = 2.327, p = 0.507$		
Bragia (Muslims)						
1900–1929	2.9	35	1.86	22.7	40	3.90
1930–1949	2.0	56	1.90	21.1	57	3.18
1950–1959	1.5	32	1.11	21.0	31	2.70
1960–1969	2.2	41	1.53	22.4	41	2.82
1970–1979	2.0	32	1.67	22.9	31	2.85
1980–1989	1.6	22	0.81	22.0	22	3.74
>1990	0.9	3	0.22	23.7	3	4.19
Kruskall Wallis (1950–1994)	$\chi^2 = 29.918, p = 0.000$			$\chi^2 = 10.613, p = 0.014$		
Karitsa (Vlachs)						
1930–1939	1.9	34	3.27	24.5	74	4.57
1940–1949	1.7	31	2.01	24.0	61	3.96
1950–1959	1.7	70	2.02	24.4	84	3.17
1960–1969	1.3	113	1.24	24.2	147	4.08
1970–1979	1.3	133	2.69	22.3	139	3.94
1980–1989	1.5	83	1.18	21.3	84	3.83
1990–1999	1.6	74	1.54	23.0	73	3.22

The third group is formed by the two Christian populations (Figure 2C, 1), and partly overlaps with the second one. In Anthohori, mean age at first child is as diverse as to be between 22 and 25 years, while marriage–first child gap is very close to 1 year in most of the cohorts. Karitsa falls into the same limits concerning mean age at first child but the chronological gap marriage–first child is somehow bigger.

In all under-study populations, age at marriage has a negative and significant correlation to the marriage–first child chronological gap (see Table 2). However, this correlation is weak (Pearson’s correlation coefficient: Anthohori: -0.102 , Muslim Roma: -0.122 , Aratos Muslims: -0.054 and Bragia Muslims: -0.158) and implies that there is a minor trend of decrease of this gap when age at marriage increases and vice versa. It seems then that there is a marginal effect on the age of first child when marriage is delayed, which undoubtedly relates to the social norms for procreation as well as to personal-psychological factors.

Additionally, an obvious reproductive strategy prevails in the Rhodopi lowlands. This is related to the avoidance of deliveries in very young ages (Table 2), even if they are not rare in the Muslim Roma population (25.1%, comparing with 5.9% for Anthohori and about 6.3% for the other Muslim populations).

This practice carries several adaptive advantages because it has been found that death probabilities of infants and young children (under five years old) are higher when mother’s age is less than 18 years compared to those of the children of the same age born by older women (Feeney 1980; Hobcraft et al. 1985). This, except for the well-known agents that affect child mortality, must be further attributed to the biological and psychological immaturity of the mother and to the need of development of the necessary skills for the nursing of the children before the onset of procreation (see Bean et al. 1992). In any case, it is obvious that discrete populations with diverse socio-economic, cultural historical background adopt a common reproductive strategy that optimizes offspring survival. However, differences between them remain significant and Roma populations remain in the most discrete position.

3.4. Comparison between the Reproductive Span

While the onset of reproduction can be estimated as the age of mother at her first child, the age of the mother at last child is the ending point of procreation. In all the under-study populations, a general trend of gradual decreasing of the age of mother at last child emerges, seen from the older to the younger cohorts (Table 3, only completed families were considered). Within that context, reproductive span shortens in Anthohori about 6 years. Note that mean age at last child is lower in the 1950–1959 cohort than it is in the next one. The same happens with the reproductive span. Considering that mean range of the reproductive span was 5.2 years for the women of this cohort, most of them terminated procreation by the late 1950s or the middle of 1960s, at the time of the great migration crisis that afflicted Thrace. According to the official data from the National Statistical Service of Greece (nowadays Hellenic Statistical Authority), the population of Anthohori diminished for about 35% between the 1961 and 1971 (total population; 1961 census: 255; 1971 census: 167) (National Statistical Service of Greece 1962, 1975).

Table 3. Mean age of mother at the birth of her last child, reproductive span and children ever born per marriage (Completed families). First marriage of the mother.

