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DEMOGRAPHIC RECONSTRUCTION OF A GREEK ISLAND COMMUNITY: NAOUSSA AND KOSTOS, ON PAROS, 1894-1998.

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ABSTRACT

This study focuses on the demographic history of the island of Paros in the period 1894-1998. Two main villages of Paros, namely Naoussa and Kostos, have been chosen as a case study for a more insightful investigation of the demographic behaviour of the island population. The method of family reconstitution has been applied to civil and parish registers of Naoussa and Kostos in order to study in depth issues related to the demographic transition in the island.

Moreover, the thesis, by means of aggregate analysis based on official statistics dated back to 1860 and on primary data collected on the field, constitutes a comparative study in four administrative levels: at the level of the nation (Greece), the district (the Cyclades), the prefecture (Paros) and the community (Naoussa and Kostos). In every case the results of the analysis of all levels are compared with each other and especially with that of Greece, placing the island populations in a national context and drawing some conclusions concerning the differences and similarities between island populations and their metropolis.

The main findings showed that marital fertility in Paros was natural up to the late 1920s. The level of fertility at the beginning of the twentieth century, however, was rather moderate, mainly due to a relatively prolonged period of breast-feeding. Infant and childhood mortality were lower than the national average in the first decades of the twentieth century, but the difference diminished, or even reversed around 1950. The marriage pattern, which up to the 1980s demonstrated certain characteristics of the Mediterranean pattern, cannot be characterised as typically Mediterranean because of the moderately high levels of permanent celibacy that were exhibited throughout most of the study period. Migration was the main regulatory factor of the demographic equilibrium in the island.

CONTENTS

LIST OF ACRONYMS

ACRONYM	FULL NAME
ASFR	Age Specific Fertility Rate
ASMFR	Age Specific Marital Fertility Rate
CBR	Crude Birth Rate
CDR	Crude Death Rate
CMR	Crude Marriage Rate
FRF	Family Reconstitution Form
IMR	Infant Mortality Rate
MCFS	Mean Completed Family Size
NMR	Net Migration Rate
NSP	Non-Susceptible Period
NSSG	National Statistical Service of Greece
SGG	Statistique General de la Grece
SMAM	Singulate Mean Age at Marriage
TFR	Total Fertility Rate
TMFR	Total Marital Fertility Rate
UN	United Nations
UNRRA	United Nations Relief and Rehabilitation Administration
USA	United States of America
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Scope and organisation of the study

Although many studies on the demographic evolution of modern Greece have been undertaken, there are still gaps and unanswered questions as far as demographic transition in this country is concerned, because of the fragmentary and intermittent nature of population statistics available for Greece in the period before 1950. On the other hand, while population data may be missing at the national level, one can resort to parochial archives to obtain detailed insight for small populations. Therefore, we chose to work on the micro-level and to apply the method of family reconstitution to an island community in order to reveal hidden parts of the demographic history of Greece. Of course the sample population is only a small fraction of the population of Greece and the question of representativeness arises. Nevertheless, we consider this population to be representative of the Cyclades at least, a group of islands which according to the 1991 census made up almost 10% of the population of Greece and also it may bear resemblance to other Mediterranean island populations not necessarily within the borders of Greece. Paros was chosen because, along with the rest of the Cyclades, it has belonged to the modern Greek state from the very beginning of its establishment in 1830. Thus it provides vital statistics for a longer time than other parts of Greece, which were integrated in later years.

Yet, as the population size of the island is too big to permit the application of family reconstitution by an individual researcher, the method was applied to the second biggest community of the island, namely Naoussa, because it retains the oldest uninterrupted series of civil registration records. The small mountainous community of Kostos is also included in our analysis. It should be explained here that we are talking about two main (and several minor) settlements, which up to 1914 belonged to the same administrative division, “the community of Naoussa”. Thus, “community” here is an administrative term. In 1915 the settlement of Kostos became a “community” on its own. For the purposes of family reconstitution Naoussa and Kostos shall be treated as one community, one population. The mean population of Naoussa and Kostos together from 1889 to 1991 was 1905 inhabitants and it did not exceed 2500 in any census up to and included 1991. This population size signifies that the linkage of nominal records (on which the method of family reconstitution is based) is manageable by one person, while at the same time it is large enough to permit the inference of statistically significant conclusions.

The period for which family reconstitution will be applied is 1894-1998. 1894 is the year from which the preserved books of civil registration permit us to apply nominal record linkage to Naoussa and Kostos. However, our study period is extended back to 1860 by means of aggregate analysis based on official statistics. This analysis will be carried out at four administrative levels: the nation-wide level will examine Greece as a whole, district level analysis will refer to the Cyclades, prefecture-level to Paros and community level to Naoussa. In every case the results of the analysis of all levels will be compared with each other thus placing the island populations in a national context and drawing conclusions concerning differences and similarities between island populations and their metropolis.

The thesis consists of nine chapters. In this chapter an outline of demographic transition theory is provided, with the intention of using it as an analytical tool in our study. A brief review of relevant studies on Greece is also to be found at this chapter together with a general historical, geographical and economic account of the examined populations. Chapter 2 presents an extensive account of the data sources used in the study and provides some socio-economic information on our studied populations. Chapter 3 is a comparative study of the demographic evolution of Greece, the Cyclades, Paros and Naoussa from 1860 to date, based on an aggregate analysis of official statistics and material from parochial archives. Chapter 4 is dedicated to migration movements in the Cyclades, Paros and Naoussa since 1861. Chapter 5 is a description of the methodology of family reconstitution and of the problems associated with its application to our data. In chapters six, seven and eight the results of family reconstitution for nuptiality, fertility and mortality, respectively, are presented. Finally, chapter 9 summarises the main findings and aims to answer the research questions posed at the end of this chapter.

1.2 Theoretical framework

Since this thesis is going to study the demographic behaviour of a society through the lenses of demographic transition, it is useful to give a brief account of this theory. The expression "demographic transition" was first introduced in the 1940s by Notestein (1945). In fact, there were several precursors who attempted to establish a theoretical model very similar to the one, which is now known as demographic transition. Most probably the best known of them were W. S. Thompson and A. Landry. Thomson “published in 1929 a general historical theory of the relationship between population and economic growth similar in all essentials to the subsequent theory of demographic transition” (Szreter, 1993:663). Landry, in his renowned book “La revolution demographique” in 1934, introduces the term “demographic regime” and distinguishes three regimes in the evolution of populations: the ancient regime, the intermediate one and the modern one. His general pattern of evolution of human populations, which he called “demographic revolution”, is very similar to what Notestein has called “demographic transition”, a term that has been established until today (Tapinos, 1993:327-329).

The term “demographic transition” was used to describe the changes that took place in historical Europe from the 18th century onwards. According to this theory pre-industrial societies, with high fertility and mortality and consequently a low rate of population growth, are followed by transitional societies in which mortality begins to decline but fertility remains high, so that considerable population growth ensues. Finally, after a time lag, fertility also declines leading to contemporary developed societies with low fertility and mortality and a low rate of population growth or even stationary populations. The theory implies that the entire process of demographic transition was unfolded in three phases, each one of which is associated with a certain level of economic development.

“Demographic transition” aspired to be a theory that not only pictures demographic reality but also explains what triggered the changes that brought this about. It is necessary, therefore, to present a very concise account of these explanations referring to each component of the transition separately.

1.2.1 Mortality

Pre-transitional societies were characterised by mortality crises that made their, nevertheless high mortality, fluctuate erratically over short periods. These mortality crises resulted from events such as wars, famines and epidemics. On the basis of what is known for west European countries (though this knowledge is limited because in most cases official statistics do not go back beyond the 19th century) the first evidence of the onset of demographic transition tends to be the stabilisation of hitherto erratically fluctuating crude death rates (CDRs) at a level of about 35/1000. This figure is somewhat arbitrary because different countries had different levels of CDRs when their periodic fluctuations in mortality became less erratic but is intended to give an order of magnitude. The timing of this attenuation of mortality crises is also very variable from one country to another. It could have happened as early as the beginning of the 18th century or as late as the mid-19th century. In most North-west European countries, however, the onset of mortality decline was between those time brackets and thereafter, during the demographic transition (up to the mid-20th century), CDRs decreased gradually to 15-10/1000 (Schofield et al., 1991).

Mortality transition was not smooth and monotonic in its course. In some European countries (England and Wales, Germany, the Netherlands and possibly France) the early improvements in mortality that took place after 1750 were followed by a period of stable or even slightly rising mortality rates. This aggravation is associated with the industrialisation that took place in these countries and its pernicious effects on the health conditions of workers and on the quality of life in the urban environment. Towards the end of the 19th century, mortality rates resumed their descending course, owing both to new medical progress and to certain improvements in working conditions (for example restrictions on the exploitation of child labour, reduction in working hours, increased wages) which were achieved through labour struggles and led to social development in the aforementioned countries (Caselli, 1994).

Although, it is widely accepted today that the largest part of the mortality transition is attributable to the elimination of contagious and infectious diseases (plague, smallpox, typhus, diphtheria, scarlet fever, tuberculosis etc.), the reasons behind the eradication of these diseases are disputed. The traditional explanation attributes mortality decline to two factors: the rising standard of living associated with the industrial revolution, on one hand, and medical progress on the other. Scholars, however, do not always agree about the relative importance of the two factors.

The argument is meaningful because those who attribute the decline of mortality to the rising standard of living imply that mortality transition presupposes a certain model of economic development, which in the case of West-Europe was brought about by the industrial revolution. The main supporter of this view is Thomas McKeown who places a lot of emphasis first of all on the greater availability of food, which led to an improved diet, and secondarily on improvements in public and personal hygiene, which he considers responsible only for the decline in one group of diseases (the ones associated with typhus, typhoid fever and cholera) (McKeown and Record, 1962) (McKeown, 1976).

On the other hand, there are those who claim that improvements in public health and sanitation as well as medical progress had been the main contributors in declining mortality[1]. While for McKeown the role of immunisation and medical treatment is low until 1935, when sulpha drugs became available, his contradictors stress that we cannot ignore the medical advances in obstetrics and paediatrics that took place at the end of the 18th century (Morel, 1991).

Both positions have their relative merits and defects and they are not necessarily mutually exclusive. More recent reassessments of the factors that influenced the decline of mortality in Europe, take into account other conditions as well, such as the workplace, urbanisation, education, infant feeding practices, politicians, planners and reformers, and even the climate (Schofield et al, 1991:10). Finally, there is also a more implicit factor that promoted decline in mortality: cultural change regarding the perception that humans have about illness and death. As Aries notices, "the medical science may have existed always in groups of specialists or in a limited area of society, but the notion of repulsion of death with artificial means was not always in the understanding of people. On the contrary this notion was ignored for a long time, if not rejected as scandalous or blasphemous" (cited in Tsaousis in Greek, 1986:111-112). Hence, it can be said that the passage from a superstitious perception of the human body to a rational one, is a necessary transformation for the onset of mortality transition.

1.2.2 Fertility

In the original formulation of demographic transition theory, mortality decline was not followed by fertility decline in a straightforward causal relationship. The classical theory of transition attributes a crucial role to economic development for fertility decline. For the first version of the theory (Notestein, 1945) economic development is a "sine qua non" for a decline in fertility. The core of the earliest explanations of fertility transition can be summarised in what are referred to as "demand theories". According to those theories, in traditional, basically rural societies based on familial models of production, children are beneficial to parents from an early age as a source of labour. Yet, in the process of economic development, the model of production shifts from familial to larger scale modes of production

[1] For supporters of the role of medicine and personal hygiene see Razzell P.E. (1974). For the role of public health and sanitation see Preston S. and Van de Walle E. (1978).

and reduces the labour utility of children. Furthermore, mass education decreases their availability for work. Thus, children not only are not any more beneficial to their parents but also give them a great burden. From this point of view, the lessening demand for children is the main reason behind fertility decline. Among the first who summarised the sequence of these relationships were A. Coale and E. Hoover (1958). Yet, attempts to attribute fertility transition to economic development can be found even in pre-Notestein authors, such as A. Landry and A. Dumont (Tapinos, 1993). It is obvious that these theories attribute fertility decline to a structural change of the society.

However, more recently, new evidence came into light, both from historical research in pre-industrial and transitional Europe and from fertility surveys in Third World countries, suggesting that economic development is not the main reason behind fertility decline. According to this evidence, in transitional Europe, regions of homogeneous fertility contained highly differentiated economic areas, and regions with the same economic conditions contained areas with differentiated fertility. Furthermore, fertility surveys in the modern world showed that there was a substantial decline in fertility in very many countries of the Third World including some where little or no economic development had taken place, such as China, Cuba, parts of India and Sri Lanka (Cleland and Wilson, 1987).

Thus, more influential theories have been devised, which contradict the classical demographic transition theory. Some of the main advocates of these theories are J. Caldwell, J. Cleland and C. Wilson[2]. Their common base is that they seek the cause of fertility decline in cultural factors rather than in macro-economic ones. According to them, societies did not accept the idea of birth control because of the incompatibility of this idea with the society’s moral values and social norms. Consequently, an ideational change is more important than a structural change in a society and the role of secularisation and modernisation is more significant than that of economic development. These two factors are likely to facilitate the initial acceptability of birth control practices. Caldwell (1982) especially, stressed the importance of the transmission of ideas, particularly the idea of nuclear family. In short, what Caldwell terms “westernisation”, that is social change over and above economic change, which results from cultural diffusion of western attitudes, is thought to be more important than industrialisation.

1.2.3 Nuptiality

Although in its original version the theory of demographic transition did not consider the role of nuptiality, subsequent research revealed that nuptiality is a crucial determinant of fertility. Especially in populations acting under natural fertility (that is fertility in the absence of any deliberate efforts to limit births) the age at marriage is a basic factor in defining the number of children born to each couple. Hajnal (1965) has established how fertility in pre-transitional West-Europe remained well below the maximum possible level due to the "European marriage pattern", which prevailed in "Europe" from at least the 17th century until the beginning of the 20th century. The distinctiveness of this pattern resides in the facts that people were getting married at a high average age (over 23 for women), and there was a high proportion of the population (usually over 10%) who never married at all. According to Hajnal this marriage pattern "extended over all of Europe to the west of a line running roughly from Leningrad to Trieste" (ibid:101).

Later on, other scholars further classified the marriage patterns of Europe, mainly by observing the ones that did not belong to the "European" pattern of Hajnal. The most well known typology is the one proposed by Laslett (1983:526-527). He divided Europe into four regions each one corresponding to a particular tendency of domestic group organisation. These regions, which are very vague as far as their geographical delineation is concerned, are labelled "West", "West/central or middle", "Mediterranean" and "East".

Although this classification refers mainly to household structures, some information on marriage patterns can also be extracted. Thus, the "West" marriage pattern is the one described by Hajnal as "European", the main addition by Laslett being that the age gap between spouses was narrow in that pattern. The "West/central or middle" marriage pattern is the same as the "West" one. The difference lies in the household structure of the two regions and is underlined by the fact that in the "West/central or middle" region, extra work groups were attached to the family, thus resulting in a high proportion of stem-family households. The "Mediterranean" marriage pattern is characterised by low age at marriage for females, high for males, great age gap between spouses, high proportion of widows, who usually remain unmarried, and overall by a low percentage of population never married at all. The "East" pattern shares the same characteristics as the "Mediterranean" one but exhibits one basic difference: age at marriage is low for both females and males and the age gap between

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[2] See for example Caldwell C.J. (1982) and Cleland J.and Wilson C.(1987)

the spouses is narrow. Otherwise, the proportion of the population married is similarly low as in the "Mediterranean" pattern and widows, although proportionately fewer, usually do not remarry.

When Laslett proposed the above classification, the "West" model (and its variant "West/central or middle") had been studied relatively thoroughly and had established itself as being the rule in pre Second World War North-west Europe. On the other hand the establishment of the "Mediterranean" and "East" patterns of domestic organisation was based only on few case studies, referring to the 18th century, from Italy and from European Russia, for the two patterns, respectively. Later on, it became clear that the characteristics of these patterns, and especially of the Mediterranean one, which will concern us further on in this study, are very fluid, and the typology put forward by Laslett is nothing else but a gross interpolation. This was pointed out by more recent studies on Portugal, Spain and Italy, which revealed a great variability in these areas as far as household structure and marriage patterns are concerned[3].

1.3 Demographic regimes and island populations

The term demographic regime is commonly used to describe the dynamic relationship between a population and its environment. This relationship determines the standard of living, the quality of life and the very survival of the population. A central concern for those who study demographic regimes is to observe the different ways in which nuptiality, fertility, mortality and migration may combine to keep the size of a given population in pace with the available resources of its ecosystem (Woods, 2000:381).

The problem of population size was already from the 18th century related with food production, as we know it today. Indisputably, one of the most influential figures who concerned himself with the question of population and resources was the English economist Thomas Robert Malthus (1766-1834), whose theories still exert an influence in contemporary population studies. He was the main representative of the pessimistic view about population in the 19th century. His central idea was that, when a population is unimpeded its growth rate presents geometrical increase, while resources grow by arithmetical increase only. Food shortage leads to increased food prices and thus real incomes are depressed. This situation brings about "misery" and "vice", which tend to raise mortality and constitute what Malthus called the "positive" check of population growth. Consequently, population growth is restrained either by the "positive" check of high mortality from disease, war or famine or by the "preventive" check of late marriage (and abstinence before it). The main preoccupation of the "Principle of population", as Malthus called his theory, and the one which made it pessimistic, was that population will reach the maximum level of available resources in a very short time (Malthus, 1970).

Although Malthus' model was regarded as a naturalistic interpretation of the lower class degradation in the period of industrial revolution in England, it dominated the studies of demographic regimes and is still considered a classical interpretative framework especially for pre-transitional populations. Nevertheless, Malthus' model may have some relevance only in a closed population system, that is in a population where migration does not play an important role. In the case of islands, migration has always been an essential element of their demography, and therefore Malthus' model cannot be used to describe their demographic system. The fact that migration is integral part of island demography had been observed by early geographers. It is characteristic what one of them wrote at the beginning of the 20th century: "A small cup soon overflows. Islands may not keep; they are forced to give, live by giving. Herein lies their historical significance" (Semple, 1911: 299 quoted in Connell and King, 1999:3).

Yet, islands, as crossroads of sea roots, not only export people but also receive. There are a lot of examples of crossroads islands: Syros in the middle of the Aegean archipelago, Mauritius in the western entrance of the Indian Ocean and Malta at the navel of the Mediterranean are only few examples of islands that, because of their geo-political importance, experienced huge immigration in different periods and developed cosmopolitan and polyglot populations (Connell and King, 1993).

Consequently, the demographic system of the populations examined in this study is expected to be different from that described in Malthus' model. Even for mainland Greece Malthus' model turns out insufficient because the country experienced heavy migratory movements since 1830 when it was established as an independent state (Siampos, 1980). It is likely that especially in insular communities in pre-transitional and transitional period, when fertility rates were high, migration operated as a "safety valve" to population pressure. On the other hand, whenever the population reached extremely low levels in-migration might have acted as a counterbalancing force by bringing in new population. This study will try to show how all

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3 See for example Reher D.S. (1990) and Kertzer I.D. and Brettell C. (1987)

the elements of the demographic system of Paros and the Cyclades (mortality fertility, nuptiality and migration) interacted to shape the demographic regime of these islands throughout the different phases of demographic transition. Therefore, although the theory of demographic transition does not take into account population mobility, in studying demographic transition in populations experiencing significant migratory movements we consider also the parameter of migration. In the following section, demographic transition theory is reassessed under a critical view so as to decide its relevance with the examined populations.

1.4 Reassessing the theory

Classical demographic transition theory has attracted great criticism, first of all because even the western pattern of demographic transition is not so consistent with the theory. There is always the problematic case of France, which was the first country to experience a decline in fertility in the late 18th century without a prior decline in mortality. When this happened France was still a peasant agricultural society, whereas France's economically much more developed neighbour, England, did not experience a decline in fertility until the late 19th century. Moreover, a considerable number of European countries underwent fertility decline at about the same time -in the late 19th century- despite substantial differences between them as far as economic development was concerned.

These inconsistencies of the demographic transition theory were well known to its founders in the 1940s. Yet, the reason that this theory not only survived but also became the central theory of modern demography, is its policy implications. As Szreter has underlined, when this theory begun to gain ground in the 1940s and the 1950s it "not only showed what had happened in the West and what could have happened elsewhere, but also what *ought* to happen" (Szreter, 1993). "Demographic transition" appeared as a denial of the theory of Malthus because it gave the hope that economic development will cause the attenuation of high rates of population growth and will alleviate the demographic explosion, which back in the 1950s was in progress all over the Third World. Thus, "demographic transition" more than being a description of the historical experience of western Europe or a predictive model for the rest of the world, turned into a tool of policy implementation. It was clearly adopted by the United Nations when in their "Report on the world social situation" in 1957 classified the countries of the world in three categories, corresponding to the three phases of demographic transition (UN, 1957).

Since then, huge amounts of effort and resources have been put down by the developed western countries in order to “impose” a demographic transition on developing countries. By the early 1960s mortality had started to decline even in some of the poorest countries thanks to international technical and medical aid. Yet, as world fertility remained at high levels until the mid-1970s, without any viewable signs of decline, westerners were worried as to how independent demographic transition could be from the level of economic development. Eventually, their anxiety lessened in the 1980s and more so in the 1990s, when the “family planning industry”, as Paul Demeny has called the population policy of the West (Demeny, 1988: 466), yielded perceptible results and fertility fell substantially in most countries. As a consequence the rate of population growth declined from its peak of 2.1% per annum in the 1965-1970 period (Caldwell et al., 1997:1). Hence, the wealthy countries of the West managed to force their historical experience on almost every developing country so that the latter achieved a demographic transition which was largely artificial and had little in common with the long-term process that started in the 18th century in western Europe.

Yet, despite its political implications in the modern world, the theory of demographic transition cannot be dismissed as an analytical tool in an academic study of historical demography. It may be incapable of persuasively explaining the causes behind transition, but its descriptive part is successful as far as it establishes the setting within which Europe passed from the old demographic regime to the contemporary one. Moreover, vast research has been undertaken to test the theory, and the findings of this research (the best known, but not the only one, being the Princeton project, directed by the Office of Population Research of Princeton University) agree with the general idea of the theory. However, new findings are added every day to the existing ones as research goes on, especially in countries that do not belong to the initiators of demographic transition. As these countries have a different economic, social and cultural background from the countries of West-Europe and their overseas settlements, their experience of demographic transition is illuminating in understanding both the process and the causes of transition.

One such country is Greece, which, although a European country, is on the geographical periphery of Europe. Moreover, historical circumstances had, for many centuries, kept her isolated from the mainstream of European history. When Greece emerged as an independent state in 1830, she left behind 400 years of Ottoman rule. During those years she remained untouched by the great historical movements that took place elsewhere in

Europe such as the Renaissance, the 17th century scientific revolution, the Enlightenment and the Industrial Revolution (Clogg, 1992:3). Consequently, one might wonder if her experience of demographic transition bears any resemblance to that of other European countries. In the following section relevant studies that have been undertaken in this field for Greece are reviewed.

1.5 Relevant studies on Greece

There are many studies in the population field concerning Greece, but here only the ones that illuminate some aspects of demographic transition in Greece and have been influential to our study will be mentioned. Perhaps the most often-quoted work is an article by Valaoras (1960): *A reconstruction of the demographic history of modern Greece* in Milbank Memorial Fund Quarterly **38**, (New York 115-139). An innovative part of this work was that it made use of the (then) newly established model life tables, which Valaoras himself, as a member of the United Nations Secretariat, had introduced in his pioneering study “Age and Sex Patterns of Mortality: Model Life Tables for Under Developed Countries” (UN, 1955). By applying survival ratios from model life tables to successive censuses, the author derives population structures, for each sex separately, for years ending in 0 and 5 from 1860 to 1965. Moreover, he provides estimates of live births, infant deaths and all deaths for the central year of each quinquennial period and estimates of the corresponding crude rates of the vital events per 1000 population. At the same time he assesses the completeness of civil registration and calculates the under-registration of births and deaths for the years that the civil registration system was functioning.

The “reconstruction” of Valaoras was an ambitious task, in the sense that it claimed to fill in every demographic gap from 1860 to, at least 1959, and it still remains a significant reference point for studies on the demographic history of Greece. Yet, it has also come in for some criticism because of the extensive assumptions the author has used to derive his results (Hionidou, 1993:51). Furthermore, the set of model life tables that he used (known as the 1955 United Nations set), has later been accused of being technically biased, inflexible and overall unreliable (Newell, 1988) and is in limited use now.

However, some of Valaoras’ findings and especially his estimates of crude rates of births and deaths will be used further on in this study as a guideline for comparison with our own findings. Therefore, it is worth mentioning in some detail how he derived estimates of live births and deaths in order to assess the under-registration of the civil registration system. As far as one can tell from his script, the author uses successive censuses to determine the suitable survival ratios of the intercensal periods in the following manner: he projects forward the age-groups of the first census to fit approximately the results of the second census. Subsequently, he projects backwards the results of the second census to fit the results of the first census. Then, "the series of survival ratios which gave the closest conformity with the census data was chosen as the most likely mortality pattern that affected the population during the given period. Maximum conformity was sought particularly among age groups which normally are not affected by significant migratory movements" (Valaoras,1960:120).

Once the mortality pattern for each period had been established the method of reverse projection was applied to census returns (and more specifically to the age group one to five) so as to obtain live births. Author's implied assumption is that, although there was an under-enumeration of infants in at least some of the censuses, in the age group one to five enumeration was fairly complete. It is also worth noting that "estimates were prepared independently for each sex but those for females were later adjusted in certain cases to conform with a more plausible sex ratio […], in accordance with international experience" (Valaoras, 1960:121). In like manner he derives estimates of deaths by applying the method of forward projection to successive age groups. Further on in the same article Valaoras compares his estimates of births and deaths with the official data and assesses the under-registration of the civil registration system. In this study we consider his estimates of births and deaths closer to reality than the published data and we use his assessments to adjust our own results in some cases, as will become clear further on.

Another influential work is an article by Siampos and Valaoras (1969) *Long term fertility trends in Greece* in International Population Conference **1** (IUSSP, London 598-610). The main concern of the article is the derivation of Coale's indices of fertility for Greece as a whole and for eighteen geographical sub-areas for the years 1900, 1928, 1951 and 1961. In this work also, projection techniques have been applied to obtain live births for periods where the civil registration system had collapsed and to purge data from errors like age-misstatement and incompleteness of registration. Much of the criticism concerning the previous article of Valaoras can be addressed to this article also. However, in this work Siampos and Valaoras used the Princeton Regional Model Life Tables, which is an improved set of model life tables and far more flexible than the 1955 UN set.

A more elaborate work concerning the demographic history of modern Greece is a book written in Greek by Siampos (1973) entitled “Demographic evolution of modern Greece: 1821-1985”. The author uses all the available population statistics combined with projection techniques to achieve a demographic reconstruction of Greece from 1821, when the war of independence started, to the late 1960s accompanied with some forecasts to 1985. The book is helpful because it proceeds to an evaluation and correction of the errors encountered in all Greek censuses from 1821 to 1971. Thus, with the use of various techniques, both errors of completeness (under or over-enumeration) and errors of content (age misreporting, sex and age selective enumeration) of the Greek censuses are corrected while at the same time the broad and unconventional age groups of some of the censuses are graduated to five-year age groups. However, the results of that graduation are not presented but only in very sketchy population pyramids. In addition to being concerned with the components of demographic change (mortality, fertility and migration), the book presents the distribution of population in urban and rural areas, in insular and mainland Greece and in geographical departments.

In 1974 a monograph was published, entitled “The Population of Greece” (Trichopoulos D. and Papaevangelou G., 1974). This work was prepared for the World Population Year 1974 following the recommendations of the United Nations for publication of national monographs. The book gives a brief account of the past population development but it focuses mostly on the period after 1950. It covers many issues including migration (internal and international), population composition by various categories (age, sex, marital status, employment status, education, ethnicity, religion) and population policy in Greece. It also contains projections up to the year 2000 for the total population by age and for its labour force. Although it seems that this book was more suitable to the policy planners of the mid-1970s, it is also useful in a general study of the demography of Greece.

Finally, a study that should not be omitted is the unpublished Ph.D. thesis of Violetta Hionidou (1993) “The demography of a Greek island, Mykonos 1859-1959 a family reconstitution study” (University of Liverpool, Liverpool). The study was the first to apply the method of family reconstitution to Greek data, and it has served as a kind of guideline to our own study. A summary of Hionidou’s thesis is to be found in an article by the same author entitled “The demographic system of a Mediterranean island: Mykonos, Greece 1859-1959” published in the “International journal of population geography”, Vol 1, (1995) 125-

146. In this paper Hionidou emphasises that the pre-transitional demographic system of Mykonos was characterised by the combination of low mortality and moderately high overall fertility with thus a resulting high rate of natural increase of the population. Nevertheless, this high population growth was counterbalanced by high emigration, which kept the island population almost constant.

It is worth mentioning also two articles by the same author (Hionidou), which, although they are not directly concerned with demographic transition, give information on marriage patterns and household structure in the Cyclades for a period where published data are scarce. The first article is entitled "Nuptiality patterns and household structure on the Greek island of Mykonos, 1849-1959" published in the "Journal of family history", Vol 20 (1), (1995) 67-102. The second is published in "Continuity and Change" Vol (14) 3, (1999) 403-427 and is entitled "Nineteenth-century urban Greek households: the case of Hermoupolis, 1861-1879".

Again it should stressed that the bibliography concerning the population field of Greece is quite rich. The above-mentioned studies are only some indicative works, selected mainly from the English literature on the subject. Although, these studies touch some issues of demographic transition in Greece, the matter could not be covered satisfactorily because the stock of population statistics for Greece became consistent only after 1950. On the other hand, studies on a local level like Hionidou's, though they may not represent the experience of the whole country, give in depth knowledge about parts of the country. Over the long-term, a lot of such studies will offer a better view on issues that cannot be explored by aggregate methods using nation-wide statistics.

In this study, although the method of family reconstitution will be applied only to two communities (Naoussa and Kostos) of a Greek island (Paros), further analysis will be done on the island itself and on the group of islands (Cyclades) that it belongs to. The purpose of this analysis will be to place the study communities into the greater geographical and demographic context, where they belong. However, since geographical areas are associated with an administrative division and the demographic analysis will take place in the context of the latter, it is of some use to present here the general administrative division of Greece.

1.6 Administrative Division of Greece

The general administrative division of Greece is presented below in hierarchical order from the greatest administrative unit to the smallest one. The original Greek names of the units are given in parentheses, while the corresponding English names are not necessarily an exact translation from Greek.

1) State (Επικράτεια)
2) Geographical Department (Γεωγραφικό Διαμέρισμα)
3) District (Νομός)
4) Prefecture (Επαρχία)
5) Municipality (Δήμος)
6) Community (Κοινότητα)
7) Settlement (Οικισμός)

It should be noted, however, that administrative units in Greece are very fluid and the delineation of each administrative unit and the number of its sub-units change frequently. Communities had never had a fixed number of settlements and very often they merge with (or they are transformed to) municipalities or other communities. Maybe the most notable change took place in 1914 when municipalities with less than 2000 inhabitants, which until then had been the smallest administrative units, were renamed as communities. Thus since 1914 communities are the smallest administrative divisions, while settlements do not have an administrating board by themselves. Bearing this in mind it should be mentioned that the above list was valid until 1998. Since then, new administrative changes have taken place. In what follows, some general information on the study regions is given, so as to familiarise the reader with the places and the people that are going to concern us.

Figure 1.1: Map of Greece showing the Cyclades (encircled) and Paros. Universal Resource Locator (URL): **www.lib.utexas..edu/Libs/PCL/Map_Collection/europe/Greece.GIF** Date 26/10/00

1.7 The Cyclades

The Cyclades comprise about thirty inhabited islands and many more uninhabited islets that are located in the middle of the Aegean Sea and occupy a land area of 2,528 square kilometres (see figure 1.1). According to the most popular interpretation, the Cyclades took their name (which means "encircling islands") from the fact that they form a circle around the island of Delos, which in antiquity was considered a sacred island, as the birthplace of goddess Artemis and her brother Apollo. The landscape of all Cycladic islands is rocky and the flatland constitutes only 23.6% of the total area. Natural vegetation is limited to shrubs, while somewhat richer flora can be found in places with water sources (Encyclopaedia Britannica, 1995).

The islands have attracted the attention of archaeologists because of the plenitude of findings of early civilisations which flourished in the Cyclades during the Neolithic Period (6000-3000 BC) and the Bronze Age (3000-2000 BC). Perhaps the most renowned feature of the Early Cycladic period (3200-2700 BC) is the Cycladic art, examples of which have been found as far away as Provence in France. Throughout the historic period the Cyclades have been found under the occupation of virtually every powerful populace in the area. Thus, they came successively under Hellenistic, Roman, Byzantine, Venetian and Ottoman rule. At the same time, during Byzantine (4^{th} century-1207) and Venetian (1207-1566) rule, when the Aegean became a battleground for Byzantines, Arabs, Venetians and Normans, the islands suffered heavily from frequent pirate raids, something that resulted in the desolation of many islands.

During the Ottoman period (1566-1821) the Cyclades came to know a short interval (1770-1774) of Russian control, as a result of the Russo-Turkish war of 1768-1774. The Russian fleet, comprising some thirty ships, harboured at Naoussa, which the Russians used as their headquarters. Cycladians declared their dedication to Catherine the Great as they saw their hopes for liberation from the Turkish yoke being fulfilled. However, the Russians left in 1774 and the Cyclades were returned to the Ottoman empire. What has remained from this short interval of Russian control and from the high expectations that it raised, is the many forenames of Russian origin that one can still find in the Cyclades. In 1821 the Cyclades took part in the war of independence along with the rest of the Greeks and when modern Greece gained independence in 1830, they were among the first to be integrated in the Greek State.

During the 19^{th} century the Cyclades saw a relative prosperity based on maritime trade. The case of Syros, the district-capital of the Cyclades, is noteworthy. After 1830 Syros became the main commercial, industrial and cultural centre of Greece. For most of the 19^{th} century it was the greatest port of the country and a cross-road of destinations from the Eastern Mediterranean to the Black Sea. Its industrial development was based mainly on the shipyards of Hermoupolis, the capital of the island. Shipyards were a profitable enterprise because of the low cost of shipbuilding in Syros compared to that of west-European shipyards. According to a contemporary French observer of the mid-19^{th} century, the cost of a 300-ton ship in Syros was 58,000 francs while in Marseilles a ship of the same tonnage cost 122,500 francs (Kardasis, 1987:175). Therefore, Syros, being already a multinational society due to its commercial significance as a port serving many routes, attracted the interest and the investments of many foreign ship-owners and private entrepreneurs.

Yet, this blossoming of Syros and of the Cyclades generally was not to last long. The islands dropped into a rapid decline from the end of the 19^{th} century, mainly due to the prevalence of steamships, the needs of which could not be supported by the infrastructure of the Cycladic ports. Other factors, like the development of Piraeus as the main port of Greece and the inadequate investment into new infrastructure in the Cyclades, played their role in the mouldering of the islands. It is indicative that the population of this group of islands after reaching a peak of 135,000 in 1896 was constantly decreasing, reaching a low of 86,000 in 1971, a decline that only the rapidly growing tourist industry from the 1970s onwards could reverse.

From the administrative point of view the district[4] of the Cyclades was constituted in 1833 and today is divided in 8 prefectures (eparchies), namely the prefecture of:

1) Andros, consisting of the island of that name.

2) Kea, consisting of the islands of Kea, Kythnos, Serifos and Makronisos.

3) Milos, consisting of the islands of Milos, Kimolos, Sifnos, Folegandros and Sikinos.

4) Naxos, consisting of the island of that name.

5) Paros consisting of the islands of Paros and Antiparos.

6) Syros, consisting of the islands of Syros, Mykonos, Delos and Giaros.

[4] The term "district" here corresponds to the Greek term «νομός», ("nomos"). In the English literature «νομός» is usually referred to as "department".

7) Thira, consisting of the islands of Thira (Santorini), Ios, Anafi, Amorgos, Donousa, Iraklia, Keros, Koufonisia, Thirasia and Schinousa.

8) Tinos, consisting of the island of that name.

The total population of the district was 97,400 in 1995 and it included some 8 municipalities and 109 communities. Again, the above list with prefectures and the given number of municipalities and communities of these prefectures should be read with due respect to the fact that it was valid until 1998. Since then some administrative changes may have taken place.

1.8 Paros

The island of Paros is the third in size (after Naxos and Andros) of the Cycladic islands (see figure 1.1). With a land area of 195 square kilometres and a population of 10,410 in 1991 (NSSG, 1998c) it is located 167 kilometres from Piraeus at a latitude of 37.5N and a longitude 25.14E. Paros together with Antiparos, a little adjacent island with a land area of 35 square kilometres, make up the prefecture (eparchia) of Paros (see figure 1.2). Unless otherwise referred, population figures for Paros mentioned in this study include the population of Antiparos. The latter is inhabited only by one community, which never exceeded 820 inhabitants in any census up to and included 1991.

The terrain of Paros does not differ much from that of other Cycladic islands, consisting mainly of granite with limestone deposits (Spaneli, 1998). In classical antiquity (5^{th} and 4^{th} century BC) the island was famous for its marble of excellent quality, which made Paros a prosperous centre of marble export. However, the marble quarries did not change the rural economy of the island, the population of which until 25 years ago consisted mainly of farmers and stock-breeders, while seamen (mainly fishermen and sailors) composed a smaller but not insignificant occupational group. The traditional agricultural products are wine and olive oil but there are also harvests of wheat and seasonal vegetables and fruits.

During the 19^{th} century the island came to know a short period of industrial activity owing to the marble quarries and to lead and manganese mines. The quarries had reopened from 1840 but their revitalisation came in 1878 when they attracted the investments of a Belgian company, which constructed a railway from the quarry site (Marathi) to the harbour of Paros and built large industrial-style buildings, which were in marked contrast with the Cycladic architecture. Nevertheless, the marble company went bankrupt and closed down at the end of the 19th century (Sofianou, 1989). The turn of the 20th century was marked by a wave of overseas emigration, mainly to the USA and to a lesser extent to Australia and South Africa. On the island, the economy remained rural, while in the 1920s the advent of refugees from Asia Minor brought new cultivations to the island. Hence, crops of tobacco, cotton, potatoes and cereals were planted together with the traditional crops of vine-trees and olive trees.

The first decades following the Second World War were characterised by intense emigration to urban centres of Greece and mainly to Athens. Farms were abandoned, lands were clearing and the population of the island declined from 9702 inhabitants in 1951 to 7314 in 1971. As was the case with the rest of the Cyclades, what reversed this desolation was the phenomenon of tourism, which transformed not only the economy of the islands but also the entire life-style of the islanders. The unwavering building activity of the last twenty five years has given Paros a facade of cosmopolitan tourist resort and indeed a large proportion of its population lives on tourism.

Until 1944 the island of Paros together with that of Antiparos belonged to the prefecture of Naxos. In 1944 Paros and Antiparos became a separate prefecture, the prefecture of Paros. Until 1998, after having undergone several rearrangements, the prefecture of Paros consisted of one municipality and seven communities. The municipality and six out of seven communities are located on the island of Paros. Only the community of Antiparos is located in the adjacent homonymous islet. All the villages and settlements of Paros (altogether some 36 villages and hamlets) belong to one of the six communities or the municipality.

Figure 1.2: Map of Paros. Universal Resource Locator (URL): www.hri.org/infoxenios/english/cyclades/paros/par_map.html Date 28/6/01

1.9 Selection of a community as a case study

In a preliminary survey on the island of Paros in January 1998, an attempt was made to spot the most suitable community for the application of family reconstitution to the population. Two things were taken under consideration in order to determine which is the most appropriate community for such task: population size and data availability. One would expect that the capital of the island, Parikia, which is classified as municipality, maintains the oldest and most well-organised books of civil registration. This being our initial thought we examined the books of civil registration of Parikia with the view of using it as our study community. Unfortunately, most of the books of civil registration before 1929 were destroyed by a flood that occurred, presumably in 1928. Therefore, uninterrupted vital statistics for Parikia exist only from 1929 onwards. After visiting the community offices of the remaining six communities and having looked into their books of vital statistics, commune registers, male and female registers (matriculation books) and anything that could be helpful to our study, it was realised that out of the six communities (community of: Agkairia, Arhilohos, Kostos, Lefkes, Marpissa, Naoussa) and the municipality (municipality of Paros (Paroikia)), the one that maintains the oldest systematic archives is the community of Naoussa. This community keeps almost uninterrupted data on civil registration, that is births, marriages and deaths, since 1894. Prior to that date, data are fragmentary and incomplete.

For reasons already stated in section 1.1 the community of Kostos is also included in our analysis and when it comes to family reconstitution Naoussa and Kostos are treated as one community. Furthermore, what made us regard the two communities as comprising one population is not only the fact that they constituted one "community" (one administrative unit) until 1914, but also the fact that there has always been great population mobility between Naoussa and Kostos. People born at Kostos were getting married at Naoussa and vice versa; this constant exchange of population was so substantial that any family reconstitution attempted with only one of the two villages would be fragmentary and very unreliable in its results. With respect to the second guideline for the choice of a study area, that is population size, it has already been argued (in section 1.1) why the selected areas, with a mean population of 1905 inhabitants throughout the study period, meet the requirements for the application of family reconstitution.

A closer focus on the examined society is attempted in the next chapter, where the economic activity of the population, its literacy and the social stratification of the two communities throughout the study period are examined from the available sources. Here, some research questions are posed, which this study shall try to answer.

1.10 Research topics

A main concern of the thesis is to explore the demographic similarities and differences between Paros and, first of all the Cyclades, and then mainland Greece. Paros is usually represented in this thesis by two communities, Naoussa and Kostos. Using the theory of demographic transition as an analytical tool, the basic research questions are:

1) What was the course of demographic transition in Greece, in the Cyclades and in Paros? This research question covers a variety of issues such as the level of fertility throughout the examined period, the timing of fertility decline, the epidemiological transition, the levels of infant and overall mortality throughout the transition. It is understandable that for all these issues, answers will be sketchy for Greece and the Cyclades but they will bear great detail when it comes to the two communities for which primary data have been used. Some

particular questions with respect to the reproductive behaviour of the population of these communities will be put forward, such as: Was declining fertility due to a "stopping" reproductive behaviour or a "spacing" one? When, if at all, did couples start to lengthen the birth intervals switching from "stopping" to "spacing" procreative behaviour?

2) What was the marriage pattern of Greece and of the examined island populations and the changes that have occurred over time?

3) What was the relationship between mortality and fertility? Did mortality decline precede that of fertility? Was there a considerable time-lag between mortality and fertility decline so as to permit significant population growth to take place? The inter-relationship between mortality and fertility is the weak point of the theory of demographic transition, as was stated in section 1.4. Although in the original version of his theory Notestein (1945) supported that fertility decline follows that of mortality with a time lag, which depends on the economic development of the society, subsequent research disputed this causal relationship[5]. Therefore, it is of some interest to investigate the relationship between mortality and fertility in an Aegean island, the experience of which, in terms of economic development and of social and cultural context, is different from most West-European societies.

4) What was the social history of Naoussa and Kostos in the last hundred years? This research topic investigates matters such as class stratification of the communities, economic activity and literacy status by social group and migratory patterns that played a crucial role in the social and demographic history of the island. Adding this kind of cultural context, apart from being informative for the examined society, will help us to better comprehend the results of correlation between fertility and occupation, fertility and literacy and eventually between fertility and social class.

5) What was the demographic regime in pre-transitional, transitional and post-transitional Paros? Was the population pressure high or low? What was the role of mortality, fertility, nuptiality and migration in upholding a demographic balance and which of these four demographic components played the most important role?

6) Was the demographic regime of Paros similar to other islands within and outside Greece?

[5] See for example Knodel J. (1974:167-185) and Livi-Bacci M. (1971:121-124) and (1977:205-213)

CHAPTER 2: DATA SOURCES AND THE SOCIO-ECONOMIC BACKGROUND OF THE SAMPLE COMMUNITIES

Two parts make up this chapter. In the first part an extensive account of the data sources used in this study is provided, while in the second part a better acquaintance with the place and people under observation is attempted.

Part 1: Data sources

Generally, two kinds of data sources are used. First of all official publications, which comprise censuses, statistics on the natural movement of the population and statistical yearbooks. The second type of data comprises all those community-level archives that have been used for the compilation of the material that enables family reconstitution to be performed.

2.1 Official Publications

Although demographic data for Greece have been compiled and published since the founding of the new State in 1830, a lot of the 19th century publications were difficult to trace, mainly because of the poor organisation that characterised public libraries in Greece. Those official publications providing demographic data that have not been destroyed or lost, were tracked down in various libraries in Greece and are mentioned in the following sections.

2.1.1 Censuses

The conducting of censuses was one of the first concerns of the modern Greek State, even before full independence was established in 1830. The first census was undertaken in 1828 and from thereon until 1856 twelve censuses took place at irregular intervals, eight of them on an annual basis from 1838 to 1845. However, all those “censuses” were little more than mere enumeration of the population and their reliability is doubted, taking into account that most of these “censuses” lasted for almost six months (Siampos, 1973:44). Progress was achieved with the 1861 census, which was the first Greek census to take into account the international recommendations for census-taking as those had been formulated in International Statistical Conferences in Brussels (1853), Paris (1855) and Vienna (1857)(ibid: 56).

The published returns of the 1861 census, which can be found today in the library of the Parliament Of Greece, present the population broken down by sex and broad age-groups (0-18, 18-25, 25-30, 30-40, 40-50, 50-60, 60-70 and 70+) for Greece and subdivisions of her, down to the level of the municipality[6]. Moreover, marital status and economic activity of the population is provided, again down to the level of the municipality, disaggregated by sex but not by age. Another interesting feature of the information is that the population of every municipality is analysed in the registered, the non-registered (i.e. citizens coming from another municipality) and foreigners. The number of families (the definition of "family" in Greek censuses until 1920 is the equivalent of "household" in the modern censuses) and of dwellings is also provided down to the level of the prefecture. Another point that is worth noting is that soldiers, travelling sailors, monks and nuns are listed separately and they are not contained in the general population. The 1861 census commenced in the 12th of March of 1861 and lasted 60 days.

The next census, that of 1870, was conducted in 16 days starting on the second of May and terminating on the 17th of the same month. The published census returns contain the same categories as those of 1861, but are more detailed and they are to be found, again, in the library of the Parliament of Greece. The graduation of ages is given in five-year age groups apart from the first two groups, (which are labelled 0-12 months and 1-5 years) and the last group (which is labelled 100 and over). The 1870 census, as well as that of 1861 and every following one, was conducted on a de facto basis and soldiers and sailors travelling abroad are again listed separately and they are not included in the place of their usual residence.

In 1879 another census took place, starting on 15th of April 1879 and terminating on 25th of April 1879, although it seems that the actual enumeration lasted seven days within this interval (Ministere de l' Interieur, 1909:ια, Vol. 1). The 1879 census followed the same principles as the previous one, the main difference being in the breakdown of ages. For provinces the age is provided for each sex separately in single years up to the age of 30 and then in five-year age-groups (labelled 30-35, 35-40 and so on) up to the age of 100 with the 100+ being the last (open ended) age group. For municipalities the same graduation is provided but only for the male population. The only place where the returns of this census could be traced was the library of "The Bank of Greece" in Athens.

[6] The municipality (Demos) was the smallest administrative division until 1914. It was equivalent with today's communities. For an account of the administrative division of Greece see chapter 1 section 1.5.