Mean Age of Mother at the Birth of Her Last Child				Reproductive Span			Total Number of Births		
Marriage				Anthohori (Christians)					
Cohort	Mean	N	StD	Mean	N	StD	Mean	N	StD
1900–1929	35.1	12	4.31	12.3	12	5.08	3.0	12	0.91
1930–1949	31.6	27	6.10	11.6	27	5.62	3.8	27	1.37
1950–1959	26.4	22	3.90	5.2	22	2.45	2.3	22	0.63
1960–1969	30.9	24	4.50	6.5	24	3.85	2.1	24	0.65
Kruskall Wallis	$\chi^2 = 24.071, p = 0.000$			$\chi^2 = 28.546, p = 0.000$			$\chi^2 = 33.259, p = 0.000$		
				Aratos (Roma-Muslims)					
1900–1929	37.9	9	7.50	17.8	9	7.79	5.4	9	2.51
1930–1949	35.2	29	5.75	16.5	29	5.73	5.2	29	2.16
1950–1959	26.8	21	4.19	8.4	21	4.32	3.0	21	1.02
1960–1969	26.7	16	4.51	7.7	16	4.87	2.7	16	1.01
Kruskall Wallis	$\chi^2 = 33.544, p = 0.000$			$\chi^2 = 32.955, p = 0.000$			$\chi^2 = 28.596, p = 0.000$		
				Aratos (Muslims)					
1900–1929	34.9	48	7.19	11.1	48	5.91	3.7	48	1.57
1930–1949	28.6	59	4.97	7.7	59	3.72	2.7	59	0.88
1950–1959	27.3	52	4.82	6.4	52	3.80	2.6	52	1.19
1960–1969	27.2	45	4.22	6.0	45	3.36	2.0	45	0.69
Kruskall Wallis	$\chi^2 = 39.913, p = 0.000$			$\chi^2 = 30.694, p = 0.000$			$\chi^2 = 45.725, p = 0.000$		
				Bragia (Muslims)					
1900–1929	33.5	20	6.42	12.4	20	4.70	3.7	20	1.30
1930–1949	32.0	48	5.59	11.8	48	5.27	3.6	48	1.39
1950–1959	28.2	28	4.57	8.0	28	3.84	2.4	28	0.74
1960–1969	28.1	33	4.43	6.2	33	4.07	2.2	33	1.36
Kruskall Wallis	$\chi^2 = 21.284, p = 0.000$			$\chi^2 = 36.928, p = 0.000$			$\chi^2 = 47.278, p = 0.000$		
				Aratos (Roma-Christians)					
<1940	38.5	13		16.4	13		5.3	13	
1940–1959	30.4	27		11.0	27		4.6	27	
1960–1979	27.7	19		8.6	19		2.7	19	
				Karitsa (Vlachs)					
1930–1939	37.5	58	3.44	13.9	58	4.42	5.1	59	2.04
1940–1949	33.6	53	4.86	10.4	51	4.29	4.0	55	1.57
1950–1959	31.2	82	3.90	7.2	97	3.06	3.1	106	1.19
1960–1969	29.3	139	4.43	6.0	138	2.72	2.8	143	0.90
1970–1979	27.0	118	5.01	5.1	118	3.44	2.4	123	0.94
				Kehros (Muslims-Pomaks)					
1940–1949	33.2	84	6.04	11.8	63	5.90	4.2	87	1.20
1950–1959	32.6	105	5.49	11.2	103	5.40	4.4	110	1.92
1960–1969	30.0	113	1.08	8.4	114	4.00	3.5	114	1.53
1970–1979	30.2	21	2.69	5.8	21	2.90	2.7	21	1.10
				Organi (Muslims-Pomaks)					
1940–1949	36.7	91	4.88	14.5	107	5.60	4.7	111	1.74
1950–1959	34.3	211	5.82	12.8	214	5.40	4.7	215	1.99
1960–1969	31.3	169	5.31	10.6	167	4.90	4.2	170	1.91
1970–1979	29.7	8	3.48	7.2	8	4.20	3.5	8	1.60

This was an era characterized by great uncertainty for the local people in their effort to seek an outlet from the extended economic slump and underdevelopment of Thrace. Some of them migrated to the capital of Greece (Athens) or to other major cities including the nearby Komotini, but the majority moved to Germany and to other western countries. In some cases, the whole family migrated. In other cases only the father migrated, leaving his family back home. In other words, the usual family formation process was greatly disturbed. The effects of migration are obvious in the next cohort too, where except for an observed increase in mean age of marriage of the spouses (Table 1), mean age at first child also gained 2.5 years (Table 2) and mean age at last child exceeded 30 years accompanied with an enlargement of reproductive span and a minor decrease in the average number of children ever born (Table 3). In Karitsa a similar shortening of mean age at last birth and reproductive span was observed signaling the future completion of fertility transition (Zafeiris 2009).

Additionally, mean age at last child is far below the age of menopause which was recently estimated to be 51 years for Greek women (Adamopoulos et al. 2002). Even though biological fertility declines with age (Ginsberg 1991; Greenwood et al. 1987; Silber 1991), it must be stressed that the mean age of mothers at last birth is very low indicating that the observed fertility limitation may be ascribed to biological factors. Therefore, we may accurately suggest that the mechanism of marriage patterns' transformation consists of: (a) the progressive decrease of the age of mother at last child, and (b) the decrease of the reproductive span which results from time changes when women try to avoid pregnancy and the end of their reproductive life. After that there is a characteristic and growing behavioral tendency to stop procreation, which seems to be independent of the population itself.

It must be noted that the demographic history of Thrace during the 19th century remains unknown and the estimation of the chronological onset and of the magnitude of such practices is impossible. However, the correlations between the mechanism of marriage patterns' transformations within the included populations are remarkable, leading all of them to a reduced number of progenies, i.e., to the gradual completion of fertility transition.

It seems that the greater differences between them can be found are concentrated on the onset and pace of transition, and not on the transition itself, which is evident. Regardless of their religious, cultural, and socio-economic background the main common element of this transition is the gradual and volunteer constrain of the upper age limit of reproduction and the shortening of reproductive gap.

The Christian populations within our sample are the pioneers of this process, followed by the Muslim population of Aratos, where a sharp and difficult to interpret decrease in the reproductive span and the mean age at last child is observed in the 1930–1949 marriage period, trend that will prevails in the next marriage cohorts too. However, as it is noted elsewhere in this paper, the widening of marriage cohorts diminishes the interpretation abilities because it sums quite diverse historical periods. This is the case of the Muslims of Aratos.

The shortening of the reproductive span and the decrease of the mean age at last child were first occurred in the 1930s, some years after the integration of Thrace into Greece and mainly after the end of Greek-Turkish war in Asia Minor. Since 1940, the whole region came under the Bulgarian control during the triple occupation of the country in the World-War II era (see Clogg 2002). It is difficult to know in what way these historical circumstances and geopolitical changes were particularized in such a small population, like this of the Muslims of Aratos, but it is rather sure that the fluidity of situation nursed feelings of insecurity in the newly shaped political and socio-economic environment of Thrace, in which not only the Muslims but all the inhabitants of the area, migrants and natives, should adapt.

But if the Muslims of Aratos were strongly influenced by the historical circumstances why this is not obvious in the neighboring population of Bragia? Probably, additional agents acted for this situation to be shaped. For example, it could be appointed to the effects

of changes in the local micro-economy structure, because of the arrival of the contiguous land working Christian population from eastern Thrace, or to other reasons, like political conflicts etc.

Whether or not, temporal trends of mean age at last child and the reproductive span within the nearby Muslim population of Bragia correspond very well to those of the Christians of Anthohori in the older marriage cohorts. More differences are observed in the younger ones. Pomaks follow up but with a significant time delay, which resulted in an elevated average number of children ever born in comparison to the other populations. The geographic, economic, and cultural isolation of Rhodopi Mountain is responsible for this delay. On the other hand, the two Roma populations follow the same general trend of the other lowland populations, but in comparison to them the mean age of the mothers at last child and the reproductive span are always higher.