In all three censuses that took place from 1861 to 1879 the labelling of the age groups used in the published results is unclear. One has to decide what exactly does the label 30-35 (for example) mean? Is it 30-34 or 31-35? It seems that it means 31-35 for one simple reason. In the 1879 census, population is analysed in single years up to and included the age of thirty. After that, the next group is labelled "30-35". Yet, this group (30-35) cannot contain those aged 30 last birthday because these people have already been registered under the single-year age group "30".

To examine if this hypothesis holds true, the following test was performed: all the age groups, both single year and five year age groups, were summed up and the total was compared with that provided by the census returns. The two totals corresponded signifying that 30-35 means 31-35, 35-40 means 36-40 and so on. The same conclusion has been reached by Hionidou (1993:144) who used data from these censuses for her thesis. Of course this classification is incompatible with the modern demographic practice which wants the first year of the five-year age group to be a multiple of five.

The next two countrywide censuses were held on 16th of April 1889 and on sixth of October 1896 respectively. They were the first Greek censuses to be conducted in a single day and the first ones to be conducted with the use of special census forms (family forms for the 1889 census and individual forms for that of 1896), instead of the multi-paged enumerator's books that were in use until the 1879 census. Unfortunately, the full returns of these two censuses were never published because in the case of the 1889 census elaboration of data was suspended before completion and in the case of the 1896 census the census forms were destroyed by a fire which reduced the census bureau to ashes (Ministere de l' Interieur, 1909:ιγ, Vol. 1). However, some initial results were published for both those censuses by the Ministry of Internal Affairs (1890 and 1897), giving the population totals by sex for each administrative unit. The volumes containing these results can be found in the library of the National Statistical Service of Greece (NSSG) in Athens.

After the two unfortunate censuses of 1889 and 1896, the next was conducted on 27th of October 1907. It lasted one day and produced full results, which have been published in two volumes and are readily available in a number of libraries in Greece and abroad. A feature of this census is again the peculiar labelling of the age groups in which the population is disaggregated. The age breakdown, according to the labels used in the census returns, follows the ensuing pattern: 0-1, 2, 3, 4, 5 and then a sum of those age groups labelled 1-5.

Considering that the five-year age group 1-5 is the sum of the previous single-year age groups, it is obvious that it contains the age group labelled 0-1. Thus, what is labelled 0-1 is actually a single year age group containing those who have not completed their first year of life. The fact that what is labelled 0-1 is not a two-year age group is also indicated by its relatively small size. If this is the case, then the subsequent age group labelled 2, contains those who have completed their first year of life but not their second, the next group, labelled 3, contains those who have completed the second but not the third year, and so on. Consequently, the age group labelled 1-5, in conventional terms, should have been labeled 0-4, since this is what it means; the age group labeled 6-10 is actually the 5-9 age group and so on. There is also another irregularity concerning age groups. After the age group labelled 26-30 (thus actually 25-29) the following age group is labelled 31-34 (meaning 30-33), a four-year age group. Immediately afterwards, there follows a six-year age group, labelled 35-40 (meaning 34-39), though the next age group is labelled 41-45 (meaning 40-44) starting again the sequence of five-year age groups. Despite its drawbacks however, the 1907 census set new standards in demographic knowledge about Greece, since it was the first Greek census to present, in its published results, the marital status of the population broken down by age groups and it did so down to the level of the prefecture.

The next census to be conducted on a countrywide basis took place on 19th of December 1920 and its results were published in 8 volumes. The age grouping and the age labelling used in this census complies with the modern practice i.e. the age groups are correctly labelled 0, 1-4, 5-9, 10-14 etc. The population under 30 years old is also presented in single year age groups. Age miss-statement was less than in previous censuses (Siampos, 1973:69) and for the first time the sex ratio of the population was feminine, something that would become a standard feature of the Greek censuses from 1920 onwards. However, this census is not free from shortcomings. The most significant of its drawbacks, from the point of view of this study, is that detailed analysis of the population by age, occupation, literacy and marital status, stops at the level of the prefecture. For municipalities and communities, only population totals disaggregated by sex are available.

On 16th of May 1928 the next census was conducted, following the same pattern as the 1920 census. Communities are represented in its results, as it was the cases with the previous census, only with population totals broken down by sex. A special feature of the 1928 census was additional questions about refugees in an effort to find out the place of origin and of settlement of the 1.2 million refugees that flooded into the country in 1922. The returns of this census can be found in six volumes, published between 1929 and 1937 by the ministry of National Finances.

On 16th of October 1940 another census was conducted but the elaboration of the census forms was never completed, because of the Second World War (which for Greece started on 28th of October 1940) and the German occupation that followed in April 1941. However, two volumes with census returns have been published and they contain population totals by sex, down to the level of the community.

From 1951 onwards, censuses in Greece have taken place in regular intervals, every ten years, and attempting to follow the recommendations of the United Nations. The dates when censuses from 1951 until 1991 have been conducted are as follows: seventh of April 1951, 19th of March 1961, 14th of March 1971, fifth of April 1981 and 17th of March 1991. Nevertheless, the census reports do not follow a standardized pattern common to all censuses. Thus, at the community level the 1951 census report provides only the population of each community by sex along with some data about the average altitude of each community, the density of its population per square kilometre and other geographical information. The 1961 report presents the population of each community broken down by sex, broad age groups (0-4, 5-14, 15-44, 45-64 and 65+) marital status, literacy, economic activity and other categories. The distribution of population in the aforementioned broad age groups is a peculiarity that the 1961 census follows for larger administrative units as well.

The 1971 and 1981 census reports provide population totals by sex for each community together with information on various categories of *de jure* and *de facto* population. Lastly, the 1991 census presents its own peculiarity: up to 1998 its full results had not been published in conventional printed form, but computerised census returns were available on request from the National Statistical Service of Greece. The results in their computerised form provide the population broken down by five-year age groups and various categories.

It is probably worth noting that apart from the aforementioned nation-wide censuses, a small-scale census was carried out every time that a new territory was annexed to the Greek state. Thus, in 1881 a census was conducted in the newly liberated areas of Thessaly and Arta. In 1913, another census was organised by the army in Epirus, Macedonia, Crete and some of the Aegean islands. Lastly, in 1947 the Dodecanese was subjected to a census, immediately after its annexation to the Greek state. Census returns from these censuses have not been used in the current study.

2.1.2 Vital Statistics

Civil registration in Greece was introduced in 1836 by a decree that allotted the maintenance of books of civil registration to the mayors and their assistants (NSSG, 1956a:XIII). However, in the first twenty years this law was not observed, mainly due to the low literacy level of the mayors. In 1856 another law was passed concerning the registration of vital events in special books by the mayors, as well as the dispatch of summary statistics to the government. This time the law allowed the employment of a registrar if the mayor was not able to carry out these requirements. Nevertheless, this law also was not observed properly, again because of the low educational level of mayors and registrars. Thus, the bureau of public finance, which at that time was responsible for the compilation of statistics on the natural movement of the population, assigned the collection of vital events to the priests of each parish. The priests sent copies of the records to the mayors. The mayors produced tables showing the natural movement of the population of their municipality based on the records of the priests. Subsequently, the mayors sent these tables to the province governor, who in his turn produced tables for the whole province and sent these tables through the district governor to the bureau of public finance.

The first nation-wide statistics on the natural movement of the population were published in 1862 and referred to 1860. Thereafter, such statistics were published almost annually covering the period 1860-1891(NSSG, 1956a:XIV). However, it has not been possible to trace any publications for the years 1886-1891 and even for the earlier period four years are missing, namely 1861-1863 and 1884. For 1862-1863 it is known that no statistics were compiled due to a domestic unrest during those years[7] (NSSG, 1956a:XIV). These publications provide quite rich information on vital events, not only for the country as a whole but also for districts, prefectures and municipalities-communities. More specifically, for every administrative unit the number of vital events is provided by year and month, births are given by sex, legitimacy status and whether live or stillborn, deaths are shown by sex and marriages by previous marital status of bride and groom. Moreover, deaths are given by five-year age groups, while there is a separate age group for those who died before completing their first year of life. This breakdown of deaths is very useful because it permits, in conjunction with census returns, the derivation of life tables.

For the period 1885-1920 there is a vacuum as far as statistics on the natural movement of the population of Greece are concerned. Publications of such statistics resumed in 1921, although the coverage of the registration system was poor until 1927. The table below gives an idea of the extent of under-coverage of the civil registration system in Greece in the 1920s.

Table 2.1: Population of municipalities and communities not providing vital statistics, as percentage of the total population of Greece.

Year	Population, as percentage of the total population of Greece, belonging to administrative units that did not provide vital statistics to the central government.
1921	13.1%
1922	4.6%
1923	6.5%
1924	9.1%
1925	2.4%
1926	2.2%
1927	1.7%
1928	0.0%

Source: NSSG, 1956a:XV

Coverage and quality of the published countrywide vital statistics improved during the 1930s but such publications came to an abrupt end in 1940 because of the Second World War. The last countrywide publication of the pre-war period referring to vital statistics is the statistical yearbook of Greece for 1939, which was published in 1940. After a full war-decade, publication was resumed in 1954 by the National Statistical Service of Greece and contained some aggregate vital statistics for 1949 onwards (NSSG, 1954). Since 1955, when NSSG started its full-scale operation, vital statistics for Greece have been published regularly, with annual reference, in two main editions: in the "Statistical yearbook of Greece" in a concise way, and in more detail in the "Natural movement of the population of Greece".

[7] The years 1862-1863 are associated with political turmoil and civil uprisings aiming at the abdication of king Otto. The Cyclades were also involved in the revolt against Otto and rebels overturned the authorities in

2.2 Primary sources

The following archival material, which enabled family reconstitution to be performed, has been used in this thesis:

I) Books of births, marriages and deaths from the register offices of the communities of Naoussa and Kostos. These books cover the periods 1894-1915 and 1932-1998 (when the data collection stopped) and they will be referred to as “books of civil registration”.

II) Parish registers of births, marriages and deaths from the same communities for the period 1916-1931 where vital statistics were kept only by the church.

III) Books of male and female registers (matriculation books) of the communities in question, which were used to fill in certain gaps in the civil registration system. It should be mentioned that the books of male registration are usually the oldest state archives to be found in Greek communities. They were used for recruiting purposes and their existence dates back to the early years of the modern Greek state. In the case of Naoussa the earliest matriculation book of males covers the period 1832-1934. It contains the name, surname, year of birth (but not the exact date of birth), father’s name, place of birth and religion and in some cases the year of death of males who were born in the period which the matriculation book referred to. However, the book is incomplete at least until 1850-1860. For the very early years it accommodates only one or two records in each year and it is unlikely that the registration is complete in more recent years also. The book of female registration dates back to 1894, providing the same information with the male registers but its principal purpose was to be used as an inventory for enrolment in primary school.

IV) Commune registers, which were also used to cover missing years of civil registration. Commune registers of both Naoussa and Kostos were created in 1915 and they include families which had their civil rights established in the communities in question. Every male member of a family acquires its own “portion” in the commune register upon his marriage. The never married are registered in the “portion” of their paternal family. Married women are registered in their husband’s portion upon marriage. If the husband does not belong to the community, a “mirror portion” is created in the

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Syros and liberated political exiles held in Kithnos. The insurrection was soon suppressed by the king’s navy.

commune register, reflecting, if properly updated, the vital events concerning the new family, irrespective of its place of residence. Commune registers, apart from names and surnames, provide dates of births and usually, if they are properly updated, dates of deaths and marriages. They also contain a column with notes where, customarily, the place of permanent residence of the person in question is mentioned.

V) "Books of reports" (the Greek term is «βιβλία εκθέσεων» ("vivlia ektheseon"). These books contain baptisms (that took place in the community) of persons who were not born there. They were extremely useful because during the last thirty years or so, few women bear children in the community clinic. Most of them, in the final stages of their confinement, go to an urban centre in mainland Greece (mainly Athens), bear their children there and return to the island a few days afterwards. Books of reports usually provide eight fields of information: forename and surname of the child, forename and surname of the father, father's occupation, place of birth, date of birth and date of baptism. In some cases they give the mother's forename and surname as well.

2.2.1 Availability and quality of primary sources

Until 1914 all vital events were registered in the community of Naoussa, where the village of Kostos administratively belonged. In 1915 Kostos became a separate community with its own register office. Civil registration can be recorded either in books which include all the three vital events (as is the case with the early years until 1915) or in separate books for births, for marriages and for deaths (as is the case with years from 1932 onwards).

A difficulty with the civil registration of these communities is that for the period 1916 to 1931 no books are kept in the community offices. This is a period when vital statistics were kept by the church according to a law, which assigned to the local parishes the task of civil registration in small communities (not the municipalities). For this period there are no parish registers for Kostos, apart from some fragmented books referring to 1930 and 1931, and it should be noted that any consistent data concerning civil registration for Kostos are to be found from 1932 onwards. Data for the years 1915-1929 for Kostos have been taken from the matriculation books and the commune register of the community. However, only births have been traced effectively from these archives. The quality of data referring to deaths and marriages for this period (1915-1929) for Kostos as far as both coverage and quality are concerned is poor.

For Naoussa there is only one missing year, that of 1898. Many births for that year have been found in the male and female registers. However, the coverage for this year is obviously not complete, since there are only 44 birth records for 1898 compared to an average of 89.5 for the two adjacent years.

With respect to the parish registers for the period 1916-1931, although they are missing from Kostos (except for those referring to 1930 and 1931), those of Naoussa are in fairly good condition. Nevertheless, parish registers contain less information than birth, marriage and death certificates available from books of civil registration. The information provided in birth records from civil registration is shown in table 2.2. Out of the 15 fields[8] of information normally available from civil registration, five are missing from parish registers, namely: father's occupation, age of father, date of registration, mother's occupation and place of birth. When it comes to marriage certificates, parish registers provide seven fewer fields than the books of civil registration. The latter provide a maximum of 21 fields, as shown in table 2.3. The missing fields from parish registers are groom's occupation, bride's occupation, groom's mother's forename, groom's mother's surname, bride's mother's forename, bride's mother's surname and date of registration. So far as death records are concerned, parish registers include five fields less than the 16 that books of civil registration usually provide (see table 2.4). These five missing fields are: occupation of declaring person, relation of declaring person with the deceased, occupation of the deceased, cause of death and date of registration. Moreover, in parish registers of any kind there is no signature of the person who declares the event.

Another problem with all records of vital events is their illegibility. In the early years, although certificates are available on printed forms, the hand-written entries on these forms pose great difficulties, thus making the transcription time-consuming. The transcription was even more time-consuming when the certificates were not printed and were entirely hand-written. This was the case with the early certificates in the books of reports and with some marriage, birth and death certificates in the 1930s.

[8] Here we chose to use the database terminology "information field" instead of the statistics terminology "variable" or the colloquialism "item of information".

A way to assess the quality of data from a registration system is by tabulating the percentages of missing cases for every field of information provided by the records of vital events. This has been done in tables 2.2, 2.3 and 2.4 for birth, marriage and death records respectively. The table concerning birth records (table 2.2) is based on the manipulation of records obtained not only from books of civil registration but also from books of reports, parish registers, matriculation books and commune registers. When examining this table one must bear in mind that many fields of information, which normally are available from birth certificates, are missing from the rest of the archives. Births taken from any source other than books of civil registration constitute almost 40% of all births. That is why the percentage of missing cases for certain fields of information, such as date of registration, age of father and father's occupation, is high.

Table 2.2: Information included in birth records and percentages of missing cases; Naoussa and Kostos 1894-1998

Information	Percentage of missing cases
Forename	0.9
Surname	0.2
Date of birth	0.3
Father's forename	1.6
Father's middle name	52.2
Father's surname	1.5
Father's occupation	30.8
Age of father	72.8
Date of registration	43.5
Mother's forename	12.0

Mother's middle name	44.7
Mother's surname	17.0
Mother's occupation	69.6
Place of birth	19.5
Date of baptism	7.8

Source: Based on the elaboration of 5202 birth records.

Marriages taken from parish registers constitute 17.7% of all marriages and this fact is reflected in table 2.3 when one looks at the missing cases of the five fields that are totally absent from parish registers. However, the data quality of marriage certificates seems to be better than that of birth and death certificates, at least as far as the basic information fields are concerned. This can be explained by the fact that, when it comes to the registration of a marriage, those who declare the event and provide the information for the marriage certificate are the persons to whom the certificate refers i.e. the spouses themselves. On the other hand, deaths (and the relevant information about the deceased) are reported by a relative or by anyone who was aware of the event. In the case of births, it was usually the father who reported the event, and in that case information is complete and accurate, but it could be some other relative or the midwife or even the priest.

Table 2.3: Information included in the marriage records and percentages of missing cases; Naoussa and Kostos 1894-1998

Information	Percentage of missing cases
Groom's forename	0.0
Groom's surname	0.0
Age of groom	2.1
Origin of groom	0.9
Occupation of groom	19.6
Bride's forename	0.0
Bride's surname	0.09
Age of bride	1.8
Origin of bride	0.4
Bride's occupation	38.8

Groom's father's forename	4.6
Groom's father's surname	12.7
Groom's mother's forename	37.3
Groom's mother's surname	99.1
Bride's father's forename	3.2
Bride's father's surname	12.6
Bride's mother's forename	37.7
Bride's mother's surname	97.6
Date of marriage	0.0
Date of registration	17.9
Place of marriage	0.0

Source: Based on the elaboration of 1156 marriage records

Coming to the quality of death certificates, one observes in table 2.4 that the middle name[9] of the deceased is almost always reported when the deceased is female but this is not the case with males. This is because an adult male in these small communities could be identified by his forename and surname, while his father's forename (used as the middle name in Greece) was invariably reported only when the deceased was a minor. On the other hand it was more difficult to identify an adult female from her forename and surname only, because women switched from their paternal to their husband's surname upon marriage. Thus, a middle name was necessary, while in 47% of the cases that the deceased was a married female both the forename of her husband and of her father have been reported. In these cases the maiden surname is usually also reported along with the husband's surname. A feature that makes things more complicated for family reconstitution is that some of these middle names (fortunately not as many as in some other kinds of records in Greece) are written as abbreviations, which in many cases could refer to more than one name. Finally, it is worth noting that 18% of all deaths have been taken from parish registers, which do not provide information about the declaring person, occupation of the deceased, cause of death and date of registration.

Table 2.4: Information included in the death records and percentages of missing cases; Naoussa and Kostos 1894-1998

Information	**Percentage of missing cases**
Date of registration	18.0
Date of death	0.0

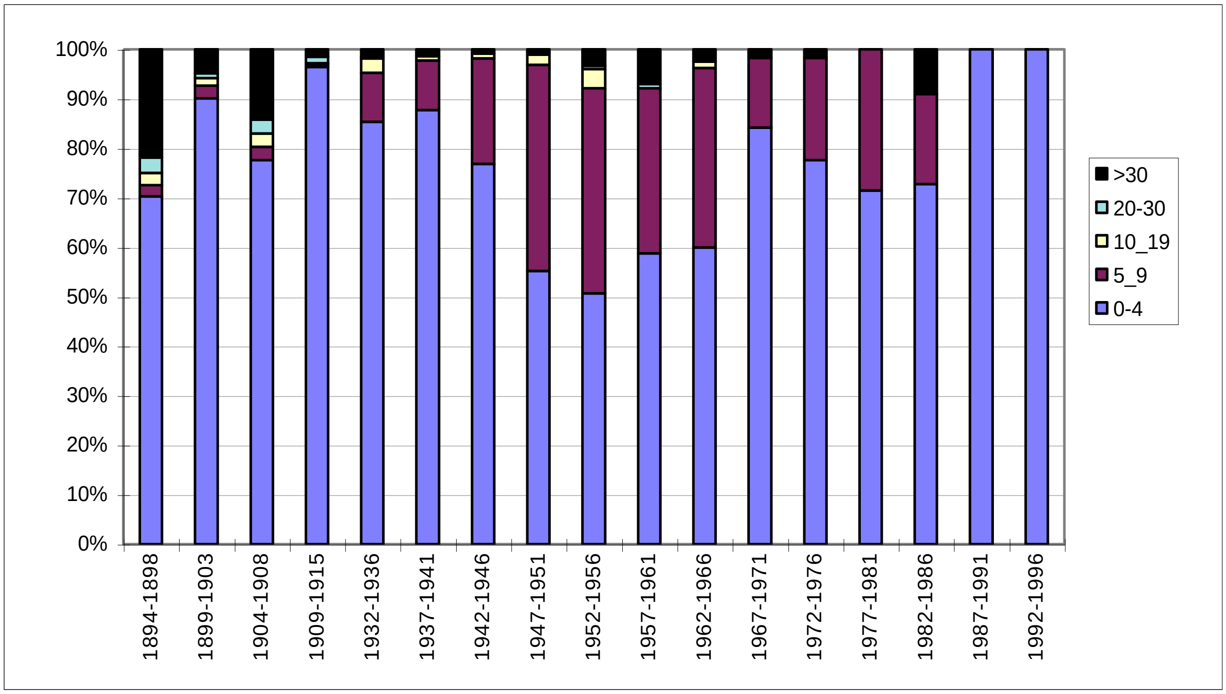
[9] In the Greek naming system "middle name" is the father's forename for males and single females and husband's forename for married females.

Place of death	0.0
Occupation of declaring	19.4
Declaring person	65.6
Age of deceased	0.9
Occupation of deceased	44.2
Place of residence	5.6
Cause of death	34.1
Marital status	81.9
Forename of male deceased	0.6
Middle name of male deceased	15.4
Surname of male deceased	0.0
Forename of female deceased	0.3
Father's forename of female deceased	38.1
Husband's forename	39.5
Maiden surname	38.1
Husband's surname	34.5

Source: Based on the elaboration of 2439 death records.

Another piece of information that can be used as an indicator of the data quality is the time-interval between the occurrence of a vital event and its registration. Figures 2.1, 2.2 and 2.3 present the delay of registration in days for births, marriages and deaths respectively, throughout the study period. The figures are based only on books of civil registration, since parish registers and the rest of the archival material do not provide a registration date. Thus, the period 1916 to 1931 is totally missing from the figures, since for this period there are no records in books of civil registration. Before examining the figures one should note that delays in registration of vital events are not always due to the negligence of people in reporting these events. In the early part of the study period there are years where the recording of vital events started with delay. Thus, registration of the 1894 events only started in April of that year. In 1895 registration started in March, in 1896 in June, and in 1899 in March. That is why in the first five years of the study period (1894-1898) the figures 2.1, 2.2 and 2.3 show that more than 20% of the vital events were recorded with a delay exceeding 30 days. A considerable delay is also obvious in the period 1904-1908, because in 1907 the recording of events started only in July and in 1908 in March.

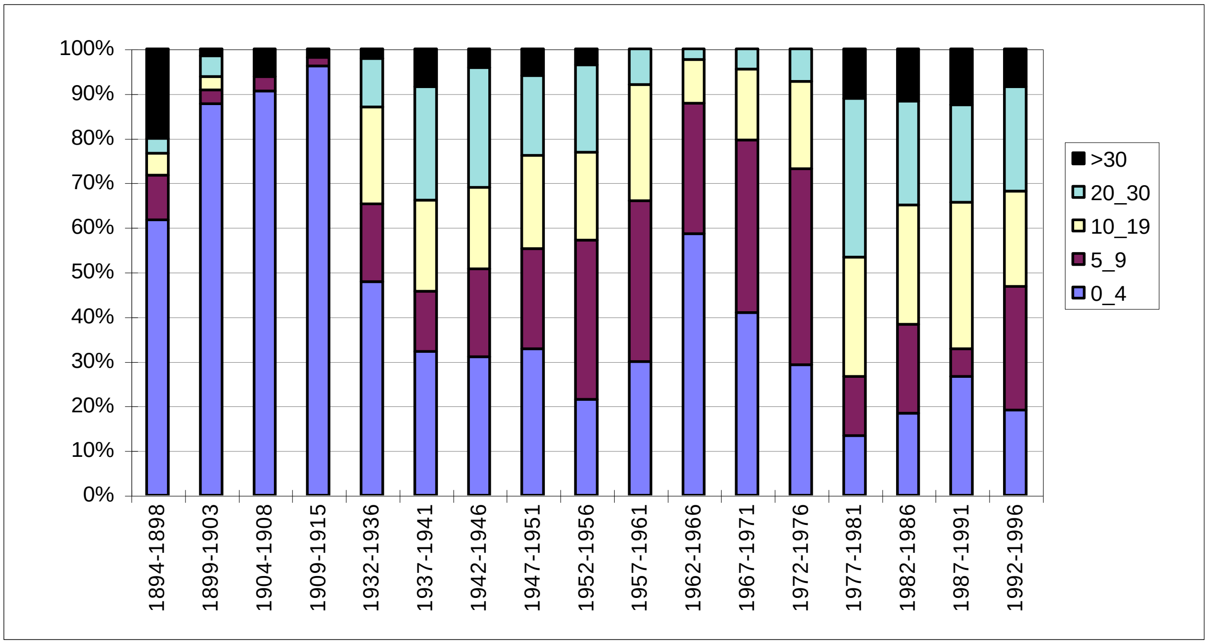
Figure 2.1: Delay of birth registration in days; Naoussa and Kostos 1894-1996.