At the end, all populations exhibit a significant decrease in the number of children ever born. It seems that this phenomenon is present despite religious and cultural norms that prohibit any family limitation (for Muslims: see (Hasna 2003)). It is apparent the fact that the number of the progenies is the result of the influence of the inherited norms, social structures, and institutions on reproductive behavior. All of them imply a great number of children per mother, but at the plains of Rhodopi their effects have been moderated or even diminished under the agent of other parameters, like the socio-economic situation, the political economy of the area, and also due to the existence of several cultural diffusion processes which changed radically the concept of the family and the value of the children. Hasan M. who lives at the roots of Rhodopi Mountain gives a thorough description (1998) of the social and economic transformations that took place in the Muslim population of Rhodopi: *"We used to give birth to a lot of children in the past. Nowadays only to two or even three if you have enough money. Otherwise you cannot maintain the family ..."*

These socio-economic transformations are responsible for the gradual convergence of sample populations concerning the average number of children ever born. In that way, starting from different levels at the beginning of the 20th century by the 1960s, all of the sample populations located in Rhodopi lowlands, except for the Roma, were very close to 2 children per marriage. Karitsa was at 2.4 and the Roma at 2.7. Nevertheless, in another Roma village (Ifaistos, a pilot study of fertility with the aid of questionnaires; Zafeiris et al. n.d.), the ideal number of children was 3 per mother. Additionally, all the women (N = 26) aged more than 40 years on the day of survey had an average of 4 pregnancies and 3.5 deliveries, which means that 0.5 children per woman were "lost" because of induced, or not, abortions. Considering that both the Roma of Aratos and the Roma of Ifaistos share the same socio-cultural and economic environment, we may suggest that it is quite possible to find similar circumstances in the Muslim Roma of Aratos, which means that abortion, induced or not, might have played an important role in family limitation in this village too.

On the other hand, almost all of the questioned women of Ifaistos aged under 40 years on the day of survey (more than 95%, N = 64) had practiced contraception as also did the older ones at about 80%. Such practices are also known from the Pomaks, applied mainly after the birth of first child (Zafeiris 2006), and are indicative of the false assumption that "traditional" populations do not practice contraception (see also Skinner 1997). Pomaks are the last that would undergo fertility transition as it is also evident from the temporal trends of total fertility rates (TFRs) which will diminish from 4.7 children per woman in Organi and 4.6 children in Kehros in 1950–1954 to 1.8 children in 1990–1994 (Zafeiris 2009). This rapid transition relates to the gradual arsis of geographic isolation, the diffusion of new cultural characteristics and more important with their gradual integration in the market economy with the abandonment of their traditional preindustrial economy.

3.5. Comparison between Mortality and Divorces

The formation of family process is disturbed by two other major forces which influence marriage itself, i.e., mortality and divorces (Table 4). Divorce is evident in all populations, but in different relative frequencies. It seems to be less important in the Christian ones,

where strong cultural agents, like gender roles etc., used to act in such ways so as to favor the stability of marriage unions. As an old lady from Karitsa stated (2004) *“in older times it was shameful to get a divorce. It was an insult to the parents and the couple itself . . . ”*. The most important influence of divorcing is found in the Roma populations, where more liberal ideas about marriage, family, and sexuality are preserved despite the adoption of the more “rigid” Muslim tradition. Divorce is found in the Muslim populations of the sample too, but may happen mainly because of the disability of the bride to conceive; i.e., because of the strong desire of husbands to have progenies, which corresponds to most divorce cases. In these cases, man and wife marry once again with other mates. Similar cases are observed in the Roma population but in a lesser magnitude.

Table 4. Marriage dissolution in the sample populations.