Source: Naoussa and Kostos civil registration data

Coming to the delay of birth registration, it may be seen from figure 2.1 that, apart from the periods 1894-1898 and 1904-1908, which had been affected by the fact that registration started only after some delay in some years, in the rest of the periods usually more than 90% of the births had been reported within 9 days from the event. This is in accordance with the relevant rules, which state that the birth should be reported to the registrar' s office within ten days from the day that the birth took place. After the tenth day but before the 90th, the reporting of a birth is accepted by the registrar but the person responsible for the reporting, i.e. a) the father, b) the doctor, c) the midwife and d) anyone who attended the labour, pays a fine. After the lapse of 90 days from the birth, the reporting can be accepted only with a permit from the local magistrate, and the person responsible for the reporting is charged an additional fine (NSSG, 1957a:XIII-XIV).

Figure 2.2: Delay of marriage registration in days; Naoussa and Kostos 1894-1996.

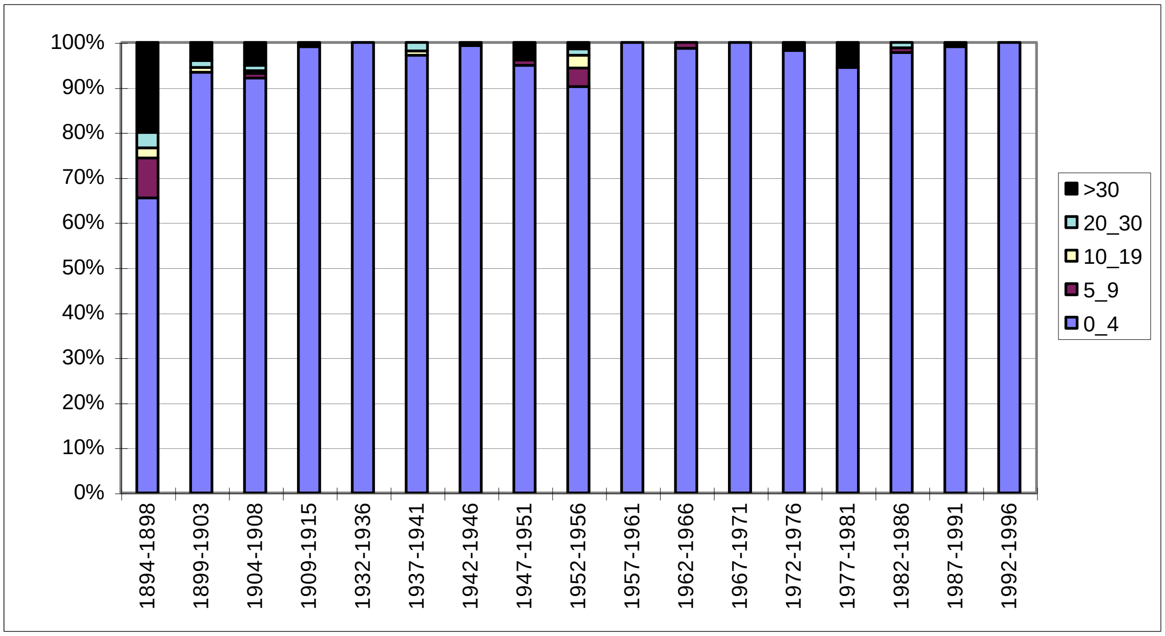


Source: Naoussa and Kostos civil registration data

In the case of marriages the delay of registration is greater than that of births because laws concerning the reporting of marriages have not been so stringent. The variability that is observed in the delay of registration in figure 2.2 from period to period most probably reflects legal and administrative changes regarding the reporting of marriages. Thus, from 1955 until 1975 a marriage ought to have been reported within 30 days from the event, while from 1976 onwards the time limit became 40 days (NSSG, 1957a:XVI), (Ministry of Internal Affairs, 1977:49). This is possibly the reason that in the period 1957-1976 100% of the marriages were registered within 30 days, while from 1977 onwards, this percentage was less than 90. Although we do not know the rules before 1955, it seems that in the period 1894-1915 the deadline for reporting a marriage was short, presumably ten to twenty days, while in the 1930s and the 1940s the time limit was less strict.

Another fact that might have affected the delay of marriage registration is that in the early years, up to 1975, the primary person responsible for reporting the marriage was the priest who performed the wedding, while the spouses were “in parallel responsible for the reporting” (NSSG,1957a:XIII). From 1975 onwards the legislation mentions only the spouses as responsible for the reporting.

Figure 2.3: Delay of death registration in days; Naoussa and Kostos 1894-1996.



Source: Naoussa and Kostos civil registration data

Death is the vital event that is registered more swiftly than the others. The main factor responsible for this is again the legislation, which commands that every death must be reported within 24 hours from the event. Moreover, the local authority cannot issue a burial permit if there is no death certificate, and a will cannot be opened without a such certificate, something that makes people more eager to declare a death. Thus, in figure 2.3, it is obvious that, apart from the years already mentioned, where registration started with some delay, in most years almost 100% of the deaths have been registered within 4 days.

Part 2: Socio-economic background of the sample communities

2.3 A closer focus on an island society

In this part the community life of Naoussa and Kostos will be examined in more detail. Naoussa, which is the second biggest village of Paros after Parikia, is situated on a bay on the north coast of the island. It is regarded as the fishing port of Paros and a substantial proportion of its population are seamen. On the other hand, Kostos is a mountain village situated 6.8 kilometres from Naoussa at a mean altitude of 142 metres. As mentioned earlier, Kostos belonged to the community of Naoussa until 1914 and was established as a separate administrative community only in 1915. In fact, Kostos has always been a small hamlet with a mean population from the time it became a separate community until 1991 of 371 inhabitants. Thus, the great majority of the population under study belongs to Naoussa, the population size of which ranged from a minimum of 1322 (in 1971) to a maximum of 2110 in 1991 with a mean of 1632 over the period 1879 to 1991. The mean population of Naoussa and Kostos together for the same period (1879-1991) was 1879 and did not exceed 2500 in any census up to 1991.

2.3.1 Economic activity and literacy status

Further on, attention will be focused on the social structure of the communities and consequently the economic activity of the population and its social stratification. In order to explore these aspects of the society two indicators are used throughout the study period: occupational status and literacy of the population. Investigation of the occupational status of the population is based on two kinds of sources: census returns and books of civil registration. Census returns would be the best way to investigate the occupational structure of the society, but unfortunately censuses after 1907 and before 1991 do not provide this information at community level. On the other hand, information on the economic activity of the population can be drawn from the books of civil registration for the period 1894-1998. Birth certificates mention the occupation of the father of the newborn child, while mother's occupation is mentioned from 1932 onwards. In like manner, marriage certificates over the entire period 1894-1998 state the groom's occupation whereas the bride's occupation is stated from 1932 onwards. Death certificates mention the occupation of the deceased and that of the person who reports the death. However, the drawback of such certificate-based data is that they do not reflect accurately the economic activity of the population. Birth certificates, for example, tend to over-represent the occupational groups that have higher than average fertility (which in our case is the farmers/stock breeders as will be shown further on) and under-represent those who exhibit lower than average fertility. Marriage certificates generate much improved information on the economic activity of the population, although this information is not completely accurate since the proportion of those never married was substantial (around 7-10% for males in various decades of the examined period) as will be seen in chapter 3.

A sensible assumption would be that death certificates can produce a better account of the occupational structure of a society than marriage and birth certificates do, because even if not all of the people get married and even fewer have children, eventually everyone has to die. Unfortunately, the occupation of the deceased reported on death certificates is usually obscure and of little use for our purpose. This is because, even in the early years of the examined period (the late 19^{th} century) most of the people died either too young (infants and young children) or too old, that is old enough to have been retired from their jobs. From the first decades of the 20^{th} century, and more so from the 1930s onwards, most of those who died at an "old" age were referred to simply as pensioners. In most cases the insurance office is also mentioned, but this is of little avail since people with different occupations were registered in the same insurance office. For example fishermen are covered by the same insurance office as farmers and stockbreeders, while another insurance office covers everyone who is not self-employed and its pensioners could have been anything from a labourer to a salesman or a waiter. Therefore, it was decided not to use death certificates for deducing the economic activity of the population of Naoussa and Kostos. Having already rejected birth certificates as unrepresentative, marriage certificates and census returns, where available, were used, to provide information on economic activity.

In the tables showing occupational groups, the literacy status of these groups is also displayed, so as better to understand the social condition of each group separately and the general level of social development of the whole community over the period 1894 to1998. Information on literacy status has been drawn from the same marriage certificates from which information on occupation has been extracted. Thus, the number of cases in tables 2.6, 2.7 and 2.8 refers to the respective occupational group and the same number of cases has been used to provide information on the literacy status of this group.

The criterion that has been used for classifying someone as literate or not is whether someone has signed his or her marriage certificate, since both spouses should sign the marriage certificate. However, this is not always as straightforward as it sounds. First of all in very many certificates there is only one signature, usually that of the groom, without that necessarily meaning that the bride was illiterate. When someone is illiterate, in the place of his/her signature it is usually written by the registrar "illiterate". Yet, there are many certificates with no signature of bride and no statement of her illiteracy. There are also certificates with no signature of groom and no statement of his illiteracy either, but with a signature of bride. Lastly, there are (very few) certificates where no one signs and no one is stated to be illiterate. However, because in 82.3% of the certificates there is either a signature of groom or a statement of his illiteracy, it was decided to use marriage certificates to provide information on the literacy status of the male population of Naoussa and Kostos.

The study period has been divided in three parts: The pre-war period 1894-1939, the transient pre-tourist and early-tourist period 1940-1979, and the contemporary period 1980-1998. For standardisation purposes, every economic activity has been classified in six broad groups, and an attempt has been made to retain this classification both in tables based on marriage certificates and those based on census returns. The six occupational groups are labelled: 1) farmers/stock breeders 2) labourers 3) craftsmen/salesmen 4) sailors/fishermen 5) traders/ businessmen and 6) services. There is also a residual category labelled "others". Before presenting tables showing the distribution of the employable population across these occupational groups, the social, economic and cultural characteristics of every group will be delineated, trying to provide an insight on the community life. Much of what follows draws on oral accounts from the local people of Naoussa. As a source of information this research technique proved to be invaluable because in many cases the knowledge of local informants supplied insights not provided in written sources.

In the group labelled "farmers/stock breeders", proprietors are included as well. This distinction between "proprietors", who were relatively few in all periods, and "farmers", who were by far more numerous than proprietors, is noticed both in the reported occupations in the community archives and in census returns. Discussions with local inhabitants of Naoussa pointed out that usually people who stated themselves to be proprietors, were those with a substantial piece of land in their possession. What differentiated them from the bulk of farmers was not only the area of the land they possessed, but also the fact that they usually did not work on the fields themselves but hired labourers for this task. Another point of differentiation, as was discovered from the books of civil registration, was the literacy status of "proprietors". Whereas most of the farmers were illiterate up to the first decades of the 20th century, it was rare for a "proprietor" not to sign a certificate. In any case, according to census returns the "proprietors", who seemed to be the big landowners, did not exceed seven percent of the "farmers/stock breeders" group in any period, while based on civil registration this percentage was even smaller.

Coming to another large group, that of labourers, it should be specified that these people were used mainly in two kinds of jobs: agricultural work and constructions (builders). Labourers were usually people without any land property and without any other source of income except for their own hands. They depended for their subsistence on seasonal employment. During summer and autumn they were hired by proprietors and farmers for harvesting and various work in the fields, while during the rest of the year they hoped to be employed as builders on construction sites.

The most heterogeneous occupational group is that of craftsmen and salesmen. It includes a very wide range of jobs and its members present a broad diversity with respect to their status and social condition. The most common craftsmen encountered in the books of civil registration in the earlier periods (until the 1970s) were carpenters, bakers, shoemakers, grocers, blacksmiths, millers, tailors, potters, barrel-makers and keepers of various shops like coffee-shops, barbershops and many more. Over time other kinds of craftsmen made their presence more obvious in the community archives. These were mainly technicians like plumbers, electricians and vehicle engineers but also people who could be classified under the "services" sector, like taxi drivers, cooks and restaurant waiters. The 1879 census does not list all those comprised in the category "craftsmen" but there is reason to believe that they are the same people we also classified as craftsmen. More specifically, in the introduction to the 1870 census (which used roughly the same classification of occupational groups as the 1879 census) is written: "…especially in small towns, it is difficult to distinguish between the craftsmen and the traders. In these towns usually the production and the selling (of goods) take place at the same store and from the same person. Moreover, craftsmanship can, in many cases, be confused with agriculture, where, for example, a farmer apart from his fieldwork … maintains a cotton-gin … or a mill. How could someone distinguish in this case the farmer from the craftsman …? Furthermore, in some cases the same farmer does not sell only his own products, but he buys other products and re-sells them …" (Ministry of Internal Affairs, 1872: κε).

Another occupational group, which was small at the end of the 19th century but became greater over time, and its members were usually well off, is that of traders. What differentiates craftsmen/salesmen from traders is that usually the latter do not produce anything themselves, undertaking only the transport and transaction of goods. Moreover, traders were more educated than craftsmen/salesmen as tables 2.6 and 2.7 show. In the early years of the study period the most common traders were the vessel-owners who were bringing goods from mainland Greece and other islands, usually goods that could not be produced on Paros. This type of trader fell into decline in recent years, when the ferryboat connection of the island with Piraeus became an everyday activity throughout the year. A few of these traders still survive, mainly by transporting goods that due to safety reasons are not conveyed by ferryboats (like gas-cylinders and highly flammable equipment). Apart from vessel-owners, the category of traders includes also owners of merchant shops and, in recent years, antique shops, jewellery shops, hotels and generally all those characterised as businessmen, who live on tourism, like bar-owners, restaurant and travel agency owners.

The services sector was meagre in the period up to the 1970s but it has grown quite substantially since then. The typical representatives of this occupational group in the pre-war period were clergymen, teachers and police officers. Something that should also be noted is the presence of customs officers because of the existence of a local customs office in Naoussa. In the late 1960s a power station became operational in a location outside of Naoussa, electrifying six Cycladic islands (Paros, Antiparos, Naxos, Ios, Donousa and Koufonisia). The power station with its employees (mechanical engineers, specialised technicians, administrative and office staff) expanded the services sector. The occupational group of service providers comprises not only all kinds of public servants but also private entrepreneurs like doctors, lawyers, architects, dentists, civil engineers, accountants, psychiatrists and the like.

The residual category "others" comprises a variety of wage earners not considered as belonging to any of the above six occupational groups. Some indicative "others" are private clerks, field guards and lighthouse guards.

Having focused on the special characteristics of each occupational group, we turn now to examine the distribution of the employed population of Naoussa and Kostos in these groups. Table 2.5 illustrates the occupational structure of the population of Naoussa at the end of the 19th century. The table is based on the 1879 census returns, re-categorising the occupational groups from the 26 that are presented in the census to the six groups just described. It is noteworthy that fishermen are completely absent as an occupational group from the 1879 census and it seems likely that they are included in the category of farmers, as is the case with all the censuses from 1907 onwards. Moreover, the sailors group is quite small for an island community but this must have been because naturally, most of the sailors were travelling when the census took place and therefore only those who were ashore were enumerated in their place of residence. Furthermore, most of those labelled as "traders" in this period are in fact sailors, since they live on sea faring, as described in a previous paragraph.

Table 2.5: Employed population (males only) by occupational group; Naoussa and Kostos 1879

Occupational group	Number	Percentage
Farmers/stock breeders/(fishermen?)	165	36.6
Labourers	120	26.6
Craftsmen/salesmen	40	8.9
Sailors	37	8.2
Services	24	5.3
Traders/businessmen	16	3.6
Others	49	10.9
Total	451	100.0

Source: elaboration of the 1879 census returns.

Looking at table 2.6, which is based on marriage certificates, one observes that the occupational structure of the communities in the first decades of the 20th century is roughly the same as that implied in table 2.5 for the end of the 19th century. There appears to have been a community of peasants, the majority of whom (62%) lived mainly on agriculture and stockbreeding. This percentage (62%) contains proprietors (which in the tables are invisible because they are under the group "farmers/stock breeders"), farmers, who can be small landlords or tenant farmers, and labourers, who are mostly agricultural labourers that period. This tripartite structure was common in rural societies at the beginning of the 20th century not only in Greece but in West-Europe as well[10]. Yet, in our case sea-farers formed a significant group, the third in size, thus differentiating Naoussa from a typical agricultural community and making it a mixed village of farmers and sea-farers. In fact, according to local informants, many of those who stated "farmer" as their main occupation, would have a fishing boat and practise fishing as an additional source of income.

10 See for example Reay B. (1996)

Table 2.6: Occupations and literacy status of males at the time of their marriage; Naoussa and Kostos 1894-1939.

Occupational group	Number	Percentage	% illiterate
Farmers/stock breeders	103	32.7	62.1
Labourers	91	28.9	96.7
Sailors/fishermen	51	16.2	56.9
Craftsmen/salesmen	35	11.1	31.4
Services	18	5.7	0.0
Traders/businessmen	15	4.8	20.0
Others	2	0.6	0.0
Total	315	100.0	61.9

Source: elaboration of marriage records.

In table 2.7 one observes that significant changes took place in the first post-war decades as far as the occupational structure of Naoussa and Kostos is concerned. Labourers were not any more the second biggest group, having shrunk to only a third of what they used to be in the pre-war period. The explanation for this probably lies in the fact that the 1950s and 1960s were the decades when a massive out-migration from rural to urban areas took place. As will be shown in chapter 4, Naoussa lost a substantial part of its population due to this exodus toward Athens. Those who left were mostly people with no stable job who had little to lose by abandoning the village. That is why proportionately more labourers than any other occupational group left the village, thus changing the occupational structure of the study society.

Table 2.7: Occupations and literacy status of males at the time of their marriage; Naoussa and Kostos 1940-1979

Occupational group	**Number**	**Percentage**	**% illiterate**
Farmers/stockbreeders	156	37.7	14.7
Sailors/fishermen	115	27.8	4.3
Craftsmen/salesmen	63	15.2	1.6
Laborers	44	10.6	20.5
Services	15	3.6	0.0
Traders/businessmen	11	2.7	0.0
Others	10	2.4	0.0
Total	414	100.0	9.2

Source: elaboration of marriage records.

Coming to recent years, in table 2.8 one finds that Naoussa is not any more a community of peasants and seafarers. The tourist development of the last thirty years has caused an economic transformation in the island society. The means of subsistence is not any more the land. Over a quarter of the employed population are craftsmen and salesmen, economic activities that usually blossom to an urban environment and are associated with provision of services and transaction of goods. The second biggest occupational group is that of sailors/fishermen but there is a substantial difference in the composition of this group in this period (1980-1998) compared to the past. Whereas, in the previous periods this group consisted mainly of sailors (68.6% and 71.3% of its members in the first and second period respectively were sailors), with fishermen being only a small minority in it, in the contemporary period fishermen make up 65.8% of this group. This can be explained by the fact that in recent years, due to tourist development, the demand of seafood has increased sharply. Thus, while in the first two periods a few fishermen were enough to cover the needs of the local population for seafood, from 1980 onwards tourism has contributed to the growth of this occupational group.

Labourers form the third greatest occupational group, but they are not agricultural labourers in their majority as they used to be in the pre-tourist era. Nowadays, most of the labourers are employed in the flourishing building industry because tourist development has boosted the construction of roads, harbours, hotels, apartments and bungalows. The services sector has grown considerably from 3.6% in the period 1940-1979 to 13.3% in the period 1980-1998 and occupies the fourth position among all occupational groups. This is mainly due to the flourishing of the liberal professions like doctors, lawyers, accountants, auditors, architects, civil engineers, and the expansion of banking activities.

Table 2.8: Occupations and literacy status of males at the time of their marriage; Naoussa and Kostos 1980-1998

Occupational group	Number	Percentage	% illiterate
Craftsmen/salesmen	58	28.6	0.0
Sailors/fishermen	38	18.7	0.0
Laborers	29	14.3	0.0
Services	27	13.3	0.0
Traders/businessmen	20	9.9	0.0
Farmers/stockbreeders	15	7.4	0.0
Others	16	7.9	0.0
Total	203	100.0	0.0

Source: elaboration of marriage records

Looking at table 2.9, which is based on census returns, it is observable that the group of farmers is the second in size, but this is only because it contains the fishermen together with farmers and stock breeders. Bearing this in mind it can be said that the occupational structure presented in the two tables (2.8 and 2.9) is roughly the same.

Table 2.9 Employed population (both sexes) by occupational group; Naoussa 1991

Occupational group	Number	Percentage
Craftsmen/salesmen	207	26.6
Farmers/stock breeders/fishermen	154	19.8
Labourers	141	18.1
Services	120	15.4
Traders/ businessmen	106	13.6
Others	50	6.4
Total	777	100

Source: 1991 census returns

To conclude, at the beginning of the period examined (1894-1939) Naoussa and Kostos formed a rural and seafaring community. It was also an illiterate community, having (inferentially) over 60% of its adult male population not knowing how to sign their name. It is astonishing that illiteracy in labourers, which that period constituted almost one third of the population, was almost universal (96.7%), and farmers, even with proprietors included, were not in a much better situation, 62.1% being illiterate (excluding proprietors this percentage reaches 64.6). On the other hand, a small group of the population, the traders, exhibited quite low percentage of illiteracy (20%), and of course service providers, because of the nature of their work, cannot be illiterate[11]. In the next forty years (1940-1979) educational level rose spectacularly and illiteracy dropped to just 9.2 percent of the adult male population. Although the economy was still predominantly agricultural, the percentage of manual workers (mainly agricultural labourers) decreased significantly, while more liberal professions gained some ground, showing signs of an imminent economic transformation. In the most recent period (1980-1998) an economic transformation, which is due to a booming tourist industry, has become apparent, while at the same time the people of Naoussa and Kostos are educated enough so that not a single illiterate groom or bride could be traced in the marriage certificates of this period.

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[11] In the early period (1894-1939) the 18 service providers shown in table 2.6 consist of the following employees:

Clerks6Police officers4Students2Teachers2Custom officers1Solicitors 1Church choristers 1Postmen1

CHAPTER 3: RECONSTRUCTING THE HISTORY

A full reconstruction of the demographic evolution of modern Greece is not feasible, for the intermittent nature of official statistics does not permit this. That is why very few studies have been undertaken, as was pointed out in the first chapter of this thesis, on fertility and mortality transition in Greece up to the 1950s when the quality of statistical series began to improve gradually. Consequently, this chapter does not aspire to present a detailed demographic history of modern Greece. It is rather an effort to shape an outline of the demographic setting in which demographic transition took place in Greece as a whole, and in some geographical sub-areas that are of particular interest to this study. Within these parameters the population history of Greece, of the Cyclades and of Paros from 1860 to date is reassembled, to the extent that this is possible from official publications. The community of Naoussa appears in this analysis, where possible, for comparative reasons. Thus, in this chapter one will have the chance to compare the results of aggregate analysis at four levels, at the level of the nation (Greece), the district (the Cyclades), the prefecture (Paros) and the community (Naoussa), and to consider how far, if at all, demographic findings for this community may apply elsewhere in Greece.

1860 was chosen as the starting date since that is the year from which vital statistics exist for Greece, though even then not uninterrupted. Moreover, in 1861 the first “real” population census took place in the country, thus permitting us to use census returns in combination with vital statistics, so as to calculate some basic demographic rates. Unfortunately, there are gaps and imperfections in the data (see chapter 2). However, by making minor assumptions and applying smoothing procedures, the chapter covers a) for Greece the periods 1860-1885, 1921-1940 and 1949 to 1995 b) for the Cyclades the periods 1860-1885, 1921-1940 and 1951-1991 c) for Paros the periods 1860-1885 and 1951-1991 and d) for Naoussa the periods 1860-1885 and 1894-1997.

3.1 Population estimates for intercensal periods

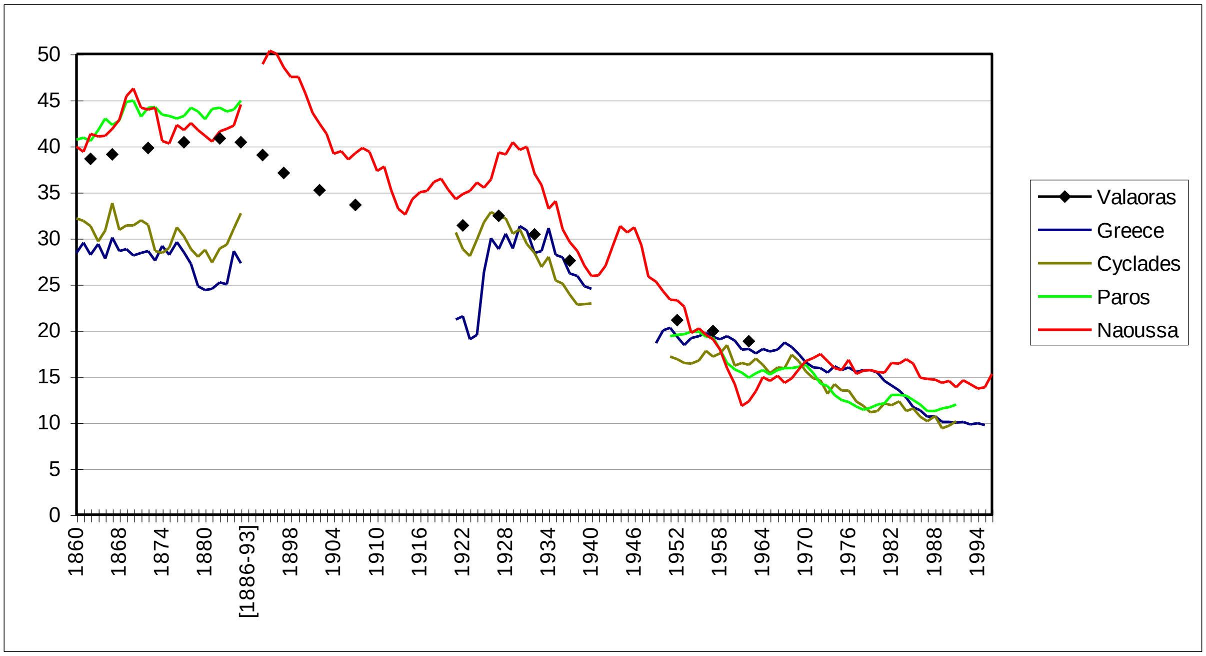
In demography, for deriving crude rates, two things need to be known: the stock of the population at risk of experiencing an event and the flows of this particular event. With respect to Greece, the Cyclades, Paros and Naoussa, a virtually complete series of statistics on the natural movement of the population provides the vital events for the aforementioned periods. Yet, censuses give us the population at risk (of getting married, bearing children and dying) only for certain years during these periods. Hence, estimation of the annual population at risk for intercensal periods has had to be made. Estimates for three populations have been produced: for the Cyclades, for Paros and for Naoussa. An explanation of how these population estimates have been made, and the estimates themselves, are given in appendix A. For Greece as a whole the crude rates that have been published by the NSSG have been used directly, so it was not necessary to produce any population estimates.

In what follows, each one of the integral parts of the demographic regime (fertility, nuptiality and mortality) is examined separately in order to establish similarities and differences between the four area-levels considered.

3.2 Fertility

A first glimpse of the fertility level of a population can be obtained by crude birth rates. The rates for Paros and Naoussa displayed in figure 3.1 are five-year moving averages as the annual birth rates are too erratic from one year to another, as is common with rates pertaining to small populations. The rates for the Cyclades, on the other hand, have not undergone any smoothing procedure, while those for Greece are the ones published by the NSSG (1997a:38-39). The births required for the computation of rates for the Cyclades and Paros have been taken from annual official publications (Ministry of Internal Affairs, (1862a), (1866a-1889a), (Ministere de l’ Economie Nationale, 1924-1939), (SGG, 1931-1940), (NSSG, 1954) (NSSG, 1956a-1998a), (NSSG, 1955b-1998b). The births for Naoussa have been taken a) for the period 1860-1885 from the aforementioned official publications and b) for the period 1894-1996 from the books of civil registration of the community itself. The population estimates used are those presented and explained in appendix A. In all cases the utilised births are as of mother’s place of residence (not place of occurrence) and the deaths as of place of residence of the deceased and not as of place of death.

Figure 3.1: Crude Birth Rates per 1000 population for Greece (official estimates and values adjusted by Valaoras), the Cyclades, Paros and Naoussa; 1860-1996.



Source: see text

It is clear from figure 3.1 that crude birth rates for Greece up to the mid-1920s were seriously affected by under-registration of births. This problem has been pointed out by, among others, Valaoras (1960:135) and Siampos and Valaoras (1969:602). Moreover, there is further evidence supporting the claim that under-registration of births was high in Greece, at least in the 19th century. This is the historical experience of west-European countries. In 1870 these countries (with the exception of France and the white population of the USA) were still characterised by natural fertility, with CBRs exceeding 35 per 1000 (Tapinos, 1993:372-377). Therefore, it is highly unlikely that Greece in the 1860s had a CBR below 30. Hence, values derived by Valaoras (1960:135) for Greece have been incorporated in figure 3.1 with the view that they give a better account of fertility in Greece at the time.

It seems that under-registration of births characterised the Cyclades in the 19th century as well. However, if one uses the CBR values of Valaoras as a criterion[12], it appears that the registration system of the Cyclades improved faster than in Greece as a whole and by the 1920s the CBRs of the Cyclades matched those given by Valaoras for Greece.

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12 An account of how Valaoras has allowed for under-registration of births in calculating CBRs is given in section 1.4, chapter 1.

With respect to Paros, where, incidentally, the available data permit the calculation of CBRs only for the periods 1860-1885 and 1951-1991, it emerges that registration of births was reasonably complete in the 19th century. The same can be said for the community of Naoussa, though there is an inconsistent rise in CBRs between 1885 and 1894. This is the time when our data sources for births have switched from official publications to the community's books of births. Yet, this event seems to be irrelevant and a more sensible explanation may be that registration improved visibly between 1885 and 1894.

What is more important to our study is that the main trends in fertility implied by CBRs, are the same for the community of Naoussa and for Greece (looking at the adjusted values of Valaoras) up to 1950. Even the level of fertility for most of the19th century is identical for the two populations, while at the end of the 19th and in the first half of the 20th century there is some differentiation, with the CBRs of Naoussa being 5-8 per 1000 above those of Greece as a whole. This is evidence that Naoussa can be used as a proxy, albeit only in a very vague and general way, to describe fertility transition in Greece. Its fertility level up to the 1950s is somewhat higher than Greece's but the general trend seems to be more or less the same.

Moreover, the fertility behaviour of the population of Naoussa agrees with that of Paros, at least for the 19th century. On the other hand, the population of the Cyclades generally exhibits lower fertility than that of Naoussa, the only exception being the 1960s. Even so, the pattern and the trend are the same and even the level does not differ dramatically between the two populations. Making an overall assessment one could say that our four populations demonstrate the same fertility pattern but at moderately different levels throughout the 136 years of the examined period.

According to this pattern CBRs fluctuated at about 40-50/1000 in the last decades of the 19th century but declined rather rapidly from 1900 onwards to reach 35/1000 in the 1910s. The time of the onset of Greece's fertility decline seems to agree with the findings for other European countries from the "Princeton project" undertaken by the Office of Population Research of Princeton University. In more than half of 700 European districts, studied by the Princeton project, the onset of fertility decline was between 1880 and 1910 (Coale and Treadway, 1986). However, even though Greece's fertility transition also started in this period, there are reasons for questioning the supposition that this first decline genuinely reflected changing fertility aspirations.

Firstly, there was an increase in the CBR from 1922 to 1930 in all three populations for which data are available for this period. Secondly, the period from 1890 to 1922 was characterised by mass emigration and wars, which may have been responsible for lowering fertility at that time. Net emigration to overseas countries alone, in the period 1890-1912 was estimated to have been 320,000 persons (Siampos, 1980:236) in a mid-population of some 2.6 million (i.e. 12.3% of the population). Mass emigration continued at much the same rate in the 1910s (it significantly declined only after 1919), while at the same time Greece entered a full decade of continuous war. This started with the Balkan Wars in 1912 to 1913, continued with the First World War in 1914 to 1918 and ended with the campaign in Asia Minor in 1919-1922. Both emigration and wars were age and sex selective. Emigrants consisted of 94% males, of whom 93% were aged 15 to 44 years (NSSG, 1980c:97). The wars also absorbed the healthiest and most vital (remaining) males of the population, many of whom never returned. Taking these factors into account, one can plausibly assume that much of the fertility decline between 1890 and 1922 came as a result of this population drain and not as the outcome of the application by the population of birth control techniques.

What could have restored fertility and boosted the CBR to levels above 30 per 1000 (even to 40 per 1000 in the case of Naoussa) by the end of the 1920s, as shown in figure 3.1? It could have been the influx of 1.2 million refugees that flooded into the country after the exchange of populations between Greece, on the one hand, and Turkey and Bulgaria on the other in 1922-23. Most likely the reproductive behaviour of the refugees was more prolific than that of the native inhabitants. However, a secondary intrinsic decline in fertility started from 1935 onwards when both the refugee population and inborn inhabitants had adapted their reproductive behaviour as a result of free choice to limit their family size.

However, CBRs alone cannot fully document this scenario, which shifts the onset of fertility transition some thirty years after its initial decline, and some indexes, better ones, have to be used instead.

3.2.1 Some better measurements of fertility

Apart from conventional demographic rates, some very commonly used measurements in historical demography are Coale’s indices of fertility. A definition of these indices is given in appendix B. Where data permit, these indices have been derived in quadruple series: for Greece, the Cyclades, Paros and Naoussa. The problem of under-registration of births for Greece up to the 1950s inhibits once again any attempt to derive credible demographic indices that are based on births unadjusted. Therefore, the figures concerning Greece are adjusted to allow for under-registration of births as this has been estimated by Valaoras (1960:135). Thus, the births on which all kinds of fertility indexes regarding Greece (I_f, I_m, I_g) are based, have been modified to take into account under-registration as shown in table 3.1:

Table 3.1: Under-registration of births in Greece for selected years, according to Valaoras.

Year	1860	1865	1870	1875	1880	1885
Under-registration (%)	25.6	25.8	28.9	31.7	43.4	24.1
Year	1921	1925-8	1940	1950	1955	1960
Under-registration (%)	35.7	9.6	4	8.1	2.5	2.5

Source: Valaoras, 1960: 135

Note: For more information on the method used by Valaoras for the estimation of under-registration see section 1.4.

From 1965 onwards no adjustment has been made. Values of Coale's indices of fertility for the19th century Cyclades are also adjusted according to the above table, although the data shown in figure 3.1 suggest that under-registration of births in that period, though high in the Cyclades, was not as high as in Greece. Consequently, indices of fertility for the Cyclades in the 19th century presented here are probably higher than the true ones. By contrast, Paros and Naoussa, according to our earlier assessment, do not seem to have been affected by serious under-registration. Again, it may be the case that under-registration of births was counterbalanced by that of deaths and that is why CBRs, which are based on population estimates (shown in appendix A) that are heavily based on the excess of births over deaths, appear plausible enough. In any case, fertility indices for Paros and Naoussa (and for the Cyclades in the 20th century) are unadjusted and presented along with those for Greece in tables 3.2 and 3.3.

Table 3.2: Coale's indices of overall fertility (I_f) for Greece, the Cyclades, Paros and Naoussa for selected years.

Years	Greece	Cyclades	Paros	Naoussa
	I_f	**I_f**	**I_f**	**I_f**
1860	0.403			
1865	0.400			
1870	0.381	0.432	0.468	0.472
1875	0.397			
1879	0.355	0.398	0.472	0.451
1885	0.373			
1921	0.303	0.351		
1928	0.337	0.358		
1940	0.272			
1951	0.201	0.217		
1961	0.182	0.206		
1971	0.184	0.189		
1981	0.170	0.159		
1991	0.114	0.127		

Source: see text

Table 3.3: Coale's indices of marital fertility (Ig) and marriage (Im) for Greece and the Cyclades;1921-1991.

Years	Greece		Cyclades	
	I_g	**I_m**	**I_g**	**I_m**
1921	0.56	0.53	0.65	0.53
1928	0.59	0.56	0.63	0.57
1951	0.40	0.50	0.38	0.57
1961	0.31	0.58	0.34	0.64
1971	0.28	0.66	0.26	0.72
1981	0.31	0.54	0.22	0.72
1991	0.18	0.61	0.18	0.70

Source: see text

A more detailed account of how tables 3.2 and 3.3 have been derived is given in the appendix B. What seems to be the case, at least at first sight, from the above tables is that the level of overall fertility was generally higher in all periods up to 1971 in the island populations examined (that is, the Cyclades, Paros and Naoussa) than in Greece as a whole. This is more apparent in 19th century Paros and Naoussa, where, without any adjustment for under-registration of births, the I_f oscillates at 0.47 while at the same time Greece's overall fertility (I_f), after substantial upward adjustment for under-registration, is almost 20% lower.

As table 3.3 reveals, this pattern of higher fertility for the island populations is due to a higher level of marital fertility in pre-war years and to a higher proportion of married females in post war years. Although the index of marriage (Im) was still at the same level in 1921 for Greece and the Cyclades, this index turns gradually higher for the Cyclades and in post war years this differentiation becomes more pronounced. Nevertheless, the fertility trend appears to be the same for the island populations and the country as a whole, irrespective of level. The measures presented in tables 3.2 and 3.3 show (as was the case with CBRs in figure 3.1) a decline in fertility from 1860 to 1921, then some increase between 1921 and 1928 and a subsequent decrease from the mid-1930s onwards (the timing of this later decrease can be seen better in figure 3.1).

The question now is whether there is any evidence to support the scenario of the "artificial" fertility transition, as suggested in section 3.2.1. It would be helpful at this point to bear in mind the historical experience of west-Europe. According to Coale (1973:53-73) fertility transition in the west came through two phases. The first phase, the date, the duration and even the existence of which are arguable, was characterised by the passage from a precipitated and almost universal nuptiality to a pattern characteristic of pre-industrial west-Europe, involving high age at first marriage and a significant proportion of population not married at all. At this stage the index of proportion married (I_m) fell from 0.85-0.75 to 0.50-0.40 and consequently overall fertility (I_f) (marital fertility (I_g) remaining unchanged) decreased 30-40%. The second phase was characterised by a decline in marital fertility (I_g) that caused a further fall in overall fertility (I_f). The two phases are termed by Coale the malthusian and the neo-malthusian transition respectively.

In the case of Greece, as table 3.2 reveals, there was indeed a fertility decline from 1860 to 1885, but this decline in overall fertility (I_f) was only 7.4%. As was mentioned above, a decline in (I_f) of at least 30% is necessary in order to accept that a society is undergoing the first stage of fertility transition. For Greece, taking 1860 as a starting point due to lack of earlier data, a decline of 25% in (I_f) below its “plateau” level of 1860 is achieved only in 1921. Yet, it is debatable whether low fertility in Greece in 1921 was a deliberate choice of the population. It would be fairly plausible to assume that fertility was relatively low because of a lack of males, who, even if they were married, had left their wives in Greece and migrated overseas or were lost in the wars. It is indicative that in 1920 there were 272,782 widows as opposed to only 79,855 widowers and 909,929 married females as opposed to

856,864 males (SGG, 1928:νδ). It might be the case that the first time that fertility actually fell as a result of a decision by the population to limit its family size was in the mid-1930s. It is possible that, if emigration and wars had not prevailed in Greece from 1890 to 1922, the fertility level between this time span would have been higher, transferring the onset of fertility transition a few decades later.

Yet, there is not enough evidence to support this theory. Indexes of overall fertility (I_f) cannot demonstrate the malthusian transition which is considered to be the first phase of fertility decline. In order to detect if such a passage from a precipitated and almost universal nuptiality to the European marriage pattern (as this was defined by J. Hajnal) has ever taken place in Greece, one must have at hand at least the indices of marital fertility (Ig) and of the proportion of married females (Im). Unfortunately, data from official publications do not permit the derivation of these indices for Greece (or for part of her) earlier than 1921[13]. Thus, it cannot be said if there was a malthusian transition in Greece and neither can the date be scented beyond which marital fertility (I_g) declines 10% from its original level, which is considered to be the onset of neo-malthusian transition. To answer these questions one has to resort to data available at micro level, namely to community registers, and to use more refined techniques. That is what family reconstitution hopes to achieve in the following chapters.

3.3 Nuptiality

Chapter 1, referring to marriage patterns in Europe as classified initially by Hajnal (1965) and then by Laslett (1983), described briefly the main characteristics of Hajnal's European marriage pattern and of Laslett's further classification of four marriage patterns, labelled "West", "West/central or middle", "Mediterranean" and "East". In the case of Greece, although numerous anthropological studies refer to marital practices such as

[13] Siampos and Valaoras (1969) have derived these indices (Ig and Im) for 1900. But their attempt was based on extensive assumptions and that makes us very reluctant to adopt their indices. For 1900 there are no data of vital events or on population structure. The authors do not explain how they derived indices for this date. Their only explanation is that "The data for the year 1900 were derived from an interpolation of the returns of the two neighbouring censuses 1896 and 1907". Yet, the 1896 census contains only population totals down to the level of the community. One can assume that they used the 1907 census and they applied a reverse projection to the youngest age groups in order to derive the number of live births in 1900. Nevertheless, the authors don't mention what survivorship ratios have used to make this reverse projection; obviously they took the survivorship ratios from a model life table but one cannot think on what basis they chose this model life table. Moreover, even if the mortality pattern of the selected life table was close to that of the 1900s Greece, the assumption has to be made that the proportion of married females at the age groups 15-19 to 45-49 in 1907 was the same with that of 1900, which may not be entirely correct.

settlement at marriage and household composition, there is a relative dearth of studies on the demographic aspects of marriage patterns.

Hajnal (1965), by comparing percentages never married at selected ages around 1900, established that Greece at the beginning of the 20th century, as far as the prevalence of marriage is concerned, was an intermediate case between the European and Eastern European patterns. This is because, while Greece's female population never married by age 50 in 1907 was 4%, the percentage of males never married by age 50 was 9, higher than any Eastern European country at that time. Thus, while marriage was almost universal for females in Greece, a pattern complying with the East-European tradition, for males the level of celibacy was quite high, bringing her closer to western customs and making her classification under either pattern problematic.

With respect to age at marriage, subsequent studies, most of which happen to refer to insular populations[14], pointed to the conclusion that some characteristics of the Mediterranean marriage pattern had been present in parts of Greece until the beginning of the twentieth century, but from thereon changes have taken place leading to a divergence from that pattern. However, there is relatively little evidence in these studies concerning the prevalence of marriage. Hionidou (1993:181-182), who explores the matter in more detail, provides trustworthy percentages of the never married female and male population of Mykonos, only for 1861. Yet, a main feature of the Mediterranean marriage pattern, as proposed by Laslett, is the universality of marriage. This implies that if marriage is not universal, or at least almost so, with proportions of permanent celibacy not exceeding 4-5 percent, then a marriage pattern cannot be classified as Mediterranean even if the rest of its characteristics comply with the Mediterranean marriage pattern.

This section examines the marriage patterns of Greece, the Cyclades and Naoussa[15] and tries to trace similarities and dissimilarities between them and to determine in which of the four categories defined by Laslett, if any, they belong. The description of marriage patterns will be in terms of age at first marriage as indicated by marriage records, Singulate Mean Age at Marriage (SMAM), as this measure has been invented by J. Hajnal (1953), and proportion married by age 50. In all cases the sexes have been treated separately because usually (and certainly here) age at first marriage is greater for males. Crude marriage rates are

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14 See Tomara-Sideri M. (1991); Kolodny E. (1992) ; Hionidou V. (1993)

15 Naoussa means Naoussa and Kostos in this section

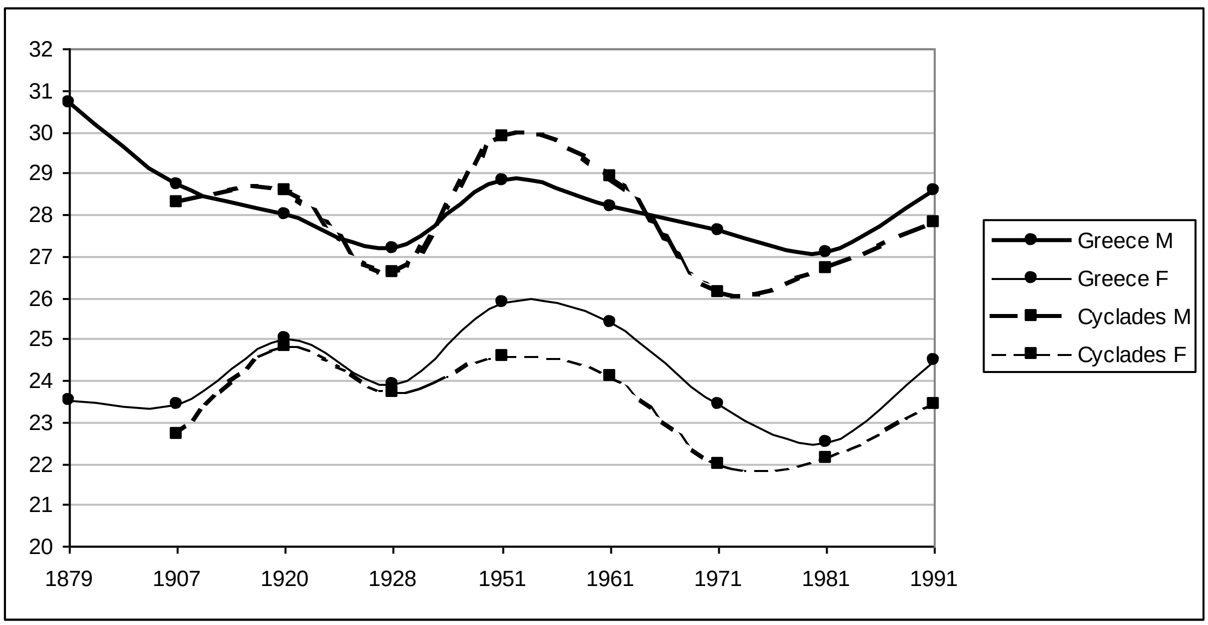
also displayed, though, as will be seen, these are more interesting from an ethnographic rather than a demographic point of view.