Marriage		Divorce (%)	Death		N	Divorce (%)	Death	
Cohort	N		Wife (%)	Husband (%)			Wife (%)	Husband (%)
Anthohori (Christians)					Aratos (Roma-Muslims)			
1900–1929	25	0.0	36.0	16.0	12	8.3	8.3	8.3
1930–1949	42	2.4	14.3	19.0	34	2.9	5.9	2.9
1950–1959	28	0.0	0.0	7.1	32	15.6	6.3	6.3
1960–1969	32	0.0	3.1	3.1	39	25.6	2.6	10.3
1970–1979	26	3.8	0.0	3.8	45	13.3	0.0	2.2
1980–1989	23	0.0	0.0	0.0	59	20.3	0.0	0.0
>1990	3	0.0	0.0	0.0	13	7.7	0.0	0.0
Aratos (Muslims)					Bragia (Muslims)			
1900–1929	63	1.6	11.1	9.5	39	0.0	23.1	17.9
1930–1949	85	0.0	15.3	11.8	58	3.4	3.4	6.9
1950–1959	72	5.6	4.2	4.2	37	0.0	5.4	0.0
1960–1969	56	7.1	0.0	8.9	46	4.3	0.0	2.2
1970–1979	68	7.4	1.5	4.4	36	8.3	0.0	0.0
1980–1989	59	5.1	0.0	1.7	23	0.0	0.0	0.0
>1990	12	0.0	0.0	0.0	6	0.0	0.0	0.0
Kehros (Pomaks-Muslims)					Organi (Pomaks-Muslims)			
1940–1949	130	1.5			194	1		
1950–1959	144	2.1			332	8.1		
1960–1969	150	2.7			274	6.2		
1970–1979	168	0.6			279	2.9		
1980–1989	175	2.3			334	1.5		
1990–1994	66	3			113	0.9		
Karitsa (Vlachs)								
1930–1939	91	0.0	11.0	11.0				
1940–1949	80	0.0	1.3	12.5				
1950–1959	117	0.0	4.3	2.6				
1960–1969	156	0.6	1.9	3.2				
1970–1979	150	1.3	0.7	6.0				
1980–1989	93	2.2	0.0	0.0				

Lastly, mortality has also played an essential role in marriage dissolution (Table 4). It is characteristic the fact that more than a half of the marriages of the population of Anthohori in the period 1900–1929 have dissolved due to the death of one of the spouses, comparing with the 33.3% calculated for 1930–1949. Most of the marriages of the first period took place in eastern Thrace, before the forced migration of the population to Greece. In the second period people had established themselves in the new homeland, but it seems that at the first years of their placement there, they were not lacking great problems. The afflictions of this journey, the very low socio-economic status—at least in the first half of

the 20th century—and the low levels of provision of Health System's benefits are recorded. Similar observations can be made for all the other populations, but the mortality effect on marriage diminishes through time, which mainly indicates the progressive improvement of life standards. Additionally, we have to note that divorced or widowers were married again with a greater magnitude in the Muslim and Roma populations and in a lesser in the Christian ones, but in this case sample numbers are very small in order to have more the less accurate calculations.

4. Discussion

In this paper, we applied a typical quantitative method of demographic analysis and we combined it with survey data in order to interpret the findings (see [Bernardi 2007](#)), giving emphasis to the social context of the events (see [Johnson-Hanks 2007](#)). Human reproduction as a multivariate phenomenon embraces all the aspects of human life. It is undeniable the fact that it constitutes a biological process, that encompasses the reflections of the political economy of an area ([Kertzer 1989](#)), the social institutions ([McNicoll 1994](#)), gender roles ([Greenhalgh 1995](#)), agency of the people ([Carter 1995](#)), their culture ([Hammel 1990](#)), and other factors. Within that framework, the demographic aspects of reproduction maintain a dynamic character imposed by the local structures, which, in their turn, are part of broader national and hyper-national ones, as is the case with the populations studied (see also [Schneider and Schneider \(1998\)](#) for Sicily).

The most determining factor which must be discussed within this context is culture, which is closely connected to demographic events and constitutes a necessary element in population change and variation ([Bachrach 2014](#)). Thus, part of the described variability emerges from the religious and socio-cultural background of the populations studied. The heterogeneity of this background can be described in terms of religion, religious sect, and religiousness. Besides that, in all the presented populations, procreation is connected to marriage. Thus, marriage is a universal prerequisite for delivering children and it is under the pressure of a strong social control. All people should get married, but this crucial event of human lifetime can occur at different ages.

Thus, strong traditions reflect the predetermined gender roles in these populations and govern the procreation processes and the onset of marriage life. The age at marriage then is low, at least lower than the entire population of Greece and clearly most of the cohorts deviate from the [Hajnal's \(1965\)](#) European marriage pattern. According to this classification, women delay their first marriage (above 24 years), the proportion of illegitimate births is low (2% or less), and the permanent celibacy high (over 10%). On the contrary, in the Eastern European marriage pattern the mean age at first marriage is lower, about 21 years, the age gap between the spouses larger and the marriage nearly universal. However, this scheme has been criticized a lot due to the fact that it neglects the existing diversity between these two marriage patterns (see for example [Puur et al. 2012](#)). [Laslett \(1983\)](#), after Hajnal, distinguished four taxonomic categories according to the type of domestic organization. The "West European marriage pattern" largely coincides with Hajnal's "European pattern". The "West/central or middle" marriage pattern, differs from the previous one in terms of work-group membership. In the "Mediterranean marriage pattern" women marry earlier and the age gap between the spouses is large. Moreover, there is a high proportion of widows who usually do not get married again. Finally, in the "Eastern European marriage pattern" the age gap between the spouses is low, but it is like the "Mediterranean marriage pattern" in all other aspects.

Within the populations presented here only the Muslims can be classified in the Eastern European typology pattern, as for most cohorts, women's age at marriage is about 20 years or less and the age gap with their spouses is narrow. On the contrary, in the Christian populations women's age at marriage is higher and the age gap with their spouses is larger. Their classification as the "Mediterranean" typology is difficult. A similar phenomenon has been described by [Gavalas \(2008\)](#) after comparing the marriage patterns in the Ionian Islands and the Cyclades. In that way, the diversity of the age at marriage remains high.

Many factors can be associated with this situation. The first one deals with the constructed gender roles in these populations. The more rigid cultural norms of Islam impose the marriage of men and woman at an early age. According to [Büchler and Schlatter \(2013\)](#) marriage is a highly religious covenant in Islam, not essential in the sense of constituting a sacrament, but in the sense of realizing the essence of this religion. Thus, both genders are culturally and socially nurtured in order to become husbands and wives. The time point for this is right after puberty for females and a couple of years later in males. Besides the fact that according to the local norms a man should be slightly older than his wife, other agents like the military obligations of the males act too.

In the case of Roma, we observe a different process. Cultural factors regulate the early (and often very early) marriage among them, irrespective being Muslims or Christians. As discussed previously, the Roma in Thrace have many similarities with the Roma from other areas of Europe, a fact which signals their cultural diversification with the surrounding populations. Except for Roma, such practices are very common today in the developing world connected, among others, with poverty, the protection of girls, family honor, and the provision of stability during unstable social periods. Several other factors include the low educational level and the elevated risk for domestic violence and widowhood ([UNICEF 2005](#)). This is also the story of the Roma population of Thrace, which in terms of social scale is positioned in the worst position, in comparison to their counterparts. Despite several public interventions underheld by the Greek state mainly by the end of the 20th century, these people largely lived their lives on the fringes of the socio-economic system, almost always ghettoized and socially excluded. In that way, their socio-economic characteristics intertwine with their low socio-economic profile and the other burdening factors of their subsistence and cause this significant demographic divergence.

Christians, as rural populations, exhibit a comparatively delayed marriage pattern, though the relevant ages are lower than the population of the entire country. The Vlachs of Karitsa seem to be more solid in the sense that age at marriage for wives does not change much over time, despite a minor decrease which is observed until the 1980–1989 marriage cohort. On the contrary in the Christian population of Anthohori a steady increase is observed, by time. Probably, this divergence can be attributed to the strong Vlachic identity in Karitsa, according to which the predefined role for females is to get married in young age.