The derivation of SMAM for Greece and the Cyclades was based on census returns. SMAM was computed by applying the formulas developed by Hajnal (1953) to the percentages never married by age group. The computation of SMAM is based on the principle that age at first marriage corresponds to the average number of years spent in the single state by those who eventually marry. This measure is also based on the assumptions that no first marriages take place after age 50 and that there is a consistent fall in the proportion single with age. The computational procedure described here applies to data that provide age by five-year age groups, as is usually the case with census returns. It involves three steps. First, percentages never married by age group, up to and including the age-group 45-49, are added and multiplied by five: $\sum_{0-4}^{45-49} S_i * 5$ =**(1)**, where Si is the percentage single at age group i. This will give us the number of person-years lived in the single state between birth and age 50 by everyone in the population. Second, the percentage never married by age 50 is obtained by adding the percentages never married at the age groups 45-49 and 50-54 and dividing by two. The complement of this will give us the percentage ever married by age 50: $100-(S_{45-49} + S_{50-54})/2=$ **(2)**. Thirdly, the number of person-years of those who never married by age 50 is obtained by multiplying the percentage still single at age 50 by 50: $50*(S_{45-49} + S_{50-54})/2=$ **(3)**. Since the notion behind SMAM is that age at first marriage can be expressed as the average number of years spent in the single state by those who eventually marry, the formula for SMAM is: **(1)-(3)/(2)**.

The derivation of mean age at first marriage for Naoussa and Kostos, as shown in figure 3.3, was based on the elaboration of 1156 marriage records covering the period 1894 to 1998. Means were calculated for each sex and for every five-year period separately. Higher than first order marriages were detected and whichever of the spouses entered a second or third wedlock, was excluded from the calculation of mean age at marriage. The basis of this elimination was whether it was stated on the marriage record that it was the second or third marriage of the index spouse. The matter of whether the failure of the records to state order of marriage was high enough to distort the results, will be examined in chapter 6.

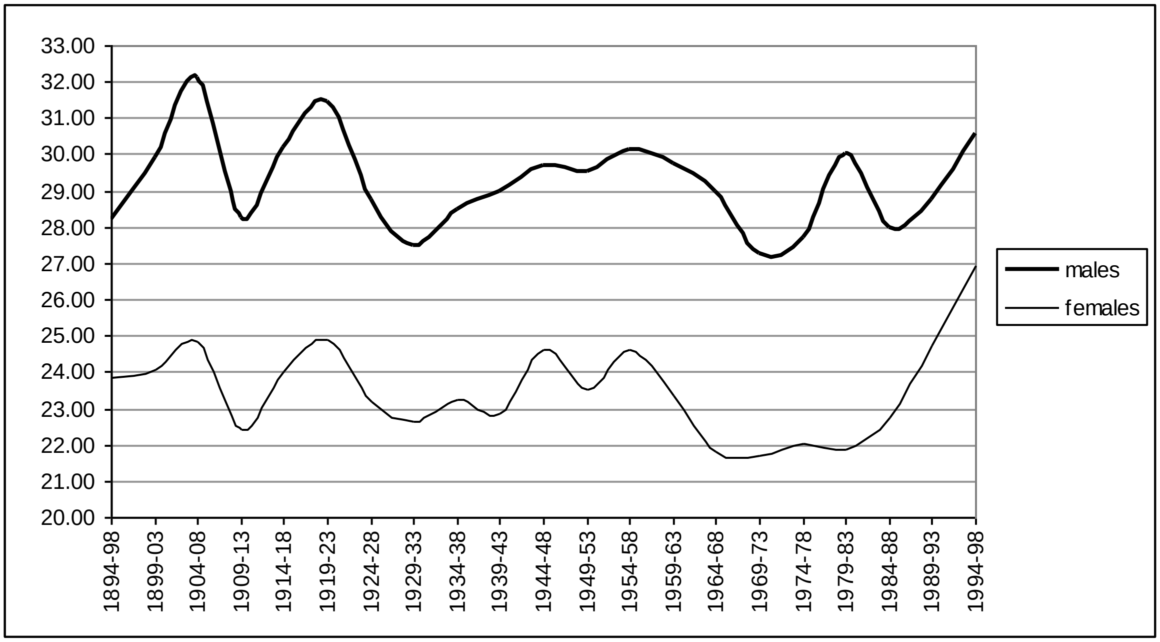
At a technical level the question that arises is how comparable can SMAM and mean age at first marriage be. The latter is a period measure and reveals the current marriage patterns at a given date. SMAM, on the other hand, discloses the marital experience of a hypothetical cohort. The two measurements referring to a certain date will not be identical unless marriage patterns have remained constant over the previous thirty-five years. In our case, the three populations that are examined in figures 3.2 and 3.3 exhibit moderate fluctuations in age at marriage throughout the observed period, but no definite trend (either ascending or descending) can be established. Therefore, given that the marriage pattern in all three populations has remained more or less stable over the 119 years of the observed period, as seems to be the case, one can treat SMAM and mean age at first marriage as comparable measurements to evaluate at least the marriage pattern of the overall period.

Figure 3.2: Singulate Mean Age at Marriage (SMAM) for Greece and the Cyclades; 1879-1991. Results refer to census dates.



Source: calculations based on census returns

Figure 3.3: Mean age at first marriage for Naoussa & Kostos; 1894-1998.



Source: elaboration of 1156 marriage records

Table 3.4: Average of SMAM of the period 1879-1991 for Greece and the Cyclades and average of mean age at first marriage of the period 1894-1998 for Naoussa & Kostos.

Greece			Cyclades			Naoussa & Kostos		
Average of SMAM		Age gap	Average of SMAM		Age gap	Average of mean age at first marriage		Age gap
Females	males		Females	Males		Females	Males	
24.2	28.3	4.2	23.3	27.7	4.4	23.6	29.3	5.7

Source: Figures 3.2 and 3.3

Looking at figures 3.2 and 3.3 and their summary in table 3.4, it can be inferred that none of the examined populations exhibits a female age at marriage that complies strictly with the Mediterranean one. According to Laslett: ‘The tendencies we have named “Mediterranean” and “East”, […] were for mean female marriage age to be about 20 or below, almost never as high as 25 or above, and often such that a majority of all women could be described as ever-married by the end of their nineteenth year’ (Laslett, 1983:533). This hardly seems to be the case with any of our examined populations. Nevertheless, the marriage pattern of the two island communities (Naoussa and Kostos) could be said to be close to the Mediterranean marriage pattern. What makes it so is not so much the female age at first marriage, which is not so low by Mediterranean standards, but the high male age at first marriage (which is the highest among our three populations) and the great age gap between spouses, which later on in the life cycle will result in a high proportion of widows. These characteristics exist to a lesser extent in Greece and the Cyclades with the female SMAM of Greece being too high to classify her marriage pattern as Mediterranean. Moreover, in Greece and in the Cyclades the age difference between spouses is not so great, though it seems that the age gap was greater in the early years of the examined period.

In attempting to explain fluctuations in age at marriage over the examined period, one should bear in mind that SMAM is not trustworthy for this purpose. This measurement does not provide the current mean marriage age of the population at a given date, but reflects the marital experience of different marriage cohorts measured at that date. Therefore, we shall be based mainly on the mean age at first marriage as shown in figure 3.3. An increase in age at marriage is observed after war periods (see figure 3.2), implying that many marriages, which had been postponed during the war years, took place immediately afterwards under more peaceful circumstances. Thus, the increased age at marriage noticed around 1920 can be attributed to the very turbulent years 1912-1922. The increase around 1950 has probably been caused by postponed marriages during the harsh years 1940-1949, when war conditions prevailed in Greece throughout the entire decade. A drop in the age at first marriage from the beginning of the 1960s until the late 1970s coincides with a similar trend in west-European countries.

However, the decline in age at marriage in West-Europe was a long term process, which started approximately at the beginning of the 20th century and stopped (and actually reversed) around 1970, a transformation often termed the nuptiality transition and regarded as the final stage of the demographic transition. It is indicative that in England and Wales the age at marriage fell from 28 and 26 for bachelors and spinsters respectively in the nineteenth century to 23.9 years for bachelors and 21.8 years for spinsters in 1970, in an almost monotonic way (Coleman, 1980:84). By contrast, in the case of Greece this process has not been so strait-forward since the three populations examined here do not exhibit any definite trend (either ascending or descending) over the examined period.

Table 3.5: Percentages of population never married by age 50.

Years	Greece		Cyclades	
	Females	Males	Females	Males
1879	2.9	6.5		
1907	4.0	8.2	6.9	7.1
1920	3.0	3.8	6.5	8.7
1928	3.7	6.8	6.1	8.1
1951	5.0	6.5	7.4	7.0
1961	5.8	6.3	7.3	7.1
1971	7.1	6.2	7.2	10.1
1981	6.7	4.9	5.2	10.4
1991	5.1	5.2	4.1	8.0

Source: elaboration of census returns.

With respect to the extent of permanent celibacy, table 3.5 takes us by surprise, revealing that the prevalence of marriage was greater in Greece as a whole than in the Cyclades. Especially in pre-war years marriage was almost universal for women in Greece, while in the Cyclades the percentage of never married women by age 50 was never below 6.1. This rather high percentage of unmarried women in the Cyclades has dropped in the last two decades, but it seems that traditionally the Cyclades followed a different marriage pattern from that of Greece, the main characteristics of which were: a rather low age at marriage for brides (circa 23), high for grooms (circa 28) and a substantial percentage of the population (both males and females) never married at all. The age difference between the spouses was wide resulting in a high percentage of widows. This marriage pattern cannot be classified under any of the narrow typologies proposed by Laslett. It bears little resemblance to the West or middle European patterns, is definitely not the Eastern European and it cannot be described as typically Mediterranean either (mainly because of the high percentages of never married).

On the other hand the marriage pattern of Greece in pre war years does bear resemblance to the Eastern European/Balkan pattern but only in terms of the intensiveness of marriage. The age at marriage for both sexes is relatively high by Balkan standards. In post war years the percentages of never married females rose (they had almost never been low for males) and the universality of marriage for females was not any more one of the characteristics of the Greek marriage pattern.

The conclusion one can draw from the above analysis is not new. Demographic and anthropological studies[16] have long noticed that marriage patterns (and the associated institutions of household composition and settlement at marriage) have been extremely variable in Greece and in the Balkans generally. Thus, trying to typologise Greek marriage patterns is of little avail since the perception of a common Mediterranean pattern is itself elusive, though this perception has pervaded a considerable portion of the relevant literature. What one can claim for Greek and Cycladic marriage patterns, is that in post-war years (and more so as we approach the present) there has been a convergence of patterns, which is probably associated with changes in modes of production, urbanisation and more general modernisation of life style.

3.3.1 Crude Marriage Rates

Before commenting on the CMRs displayed in figure 3.4 it should be said that the rates for Greece are those published by the NSSG (1997b). The numerators required for the computation of rates for the Cyclades have been taken from annual official publications (NSSG, 1956a-1997a) and are by groom's place of residence, while the denominators are population estimates from table A.1 in appendix A. Marriages for Naoussa and Kostos have been taken from the books of civil registration of the two communities. Denominators are again to be found in appendix A.

The purpose of figure 3.4 is not to show the level or trend of nuptiality, though one can observe a declining trend in the last twenty years, but to illustrate how superstitious traditions define the marriage-year of very many Greek people even nowadays. In all three populations it may be seen that CMRs drop steeply in leap years. For Greece one can also notice that CMRs in years adjacent to a leap year are usually higher than the rest non-leap years because of the concern of the people to avoid getting married in a leap year. The belief that getting married in a leap year brings bad luck to the married couple is obviously still strong in the Greek population.

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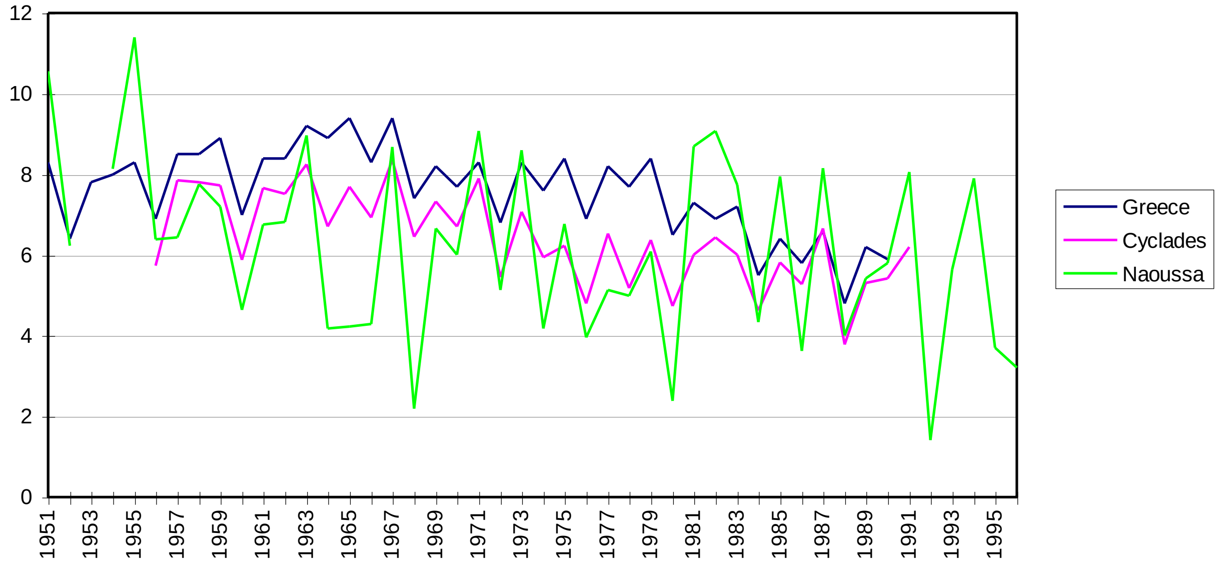
[16] See for example Cassia, S. P. and Dada, Constantina (1992) *The making of the modern Greek Family* (Cambridge University Press, Cambridge) and Hionidou Violeta (1993) *The demography of a Greek island, Mykonos 1859-1959* (Unpublished Ph.D. thesis, University of Liverpool)

Figure 3.4: Crude Marriage Rates (per 1000) for Greece, the Cyclades and Naoussa & Kostos; 1951-1996

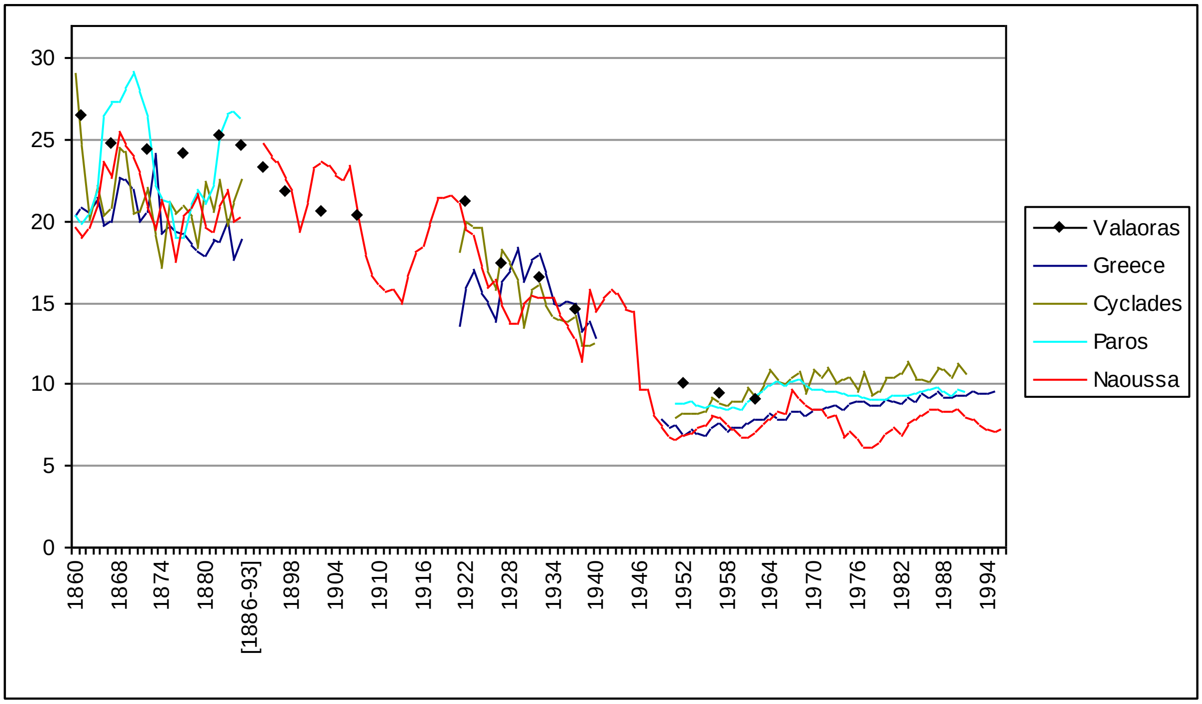


Source: see text

3.4 Mortality

Figure 3.5 records the development of crude death rates (CDRs) of the populations under consideration from 1860 onwards, for periods where data are available. As was the case with the computation of the CBRs presented in figure 3.1, the series of vital events required for the computation of rates for the Cyclades and Paros have been based on annual official publications (Ministry of Internal Affairs, (1862α) (1866α-1889α), (Ministere de l' Economie Nationale, 1924-1939), (SGG, 1931-1940), (NSSG, 1954) (NSSG, 1956a-1998a), (NSSG, 1955b-1998b), while the rates for Greece are the ones published by NSSG (1997a:38-39). The death series for Naoussa have been taken a) for the period 1860-1885 from the aforementioned official publications and b) for the period 1894-1996 from the books of civil registration of the community itself. In the cases of the Cyclades, Paros and Naoussa, the relevant populations used as denominators are to be found in tables A.1, A.2 and A.3 of appendix A. The rates for Paros and Naoussa are seven-year moving averages, so as to eliminate erratic fluctuations. This smoothing procedure does not permit us to observe mortality crises that may have struck the populations. However, when the original (unsmoothed) CDRs for Naoussa were inspected, the only major mortality crisis that was observed was that of 1942 when mortality reached 41.76 per thousand population due to the famine that hit the whole country that year. This particular incident will be examined in a later chapter (chapter 8) of the thesis.

Figure 3.5: Crude Death Rates (per 1000) for Greece (NSSG values and values adjusted by Valaoras), the Cyclades, Paros and Naoussa; 1860-1996.



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The most apparent feature of the CDRs for the four populations in figure 3.5 is their relative closeness from the beginning of the examined period, unlike the situation with crude birth rates in the 19th and early 20th century (see figure 3.1). This can partly be explained by the fact that under-registration of deaths was lower than that of births (Valaoras, 1960:135). Thus, while the more complete registration of births in Paros and in Naoussa in the 19th century leads to CBRs that appear much higher than those of Greece and the Cyclades, in the case of deaths there were not such great differences in the completeness of registration between the examined populations and therefore their CDRs are closer together.

Figure 3.5 implies that all four populations were spared major mortality crises that characterised the old demographic regime. One can have objections whether this is the case for Paros and Naoussa since the use of seven-year moving averages instead of the original CDRs might make any mortality crisis invisible. However, one cannot dispute that this was the case for 19th century Greece and Cyclades. The absence of extreme fluctuations and the fact that CDRs in the beginning of the observed period oscillate at 25/1000, indicate that we have to do with populations already undergoing the first stage of demographic transition. Even allowing for under-registration of deaths, the C.D.R. does not exceed 26.5 (Valaoras, 1960:132) at any time between 1860 and 1897 (the period covered in the 19th century). Rates for Naoussa decline rather rapidly from 1905 to the mid-1910s and then there is an upsurge, which peaks in the early 1920s. The rates of Valaoras seem to imply the same trend for Greece as well, although this trend is not so clear because Valaoras does not give any rates for the period 1909-1920.

However, it is not difficult to interpret this rise in CDRs. As was mentioned in section 3.2.1., the period 1912-1922 was one of the most turbulent in the history of modern Greece. It was a decade of uninterrupted wars while mass emigration was still in progress. And while it is easy to understand how wars might raise CDRs, it is not so obvious that emigration might also contribute to this increase. When emigration is heavily age selective and claims large portions of the reproductive ages (and in our case almost 99% of emigrants were aged 15 to 44 years as has been mentioned above), it alters the age structure of the population, leaving high proportions of young children and elderly people, among whom, mortality is higher than average, thus raising CDRs. Moreover, as Valaoras tells us "the data suggest a huge mortality among the civilian population, as the result of a widespread food shortage caused by an international blockade as well as of the influenza epidemic which swept the country in 1918-1919 (ibid, 1960:127).

Another period of great hardship for the Greek people was that of 1940-1949. According to calculations of Valaoras (1960:127), in the 1940s 600,000 people went missing and 240,000 were never born. A great loss was caused by the general famine during the calendar years 1941-1942 and it was in those years also that fertility dropped steeply due to temporary sterility among female victims of famine. It would not be irrational to assume that in national level crude rates of births and deaths had crossed each other during those two years. Yet, there are no data available at the national level to illustrate this supposition. However, the disruption of the normal course of population evolution in this period (1940-1949) will be investigated through the study communities (Naoussa and Kostos) in a later chapter.

In the post-1950 period, CDRs resumed their pre-war decline, reaching their lowest point in 1955 with a CDR for Greece of 6.9 per 1000. After that a gradual increase in crude death rates is observed, which came as natural consequence of the ageing of the population. The extent to which this increase is not uniform across the four populations under consideration, probably reflects differences in the age structure of these populations rather than any improvement or worsening in mortality conditions.

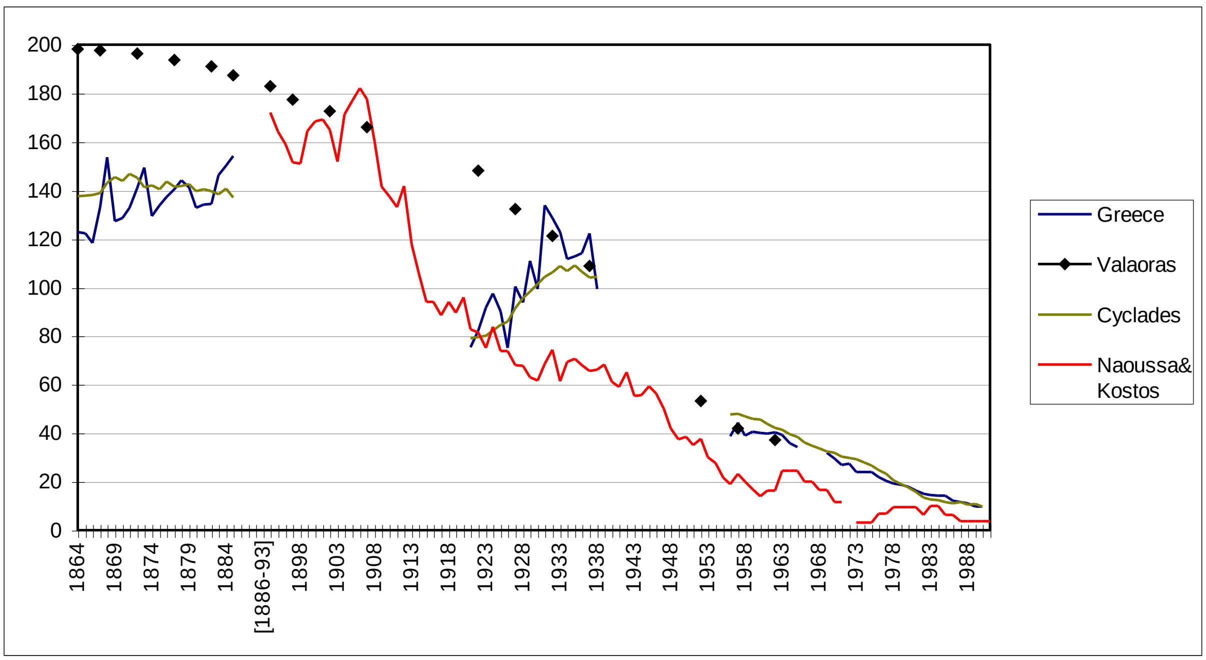
3.4.1 Infant Mortality

Naoussa and Kostos are treated here as one population so infant mortality rates (IMRs) presented in figure 3.6 refer to both communities together, except for the period 1915-1931. For this period data for Kostos have not been taken into account in the computation of IMRs because of their poor quality. To define which deaths occurred during infancy, that is within the first year of life, the age at death as reported in the death certificates was used. However, in a later chapter (chapter 8) results of family reconstitution show that the reported age at death for infants was seriously biased upwards. 26% of persons who died before age one were reported as being age one on the death certificates. This rounding of age would bias IMRs downwards and therefore it was decided to base the infant mortality rates for Naoussa and Kostos on deaths with a reported age at death one year or less. These deaths include all cases with reported age of the deceased "one year" or "12 months" along with cases with reported age below one year. However, they do not include cases where the age of the deceased was clearly one year, such as cases where the age of the deceased is reported as "one and a half years" or with even greater accuracy such as "15 months", "17 months" etc.

The rates presented for the Cyclades and for Naoussa and Kostos are the nine-year moving averages of the calculated ones, for reasons already mentioned previously in this chapter. The rates for Greece are unscathed. In all cases the births and infant deaths utilised are as of place of residence of the relevant person and not as of place of occurrence of the event.

If Valaoras' adjusted IMRs for Greece presented in figure 3.6 are right, it appears that under-registration of infant deaths in 19th century Greece was at high levels with a tendency to improvement towards the end of the century. By contrast, IMRs for our two communities up to 1907 are fairly close to those of Valaoras and presumably to the real values for Greece. However, from 1907 onwards figures for Naoussa and Kostos are almost always lower than those for Greece and the Cyclades. This lower level of IMRs is partly spurious and owes its appearance to the small population size of Naoussa and Kostos (even taken as one community, one population). As infant mortality improved over time, the number of infant deaths in the population of Naoussa and Kostos became too small to permit the derivation of credible infant mortality rates. Suffice to say that from 1918 onwards annual infant deaths in this population are one-digit numbers without exception. In 1938 the figure 0 appeared for the first time and in post-1950, nil infant deaths was the rule rather than the exception. Having to deal with such small figures, even nine-year moving averages cannot produce trustworthy IMRs.

Figure 3.6: Infant Mortality Rates (per 1000 live births) of Greece (values registered by NSSG and values adjusted by Valaoras), the Cyclades and Naoussa & Kostos; 1864-1991.



Source: see text

Note: Infant deaths and the corresponding births for Greece and the Cyclades have been taken from official annual publications. The relevant series for Naoussa and Kostos have been extracted from the books of civil registration of the two communities.

Another predicament in interpreting the above diagram lies in the fact that rates for Greece and the Cyclades go up in the period 1921-1938 while those for Naoussa and Kostos and, more importantly, those of Valaoras' for Greece continue to decline. This contrast may partly be attributed to the fact that registration improved considerably between those two dates because of a new law (the 2430 of 1920) on civil registration, which was implemented gradually from 1924 and covered all parts of the country by 1933[17]. The launch of this law coincided with a more general restructuring of all statistical services under the General Statistical Service of Greece (NSSG, 1956a:XV). It seems that, although under-registration of deaths for Greece and the Cyclades –as was concluded from figure 3.5- was not too high, that of infant deaths was notably high in the early 1920s.

Nevertheless, historical evidence suggests that the increase in IMRs in the 1920s was not entirely due to improvement of registration of infant deaths. The exchange of populations in 1922-1923 brought to Greece more or less 1.4 million people (although the census of 1928 encountered only 1,221,849). The Greek State, already impoverished by continuous wars, was unprepared to accept such a huge influx of people. It located the refugees in provisional settlements that lacked even rudimentary facilities and did not meet basic rules of public hygiene. Under these degraded conditions it is reasonable to infer (although there are no hard data to prove this) that infant mortality was extremely high, thus affecting the IMR of the entire population, the refugees comprising almost 22% of it. It is doubtful though if one can claim the same thing for the Cyclades, because only 3.7% of their population consisted of refugees in 1928 (SGG, 1933 **(I)**). Most of the rise in IMR in the Cyclades in the 1920s was probably caused by improvements in the registration of infant deaths.

3.5 Life tables

For the purposes of this chapter eight life tables have been produced referring to 1870 and 1879, one for each sex, for Greece and the Cyclades respectively. The derivation of all life tables has been based on age and sex-specific death rates for the 1870 and 1879 populations of Greece and the Cyclades. The relevant data (age-sex structure of the population and deaths by age and sex) have been obtained from official publications (Minister of interior,1876a, 1872b,1886a, 1881b). The computation of life tables is based on the assumption that the population age-specific death rates ($_nM_x$) are equal to life table age-

[17] The law 2430 / 1920 "concerning civil registration" introduced an individual "statistical form" for every vital event. Thus, for every event the registrar, apart from the relevant certificate (marriage, birth or death certificate) had to fill in a separate "statistical form" in the presence of the person who reported the vital event because this form contained questions not included in the (marriage, birth or death) certificate. The "statistical forms" were sent every month either directly to the General Statistical Service of Greece (for towns with population more than 5000) or to the statistical office of the relevant prefecture (for towns with population less than 5000). Before this law came into effect vital events for statistical purposes were registered in a list, not in an individual form, and were sent to the statistical services every trimester (NSSG, 1956a:XV-XVI).

specific death rates ($_nm_x$). The life tables have been derived with the help of the UN software package for mortality measurements “Mortpack” and are presented in appendix C.

The primary purpose of these life tables is to sketch the mortality regimes prevailing in late 19th century Greece and the Cyclades and to compare them. Before commenting on the life tables it is worth mentioning another point about their derivation. The Greek censuses of 1870 and 1879 (and previous and following censuses as well) did not include with the rest of the population the sailors travelling abroad and the personnel of the Greek army and navy. The 1870 census returns provide these categories of the population separately, by five-year age groups, referring to the whole of Greece only. For the derivation of the 1870 male life table for Greece, these categories have been integrated into the structure of the male population. The same has been done for the 1879 male life table for Greece, but this time the percentage of soldiers and of sailors travelling abroad in every age group of the 1870 population has been applied to the population of 1879. On the other hand, in the generation of life tables for the Cyclades the respective soldiers and sailors travelling abroad have not been taken into account because it was assumed that their deaths, while they were away from home, would not have been registered in the Cyclades but in the place of death for soldiers and in the destination port for sailors.

A more important point that was taken into account in the derivation of the life tables was the astonishing under-registration of infants in the 1879 census. The following table (table 3.6) is illuminating as it reveals an incredible lack of infants in the 1879 census by presenting the huge difference that exists between homologous populations at age 0 in 1870 and 1879, while their corresponding deaths are almost identical.

Table 3.6: Populations in age-group 0-11 months with the corresponding deaths in parentheses, indicating extreme age-misstatement in the 1879 census-returns.

Year	**Greece**		**Cyclades**	
	Males	Females	Males	Females
1870	22,427 (2669)	21,684 (2595)	2,107 (281)	2,235 (256)
1879	8,710 (3131)	7,972 (2760)	629 (248)	581 (214)

Source: Census returns of the 1870 and 1879 Greek censuses.

It is extremely improbable that, for example, the male population of Greece at age 0 in 1870 was 22,427 but that the same age group shrunk to 8,710 in 1879. The corresponding deaths suggest that this age group (0-11 months old) must have increased from 1870 to 1879 in the case of Greece and only slightly decreased (or remained stable) in the case of the Cyclades. It is obvious that the recorded size of the age-group 0-11 months in the 1879 census was heavily biased downwards due to severe age-misstatement. The problem of age misreporting in the 1879 census has also been pointed out by Hionidou who focuses attention on "the virtual absence of infants in the 1861 and 1879 censuses" (Hionidou, 1993:144).

Most probably many infants aged less than 12 months (10, 9, or even 8 months) had been reported as being one year old. This had almost certainly happened in both the 1870 and the 1879 censuses, but it is not known why this age misstatement is not obvious in the 1870 census. It may be the case that in the 1870 census report, the census takers of the period, when they graduated the ages in five year age groups, applied some kind of smoothing procedure to eliminate the effects of age-misstatement, especially in the 0-11 months age group. Consequently, the population 0-11 months is closer to the truth in the 1870 census report than in that of 1879. To allow for the aforementioned extreme age misstatement the 1879 life tables in appendix C have been adjusted accordingly: the age-specific mortality rates at age 0 (${}_1M_0$) used to derive the 1879 life tables are those for the respective populations of 1870.

Age misreporting also accounts for a higher than expected mortality in the age group 21-25, especially in the male life tables. In fact the age group which males of that period tried to avoid was the 18-24 one, because at these ages they were liable to military service (Siampos, 1973:57; Hionidou, 1993:144). Therefore, in the two censuses in concern, an over-concentration of males appears in the age groups 16-20 and 26-30. These age groups, as a consequence, show decreased mortality in our life tables, while the central age group 21-25 emerges with increased mortality. Strangely, it seems that females also avoided the 21-25 age group and thus mortality appears higher than it should have been in this age group for females as well.

Giving an overall view of the mortality regimes prevailing in 1870 and 1879 in Greece and the Cyclades one can say that life expectancy at birth in 1870 Greece was about 40 years while in 1879 had risen to 44-45 years. For the Cyclades relevant values were three years higher than those for Greece in 1870 and 2-3 years higher than those for Greece in 1879.

3.6 Conclusions

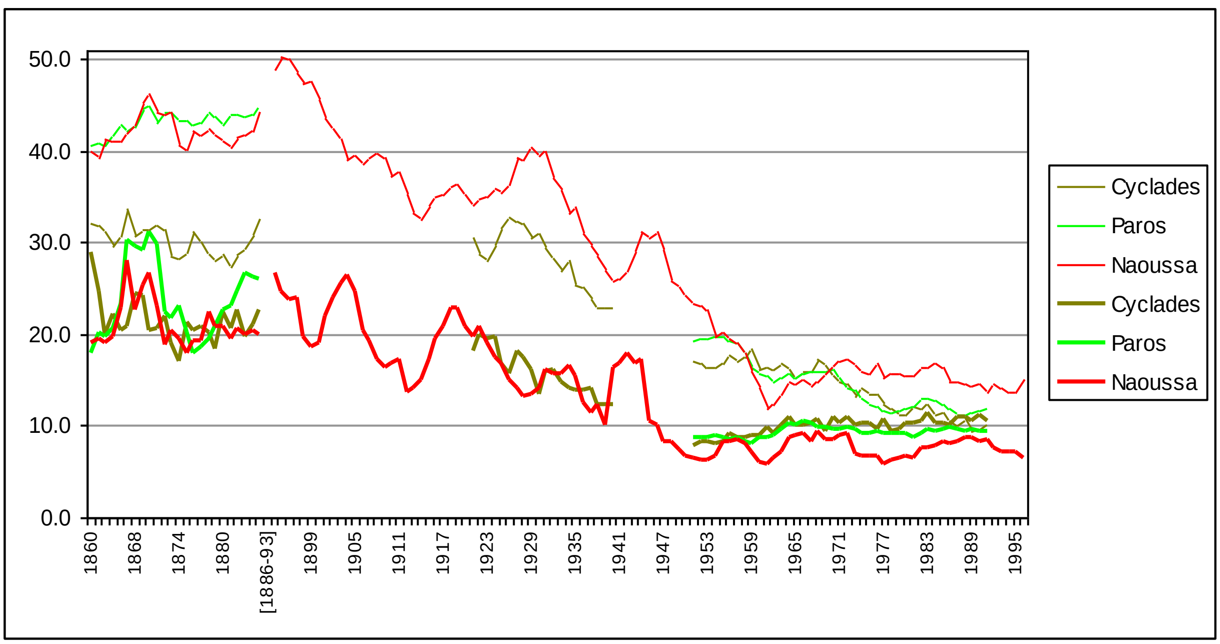
Through the review of fertility, nuptiality and mortality for Greece and some of its island populations in the last 140 years or so, we discern a remarkable similarity in the trends and not very great differences in the levels of these components throughout the examined period. That suggests a similar pattern of demographic transition at least for the examined island populations, though these diverge slightly from Greece, especially in terms of marriage patterns and fertility levels.

As far as fertility is concerned crude birth rates showed a decline from about 40-50/1000 in the last decades of the 19th century to below 15/1000 in the 1980s and the 1990s. This impressive decline was not monotonic for any of the examined populations. CBRs increased in the 1920s to fall again from the mid-1930s onwards. The temporary reversal of the declining fertility trend in the 1920s is probably associated with the more prolific behaviour of the refugees, who flooded into the country in 1922-1923. Two other factors responsible for this fertility increase in the 1920s must have been the return of males from a series of wars that took place between 1912 and 1922 and the termination of overseas emigration, in 1921, when USA placed the first numerical ceiling upon immigration (US Bureau of the census, 1975:97). Fertility resumed its declining trend from the mid-1930s onwards. In general the examined island populations exhibited somewhat higher fertility than Greece as a whole. This difference in fertility level is more obvious in the early years of the study period, especially in the years before 1940, but it becomes negligible or even reversed as we approach the present.

Greek and Cycladic marriage patterns do not show any divergence from each other in the end of the 20th century, but this was not the case in the past. Until the first post Second World War decades in the Cyclades, unlike in Greece as a whole, a substantial percentage of the population (both males and females) never married at all. Age at marriage was lower for brides than the national average (circa 23, while for Greece was circa 24) and the age gap between spouses wider.

With respect to mortality the most interesting feature, as can be seen in figure 3.7, is the abrupt drop of mortality in the immediate post Second World War years and the gradual decline in fertility that followed with a time lag of six-seven years. Although the second half of the 1940s is a period of transformation of the mortality regime, for Greece the 1940s is also a period where no official publications on the natural movement of the population exist. However, one has evidence to believe that this sudden drop in mortality in the immediate post war years, which in our case is revealed by the CDRs for Naoussa, occurred in the rest of Greece as well. The reason to believe this is that the same abrupt fall took place in almost every European country in that period, so homogeneously to make demographers talk about the completion of a phase of health transition and the beginning of a new mortality set. More information about this transition that is associated mostly with a change in the causes of deaths will be derived in a following chapter.

Figure 3.7: Crude Birth Rates (depicted with thin lines) versus Crude Death Rates (depicted with thick lines); the Cyclades, Paros and Naoussa 1860-1996.



Source: figures 3.1 and 3.5

Figure 3.7 also discloses an amazing feature of the populations under concern. The great gaps between CBRs and CDRs, especially those of Paros and Naoussa, suggest a huge natural increase, which should have led to high growth rates in all the three populations at least until the

1970s. However, the census figures (seen in tables A.1 to A.3) show declining populations for most of the 20th century up to 1971. The only factor that could account for this discrepancy is migration, which is considered extensively in the next chapter.

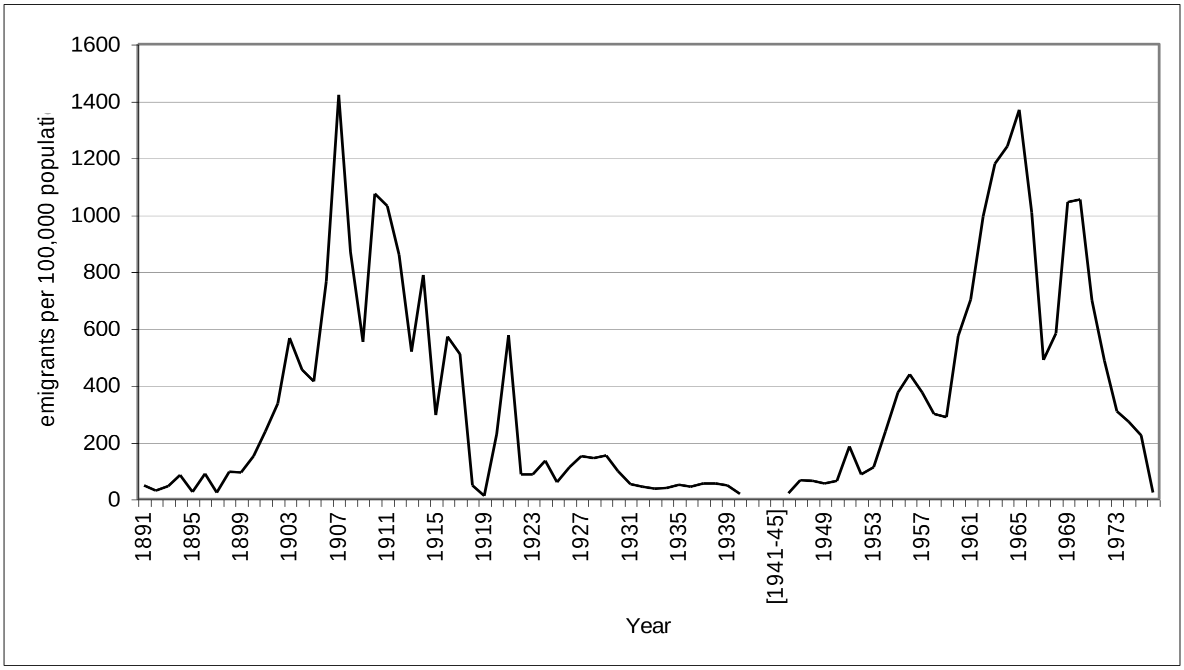
CHAPTER 4: MIGRATION

In the previous chapter a contradiction between natural increase and figures of censuses for the island populations was noticed: a great natural increase did not result in a population growth but on the contrary, as the censuses revealed, the population was decreasing for most of the 20th century up to 1971. Obviously, the only responsible for this contradiction is migration and this chapter examines migration in the Cyclades, Paros and Naoussa from 1861 to 1991 trying to demonstrate that it is a fundamental component of these island populations and one cannot explore the demographic system of these islands without referring to migration.

4.1 National Setting

Before examining the migratory movements in our three island populations, a laconic outline of the Greek international migration should be put forward so as to better understand the setting of those movements. Generally, in modern Greece two main emigration streams can be distinguished, followed by two surplus inflows of Greeks from abroad. The two large emigration waves occupy the periods 1890-1920 and 1955-1973 and are showed schematically in figure 4.1.

Figure 4.1: Emigration from Greece 1891-1976; Annual rates per 100,000 population.



Note: Until 1954 only transoceanic emigration is shown while the curve from 1955 onwards refers to total emigration. Source: (NSSG, 1980c:96)

The first wave (1890-1920) is the era of the grand transoceanic emigration. According to NSSG from 1891 to 1920 386,611 people emigrated to overseas countries and 95,36% of them (368,699) headed to the USA (NSSG, 1979b:52). However, USA was not the only destination country. It is also in that period that Greeks established their first communities in Brazil, Canada and Australia. The first emigration wave effectively ceased in 1921, when USA placed the first numerical ceiling upon immigration (the hitherto limitations were only qualitative)(US Bureau of the census, 1975:97).

Nevertheless, apart from transoceanic emigration, in that period there was a substantial emigration to South Russia, Romania, and to East-Mediterranean countries (especially to Egypt), a migratory pattern that had started from the 19th century. Although there are no data compiled from NSSG for these movements, it is known from other sources (Clogg, 1992:80) that at the time of the First World War, some 100,000 Greeks were in Egypt. Many of them were merchants and cotton brokers and came from the Aegean islands. The, once large and prosperous community, went into a rapid decline with the rise to power of Nasser in 1952.

No sooner was the first emigration stream over (in 1921), than the greater and most significant influx of population in the history of modern Greece started. The exchange of populations (between Greece and Turkey), already in its way after the “catastrophe”, as the Asia Minor disaster of 1922 came to be known, was formalised with a Greek-Turkish agreement in 1923. The population that came in Greece amounted to 1.4 million people, but the census of 1928 encountered only 1,221,849 (Emke-Poulopoulou, 1986:43). In this figure are included 107,553 refugees from revolutionary Russia and Bulgaria. The rest of the Asia Minor refugees had either died because of the degraded conditions of their provisional settlements (which settlements had very roughly been arranged by a Greek state unprepared to accept such a huge influx of people), or emigrated. On the other hand, in the framework of the same agreement, about 380,000 Muslims were transferred to Turkey.

The second emigration wave (1955-1973) is characterised by a new pattern of emigration to West-European countries and mainly to Federal Republic of Germany (West Germany). In parallel, the traditional pattern of emigration to overseas countries resumed in the 1950s, but the USA gradually ceased to be the main destination because of the growing flows of overseas emigrants that preferred Australia and to a lesser extent Canada as destination countries.

The year 1974 is regarded as a milestone in the demographic history of Greece. From that year onwards the net migration is positive and Greece has been converted from a sending into a receiving country. The net immigration for the periods 1971-1981 and 1981-1991 is indirectly estimated to 272,000 and 245,000 respectively (Siampos, 1993:447). Most of the immigrants are Greek return-migrants from West-Europe (NSSG, 1980c:102).

4.2 Cycladic Settings

Tables 4.1 to 4.3 present an indirect measurement of the migration movements that took place in the Cyclades, Paros and Naoussa in the intercensal periods from 1861 to 1991 wherever data are available. Data for the computation of these tables have been taken from tables A.1 to A.3 in appendix A. Growth rates of net migration have been calculated as the percentage of the mid-population of each intercensal period that has net-migrated. The notation used in the ensuing tables is as follows: t denotes time (year), P stands for population, $\overline{P}_{(t-n,t)}$ signifies the mid-population between time t-n and t, $B_{(t-n,t)}$ represents the births occurring between time t-n and t, $D_{(t-n,t)}$ denotes the deaths occurring in the time interval t-n and t. Births and deaths are not showed in these tables, but the reader can find them in the appendix A, where one can refer to for more details on the estimation of natural increase and on annual net migration.

Before looking at the following tables one should bear in mind that net-migration estimates are subjected to the deficiencies of the background statistical material, as described in appendix A. More specifically, under-registration of vital events was in high levels in Greece in the period prior to the mid-1950s (Valaoras, 1960). However, under-registration of births, (which was almost always greater than that of deaths) did not exceed the under-registration of deaths for more than 5-10% (ibid., 1960:135). Consequently, estimates of natural increase, which are based solely on the excess of births over deaths, will not be extraordinarily affected by under-registration of any kind although they will be an underestimate. The bias is expected to be smaller in the examined populations because, as emerged in a cursory assessment in chapter 3, there is evidence that registration of vital events was more complete in the examined island populations than in Greece as a whole. Even so, under-estimation of natural increase will cause estimates of net migration to be biased downwards in the case of net emigration (i.e. they will show less people leaving) and upwards in the case of net in-migration i.e. (they will show more people coming).

The degree of this bias depends on the completeness of the censuses. Censuses conducted from 1951 onwards are known to be fairly complete, since post-enumeration surveys showed that in none of these censuses under or over-enumeration exceeded ± 0.5% (Siampos:1993). Yet, Greek censuses prior to 1928 have been found to under-state the actual population (especially so far as infants and females are concerned), although no estimates of under-enumeration have been produced. It is thought, however, that the degree of under-enumeration differs from one census to another (Valaoras, 1960:116-118). Assuming that each census was more complete than its previous one, the bias in the estimates of net migration will be more pronounced over successive intercensal periods. In any case, however, estimates of annual net migration, as was pointed out in appendix A, are a rough approximation and probably a necessary compromise in lack of good quality population statistics.

Table 4.1: Indirect measurement of the migration balance in the Cyclades; 1861-1889, 1920-1940, 1951-1991.

Date of census (t)	Population enumerated (P)	Real increase $P_{t-n}-P_t$=**(1)**	Natural increase $B_{(t-n, t)}-D_{(t-n, t)}$= **(2)**	Net Migration **(1)-(2)=(3)**	Growth rates of net migration (%) $\frac{(3)_t}{\overline{P}_{(t-n,t)}}$*100=**(4)**
1861	117046				
1870	123299	6253	9733	-3480	-2.9
1879	132020	8721	11188	-2467	-1.9
1889	131508	-512	11593	-12105	-9.2
1920	122347				
1928	129702	7375	12718	-5363	-4.3
1940	129015	-687	19124	-19811	-15.3
1951	125959				
1961	99959	-26000	9256	-35256	-31.2
1971	86340	-13659	5448	-19067	-20.5
1981	88458	2118	2219	-101	-0.1
1991	94005	5547	30	5517	6.0

Note: Births and deaths have been taken from annual official publications: (Ministry of internal affairs, 1862-1889), (Ministere de l' Economie Nationale, 1924-1939), Statistique Generale de la Grece, 1931-40) (NSSG, 1954, 1955a-1997a). Population figures have been taken from census returns.