Additionally, despite the strong cultural norm which governs marriage in Muslim populations, it is the agency of the people itself that causes a diversification of the Muslim Roma concerning pre-marital sex. The same is the case with the Christian population of Roma and people from Anthohori, even though pre-marital sex is typically forbidden by the Orthodox church. Thus, despite the social norms, rituals, and folklore customs for the preservation of the virginity of the woman before marriage in Greece (see [Varvounis 2013](#), pp. 145–50), often people's action causes significant departures from the socially accepted behavior. The importance of culture in the regulation of such behavior is inevitable. This is the reason that causes the diversification presented within the Muslim population, which exhibits a higher religiosity compared to the Roma, and it is irrespective of the Islamic sect in which people belong to.

However, the Rhodopi plain is subject not only to local developments, but also to national and international ones. The historical momentum since the beginning of the 20th century until the 1950s (see [Clogg 2002](#)), played an important role in the regulation of the other elements of marriage system which control fertility and procreation in the studied populations. Within the Rhodopi region, there was a significant confrontation for the redistribution of the land after its integration to Greece (see [Divani 1995](#)) and also the Christian population of Anthohori, being a refugee, one faced significant problems on grounds of health and survival as happened in all the refugee populations during this time ([Refugee Settlement Commission 1928a, 1928b](#)). World War II, the occupation of Thrace by the Bulgarians and the civil war which followed, almost surely triggered the observed demographic changes. In that way the local circumstances intertwined with

the national and international developments and shaped the demographic profile of the studied populations.

Despite the fact that even today the Greek Thrace is one of the poorer and underdeveloped areas in Greece (see Eurostat database at <https://ec.europa.eu/eurostat/data/database>, accessed on 3 August 2021), during the 1950s a clear economic and social development was observed. These populations were gradually but finally fully integrated in the market economy and a significant cultural diffusion (for the term see for example, [Bachrach 2014](#); [Fort et al. 2015](#)) occurred between/in them, which affected solely the marriage system. This resulted in the decrease of fertility in all populations. A well-known pattern emerges: fertility transition can be attributed to the changes of the local socio-economic and cultural environment (see for example, [Caldwell 2001](#); [Vézina et al. 2014](#); [Breschi et al. 2014](#)).

One of the most important changes emerged gradually and relates to the neo-locality of the couple after marriage and the expansion of the nuclear households (see [Hajnal 1965](#); [Laslett 1977](#)). The extended family was a well spread model of domestic organization in rural Rhodopi and Pieria in the past. According to this model, a typical household consists of the father and mother, their married sons with their wives, their grandchildren and the unmarried daughters (see [Caftanzoglou 1994](#); [Kaser 2012](#), p. 110). Over the time, and due to the fact that socio-economic conditions were changing, this type of domestic organization was gradually replaced by the nuclear family, however, with different rhythms and spread among the populations studied. Toward the modern era, this phenomenon showed a greater penetration in the Christian populations than in the Muslim ones, but overall, it altered the procreation behavior in order to give rise to a convergence trend in the marriage system and fertility levels among the populations studied. This phenomenon is closely connected to the elevation of the cost of childbearing and their lower utilitarian values of the children in the emerging new regime of domestic organization, as at the same time the populations became fully involved in the market economy (see [Nauck 2014](#); [Werding 2014](#)).

Thus, significant changes were observed in the demographic behavior and especially in marriage patterns of the populations of the area, representing the undergone socio-economic and political transformations. The most important of them was the shortening of reproductive span and the diminishing of mean age of the mothers at marriage which progressively resulted in the reduced number of the progenies. A similar pattern was observed in Dion ([Zafeiris and Kaklamani 2019](#)).

5. Conclusions

The under-study populations have kept a dynamic identity in their demographic profile, responding to a variety of factors which affect the day-to-day life. The sample populations from Rhodopi, examined within the present data set revealed that the spatiality of demographic characteristics mainly represents the effects of the political, historical cultural, religious, and socio-economic characteristics and transformation. However, it would not be an exaggeration to argue that in any data set, the diversity of these characteristics could be big enough to even distort the demographic profile of the examined geographical region, if these are not taken in consideration during the designing of a research project, during data analysis and in the interpretation of the results. That means that a small scale research should be expanded due to its ability to detect and localize the mechanisms of demographic change.

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