The Cyclades as a whole were characterised by constant net out-migration from 1861 to 1981. Only in the 1980s this trend has been reversed rather abruptly so that the decade 1981-1991 appears a sizeable net in-migration, which reached 6% of the mid-population of that decade. Otherwise, emigration was in high levels already from the mid-19th century, it inflated the period of the grand emigration to America, that is between 1890-1920, and it slowed down when this period was over. However, people from the Cyclades continued to leave their islands in a rate that exceeded natural increase in the 1930s and amounted to 31.2% of the population of this group of islands in the 1950s. From thereon emigration is constantly reducing and turns into immigration in the 1980s.

Table 4.2: Indirect measurement of the migration balance in Paros; 1861-1889, 1951-1991.

Date of census (t)	Population enumerated (P)	Real increase P_{t-n}-P_t=**(1)**	Natural increase $B_{(t-n, t)}$-$D_{(t-n, t)}$= **(2)**	Net Migration **(1)-(2)=(3)**	Growth rates of net migration (%) $\frac{(3)_t}{\overline{P}(_{t-n,t})}$ *100=**(4)**
1861	6565				
1870	6956	391	1030	-639	-9.5
1879	7398	442	1522	-1080	-15.0
1889	7928	530	1181	-651	-8.5
1951	9702				
1961	8461	-1241	875	-2116	-23.3
1971	7314	-1147	450	-1600	-20.3
1981	8516	1202	246	956	12.1
1991	10410	1894	255	1639	17.3

Note: Births and deaths have been taken from annual official publications: (Ministry of internal affairs, 1862-1889), (NSSG,1954, 1955a-1997a). Population figures have been taken from census returns.

Table 4.3: Indirect measurement of the migration balance in Naoussa; 1861-1889, 1896-1991.

Date of census (t)	Population enumerated (P)	Real increase P_{t-n}-P_t=**(1)**	Natural increase $B_{(t-n, t)}$-$D_{(t-n, t)}$= **(2)**	Net Migration **(1)-(2)=(3)**	Growth rates of net migration (%) $\frac{(3)_t}{\overline{P}(_{t-n,t})}$ *100=**(4)**
1861	1517				
1870	1579	62	279	-217	-14.0
1879	1590	11	324	-313	-19.8
1889	1760	170	353	-183	-10.9
1896	1827				
1907	1670	-157	432	-589	-33.7
1920	1410	-260	309	-569	-36.9
1928	1655	245	240	5	0.3
1940	1421	-234	370	-604	-39.3
1951	1610	189	267	-78	-5.1
1961	1481	-129	170	-299	-19.3
1971	1322	-159	93	-252	-18.0
1981	1725	403	141	262	17.2
1991	2110	385	161	244	12.7

Note: Births and deaths for years up to 1889 have been taken from annual official publications: (Ministry of internal affairs, 1862-1889). Births and deaths for the period 1896-1991 have been taken from community archives. Population figures have been taken from census returns.

The pattern is the same for Paros and Naoussa as well (tables 4.2 and 4.3), the only main difference being that migration becomes positive in the 1970s, a decade earlier than in the Cyclades. A point that is worth noticing is that during the period of emigration (1861-1971) there are two intervals where net out-migration slows down or even becomes net in-migration. The first interval is the intercensal period 1920-1928. For the Cyclades, during this period real increase of the population takes place for the first time since 1870-1879. For Naoussa, apart from a positive real increase, a positive net migration is also noticed. The explanation of this trend comes from the historical events. The period 1920-1928, as it was mentioned higher on this chapter, is associated with the influx of refugees that flooded into the country in 1922-23. In the case of the Cyclades the 1928 census enumerated 4,782 refugees out of 129,702 total population, i.e. 3.7% of it (SGG, 1933 **(I)**). At the same time refugees constituted 3.4% of Paros' population and 7.4% of Naoussa's one (ibid: 129-131). The fact that net-migration still appears negative during that period in the Cyclades and slightly positive in Naoussa, discloses that emigration of local people was always in high levels but was outshone by the inflow of the Asia Minor refugees. The example of Naoussa testifies that emigration was still in process in that period: although 122 refugees (out of 1655 total population) were enumerated in 1928, only 5 net-immigrants showed up in table 4.3.

The second interval where net-out migration is curtailed, is the 1940s. This is more obvious in Naoussa and Paros than in the Cyclades. Both Paros and Naoussa increased their population between 1940 and 1951. For Paros this increase is only 1.1% (from 9599 in 1940 the population reached 9702 in 1951)[18] while for Naoussa is 13.3% (from 1421 to 1610), despite the fact that net migration continued to be negative. The 1951 census encountered less population in the Cyclades than that of 1940, but this reduction must have occurred two or three years before 1951, when the great rural exodus towards Athens started. Otherwise, in the first half of the 1940s, when Greece was under a tripartite occupation, Greeks generally did not emigrate with the exception of those who were forced to move to German concentration camps or to work to German factories. Therefore, the Cyclades, which were under Italian occupation, were a safer place to stay than Athens and Salonica, which were under German occupation, or Thrace and eastern Macedonia where the population suffered persecutions by the Bulgarian occupation troops.

[18] Figures are based on census returns.

The end of the war in 1944 in Greece was followed by a devastating civil war, which forced some 700,000 persons to abandon their villages and to seek shelter in the urban centres (Clogg, 1992:148). Thus, started the great movement of urbanisation that reduced the rural population of Greece from 48% in 1951 to 35% in 1971. Although the civil war did not strike the Cyclades as other parts of Greece, for reasons examined later on this chapter, a huge net out-migration is also observed in tables 4.1 to 4.3 for the Cyclades, Paros and Naoussa respectively. This out-migration must be attributed to international and internal emigration as well, but all the indications imply that the largest part of this movement was absorbed by internal migration.

The most important evidence for this in our case comes from a research conducted in the early 1960s, when it became obvious that the depopulation of some parts of the country had reached unprecedented rates. At that time, among other similar studies, a comparative study of internal migration and urbanisation was sponsored by the Social Sciences Centre, Athens, concerning the island of Paros and a village of Epirus (Moustaka, 1964). According to that study the Parians who settled in other parts of Greece (mainly in Athens) from January 1951 to December 1962, amounted to 2016 persons. (Ibid: 1). Table 4.2 for Paros measures 2116 net out-migrants for the period 1951-1961. Taking into account that immigration to the island was negligible that period, it is made clear that the vast majority of Parian emigrants in the 1950s were headed towards the urban centres of mainland Greece.

The same holds true for the Cyclades also but at the same time the pre-war pattern of emigration to the USA resumed and continued in the 1960s. When Greece began from 1954 onwards to export people in rising waves towards West-Europe, the Aegean islands did not really contribute to that movement because of a preference that emigrants from these islands exhibited to overseas countries and especially to the USA (Siampos, 1980:239).

The 1971 census finds the Cyclades with the lowest population ever enumerated in any official census from the establishment of the modern Greek state (1830). The 1971 was the year with the lowest population for Naoussa as well for the studied period. However, the depression that the 1971 census caused by showing that the population of this group of islands is constantly decreasing without any viewable signs of recovery, was not to last for long. From the 1970s onwards population is increasing and net-emigration has been converted into net immigration in the 1970s for Paros and Naoussa and in the 1980s for the Cyclades as a whole. The main responsible for this remarkable recovery, as will be seen further on, is the tourist development of the islands.

4.3 Demographic characteristics of emigrants

Although data on the demographic profile of emigrants are available in national level, there are less such published data for district and even less for prefecture and community levels. Therefore, the profile of the Cycladic, Parian and Naoussian emigrant will be deduced mainly from national level data and where possible from more place-specific data.

Overseas emigration in the beginning of the 20^{th} century was in fact a movement of male population. From 1890 until 1919, when the massive emigration had already taken place (see figure 4.1), almost 90% of emigrants were men. Before 1910 this percentage was even greater (94-96%) (Emke-Poulopoulou, 1986:62-68.) According to other estimations the host of emigrants between 1900 and 1914 consisted of 94% males, of whom 93% aged 15 to 44 years (NSSG,1980c:97). After 1920 the proportion of men emigrating towards USA dropped dramatically and for three years (from 1922 until 1924) there were more women emigrating to the USA than men. This is because emigration of women and children depended, at least in this period, on the prior emigration of the family head. After 1920 the strict restrictions on migration posed by the USA government, prevented adult workers from seeking work in USA, but did not put off women meeting their husbands who had already settled in the States. Nevertheless, the number of women going to USA these three years (1922-1924) is negligible compared to the total volume of emigration during 1890-1920 and men still made up 89% of the total overseas emigrants in the beginning of the 20^{th} century. In the period 1931-1940, a period where statistical data had been improved, the proportion of males per 100 emigrants for overseas countries had dropped to 59.2, while for European countries was 77.7 and for all countries together 66.2 (Siampos, 1980:241).

For the post war period some data for Paros can be drawn from the study of C. Moustaka (1964). According to her study the mean age of those migrating from Paros to Athens from 1951 to 1962, which in the case of Paros made up the bulk of the emigrants in this period, as was seen in the previous section, was 34.3 years with no great difference between men and women migrants. As a matter of fact the median age of those migrants was lower because their age distribution shows a strongly positive skew and the greater age group was that of 25-29 years old. (Moustaka, 1964:7-8). In the post war-period participation of females in migration was greater than in earlier years. As national level data reveal the sex ratio of emigrants to foreign countries from 1955 to 1977 oscillated between 34.4 and 45.3 females per 100 emigrants (Siampos, 1980:241), while this sex ratio was slightly over 50 (51.4) in the case of internal migration (Tsaousis, 1986:129).

Conclusively, it seems that the typical emigrant in pre war period was the young male, while in the post war period male predominance had been weakened and even reversed in the case of internal migration. What remains to be further examined is the marital status of the emigrants.

In order to investigate the marital status of emigrants from the three geographical places of our concern, table 4.4 has been constructed. This table is based on those official censuses of the period 1861-1991 that provide the marital status of the population. Up to 1879 the censuses classify the population into three groups as far as its marital status is concerned: Single males/females, married males/females and widows / widowers. From 1907 onwards the group of those being divorced is also included. Table 4.4 shows the sex ratio of married population, expressed as females per 100 males, over the period 1861-1991 in the populations of the Cyclades, Paros and Naoussa, wherever data are available for each population.

Table 4.4: Sex ratio of married population (females per 100 males) for the Cyclades, Paros and Naoussa; 1861-1991.

Census Year	Cyclades	Paros	Naoussa
1861	100.8	102.6	102.0
1870	103.4	96.5	104.1
1879	105.5	103.3	100.0
1907	107.0	106.0	106.8
1920	106.0	101.4[a]	
1928	106.8	110.4[a]	
1951	89.0		
1961	106.9		
1971	101.5		
1981	97.4	97.1	
1991	94.4	93.2	94.4

Source: elaboration of census returns.

[a] Note: Until 1945 Paros belonged to the prefecture of Naxos. In the 1920 and 1928 censuses, data on marital status reach up to the level of prefecture only. Thus, for these years the sex ratio of the married population of the whole prefecture is used as an approximation of that of Paros.

Table 4.4 discloses that all over the examined period until 1971 there was a more or less significant number of married males who were absent in the time of censuses. These males could have been either sailors and soldiers away from home or temporary emigrants who left their family of marriage in a search of a better fortune elsewhere. Consequently, it can be inferred that emigration was not necessarily confined to either single males or families altogether. Married men could also emigrate alone, leaving their wife and family back. Has the same held true for married women? There are two figures in table 4.4 that could suggest this.

The figure which is more suspiciously inconsistent with its adjacent ones, is the sex ratio of married population in the Cyclades in 1951, according to which more married males than females were to be found that date in the Cyclades. It was mentioned in section 4.2 that by 1951 the great movement towards Athens had already started. In this movement women did participate but not married females alone. It was either single females who left the islands in search for a job or, for reasons described in the following section, married females who left the islands along with their husbands and families. It is difficult to imagine in the Greek culture that a married woman will leave her husband and her household to migrate to another place alone, for whatever reason. Something else must have happened.

In fact, the answer to why the sex ratio of the married population in the Cyclades in 1951 was strongly masculine comes from the political history of modern Greece. 1951 is a date shortly after the civil war has ceased. As an aftermath of the civil war prisons were full of political detainees and islands were filled with political exiles. In the Cyclades alone the 1951 census enumerated 11,623 political exiles mainly in the two prison-islands of Giaros and Macronisos (Giangakis, 1978:20). Almost all of those exiles were males and many of them were married. That is why the sex ratio of the married population is distorted in the 1951 Cyclades. Cycladic islands continued to be used as places of exile until 1964 when, in a democratic break, an amnesty was granted to all political detainees (Clogg, 1992:160). Prison-islands opened again in 1967 by the military dictatorship and they permanently closed in 1974 with the restoration of democracy. However, a similar masculine sex ratio as that of 1951 does not appear in the two subsequent censuses of 1961 and 1971, first of all because political detainees were much fewer than in the first post-civil war years (Giangakis, 1978:20). Moreover, the 1961 and 1971 censuses make a distinction between members of households and members of communal places and provide the marital status only for the former ones.

Another suspicious figure concerns the sex ratio of married population in Paros in 1870. It appears that more married males than females were to be found that date in the island. One can hardly believe this because table 4.2 shows that net emigration in the period 1861-1870 was quite substantial (the island lost 9.5% of its population during this period) and those emigrants could have not possibly been married women who left their husbands and households to search for work out of the island. What could have happened is a misreporting of females, which was a very common thing in the Greek censuses of the 19th century. One should also bear in mind that the 1870 census lasted 15 days, and that fact alone reduces the accuracy of its results. However, it is peculiar that the rest of the 19th century censuses do not show a similarly masculine sex ratio of married population. Therefore, one cannot exclude the possibility that the unbalanced sex ratio in 1870 was, to some extent at least, genuine. Yet, if incomplete enumeration of the census is not responsible for the distorted sex ratio of married population in 1870, it is not know what caused it.

Finally, the masculine sex ratio in the Cyclades, Paros and Naoussa from 1981 onwards can be explained by the fact that tourism and immigration had already started by 1981 and it makes sense that some of the immigrants were married males who came to the islands alone. This assumption is reinforced by the fact that both 1981 and 1991 censuses took place in the beginning of the tourist season (5th of April and 17th of March respectively) when, apart from the tourists, some temporary employees had already gone to the islands in search for a job during the tourist season.

4.4 Causes of emigration

A major push factor during the whole period of intense emigration from the Cyclades was the geomorphology of these islands. All of these islands are summits of the submerged mountain ranges of Greece (Encyclopaedia Britannica, 1995: 819). Therefore, the scenery is mountainous, the only natural vegetation consists of some Mediterranean shrubs and the scattered fertile soil is held in the slopes by artificial terraces. This morphology of the land makes agrarian economy insufficient for subsistence, forcing a great proportion of the population in the traditional society either to migrate or to turn to the sea for a living.

However, emigration from the Cyclades was not determined entirely by the lack of means of subsistence. The study of C. Moustaka (1964), which is in fact the only systematic study about migration in Paros and refers only to internal migration during the period 1951-1961, revealed that what brought the Parians to Athens in the 1950s was not only "the desire for a better (economically) life" and the search for work, although these were the main motives for emigration. As table 4.5 discloses a significant percentage of the migrants (12.5%) responded that the desire for technical and general education for themselves or for their children induced them to go to Athens, while 2.7% emigrated for the sake of their health. These findings emphasise the low socio-economic level prevailing that time in the island and the lack of educational and medical facilities.

Table 4.5: Reasons for internal migration (from Paros to Athens) obtained by two forms of the same question by Parians who settled in Athens during the 1950s.

Reasons for migration	Open-ended form (N=417)	Multiple choice form (N=1195)
To find work	37.6%	23.8%
To live better (economically)	30.5%	27.3%
To study	12.5%	9.1%
To be near relatives	9.6%	7.0%
To get married	4.8%	5.7%
For the sake of his/her health	2.0%	2.7%
To be freer	-	12.3%
Reasons non-classifiable	1.2%	-

Source: (Moustaka, 1964:60)

A reason for leaving the island, mentioned by 5-6% of the emigrants was to get married. To better comprehend why people had had to leave the island to find a spouse, one should bear in mind the following considerations: All over Greece intermarriage between relatives by consanguinity is forbidden by canon law up to the degree of third cousin. In small communities, with a population, say, below 2500 inhabitants - as is the case with all communities of Paros except for the capital of the island-, this prohibition confines drastically the range of available spouses. Moreover, the relationship of godparenthood is considered to be one of spiritual kinship. Thus, intermarriage between members of the family of the godparent and that of the godchild is also forbidden to the degree of third cousin, "just as marriage is prohibited with any consanguine to this degree" (Kenna, 1976:353). On the top of that, intermarriage between godchildren of the same godfather is also prohibited by canon law imposing further restrictions to the market of available spouses (ibid:353). And although the customary practice for a godparent is to stand sponsor to children of one sex only, so as to alleviate this restriction, this practice is not always observed. It is understandable then why in small islands, like the Cyclades, part of the population has to search for a spouse not only in different communities within the island but also outside of the island, as table 4.5 reveals.

Nevertheless, another motive was simply the attraction of rural people to the urban way of life. This was made obvious when migrants from Paros answering the question "why have you left the village?" stated "I had heard that life in Athens was better" or "I saw those who came back from Athens were better off and I decided…". Another factor seems to be that mass emigration itself caused unemployment as it was the case with a Parian migrant who stated "Everyone has gone, so I couldn't run my shop" (Moustaka, 1964:63).

4.5 Immigration

Although immigration to Paros and Naoussa until the 1970s was limited, as the tables 4.2 and 4.3 suggest, the marriage records of Naoussa and Kostos imply that these communities (and inferentially the island) were not closed to outside world. On the contrary, at any segment of the examined period a significant percentage of grooms and brides not only came outside of the two communities but also outside of the island itself. This finding, along with other ones about immigration and spouse availability, are demonstrated in tables 4.6 and 4.7.

The derivation of tables 4.6 and 4.7 was based on the manipulation of 1156 marriage certificates covering the period 1894-1998. The criterion used in the construction of these tables was the "place of origin of groom" and that of bride as these were stated in the marriage certificates. The faint inconsistency that is observed between the fourth column of the two tables, that is between the "total number of grooms" and the "total number of brides", is attributable to the fact that only those (grooms or brides) for which a place of origin was reported in marriage certificates were taken into account in the construction of the tables. Thus, in tables 4.6 and 4.7 in some cases the total number of grooms does not agree with the total number of brides, because not all of the grooms and brides are included. However, the missing cases do not distort the results, since only 0.9% of the marriage certificates do not mention the origin of groom, while for brides this percentage is even lower (0.4).

Table 4.6: Grooms originated outside Naoussa and Kostos as percentage of all grooms and grooms originated outside Paros as percentage of all grooms; Naoussa & Kostos 1894-1998.

Years	**% of grooms from outside Naoussa & Kostos**	**% of grooms from outside Paros**	**Total number of grooms**
1894-1909	18.9	11.7	196
1910-1919	4.6	3.5	86
1920-1929	0.0	0.0	133
1930-1939	8.3	3.7	109
1940-1949	16.8	8.0	125
1950-1959	11.3	4.0	124
1960-1969	18.3	11.0	82
1970-1979	20.7	6.9	87
1980-1989	27.2	15.8	114
1990-1998	40.0	23.2	95

Source: elaboration of 1156 marriage records

The reasons that in small communities availability of spouses was restricted at any time, were mentioned in section 4.4. However, apart from social conventions and cultural rules, availability of grooms in the examined communities was further confined because of extensive emigration of males. The first emigration wave (1890-1920) was highly sex and age selective, consisting of 94% males, of whom 93% aged 15 to 44 years (NSSG,1980c:97). The substantial percentage of non-Parian grooms (11.7%) in the turn of the century as opposed to only 1.5% of non-Parian brides indicates that there was a lack of males in the island, which was filled in with imported grooms. Generally, up to the 1970s immigrant grooms were more than immigrant brides, something that shows not only an unbalanced sex ratio but also the adverse social status of women. Nevertheless, it is worth noticing that as far as intra-island mobility is concerned, brides, especially in the pre-war years, were more mobile than grooms.

Table 4.7: Brides originated outside Naoussa & Kostos as percentage of all brides and brides originated outside Paros as percentage of all brides; Naoussa & Kostos 1894-1998.

Years	% of brides from outside Naoussa and Kostos	% of brides from outside Paros	Total number of brides
1894-1909	14.1	1.5	199
1910-1919	5.8	1.2	86
1920-1929	1.5	1.5	134
1930-1939	6.4	0.9	109
1940-1949	10.3	5.6	126
1950-1959	13.6	4.8	125
1960-1969	11.0	7.3	82
1970-1979	16.1	5.7	87
1980-1989	29.8	19.3	114
1990-1998	33.7	28.4	95

Source: elaboration of 1156 marriage records

With respect to the origin of these immigrants, the analysis of marriage records showed that in the pre war years males were originated mostly from other Cycladic islands in a percentage of 53.3 and to a lesser extent from Athens and Piraeus (13.3%), with the remaining 30% coming from mainland Greece and 3.3% from Alexandria, Egypt. The most common islands of origin of male immigrants in that period (1894-1939) were Syros, Amorgos, Naxos, Mykonos, Milos and Sifnos in that order. In the period 1940 to 1979 this migratory pattern changed as 36.7% of immigrant grooms came from Piraeus and Athens and 43.3% from Cycladic islands. In the most recent period (1980-1998) those who came from Cycladic islands constituted only 5% of all non-Parian grooms in the two communities, while those who came from Athens and Piraeus made up 42.5% of them. At the same time a significant percentage of immigrant grooms were originated from the USA (12.5%) and other foreign countries. Most of the USA immigrants, as their names show, are descendants of local people who had emigrated to the USA, and they decided to return to their motherland when they saw the rapid economic and social development of the island during the last two decades. The same applies also to some immigrants from Athens, whose names indicate clearly that they draw their origin from the island.

The percentage of non-Parian brides, on the other hand, was always low until the 1970s, since most of the imported brides to the two communities were originated from other communities within the island (see table 4.7). However, those few who came outside of the island, in the period 1894-1939 were mostly from Piraeus (42.86%) and from neighbouring islands (42.87%). In the period 1940 to 1979 Athens and Syros along with other islands are the main places of origin of female immigrants, but at the end of this period the first foreign brides showed up and settled down on the island. Thus, there were two English females and one from Belgium, all of whom got married with local inhabitants. In the most recent period (1980-1998) the percentage of foreign brides reached 36.7% of all non-Parian brides, but many of those foreigners were tourists who performed their wedding ceremony on the island but did not settle there.

It is worth noticing that the tourist development of the island from the 1970s onwards, apart from attracting population to the island, has changed the morals and ethics of people. As many as 33.7% of all brides in the 1990s came from outside of the two communities, something that had never happened in the past. Moreover, a cross-tabulation of the bride's occupation and her origin showed that from 1980 onwards 34.4% of non-local brides reported an occupation other than housekeeping. On the other hand the proportion of local brides who were working outside the house at the same period was only 19.6%. Hence, we observe that the substantial immigration in the last twenty years is changing the traditional society, since the immigrant population is now part of that society and the behaviour and life style of the newcomers has penetrated and characterises the total population.

In conclusion, immigration to the examined communities was sporadic and insubstantial from the 1860s to 1970s but not non-existent. The immigrants were mostly males coming from other Cycladic islands in the earlier period and from Athens and Piraeus later on. From the 1970s onwards a significant inflow of immigrants is observed from different places of origin but chiefly from mainland Greece and from abroad. Most of those who came from the USA and from Athens are return-migrants, though many non-local people have come from Athens as well.

4.6 Causes of immigration

In the early years of the examined period (1894-1939) the infrequent immigrants, as the analysis of the marriage records revealed, consisted of people with a variety of occupational statuses who were found in Paros mainly because of the nature of their job. Thus, 20% of all non-Parian grooms in the early period were merchants who were travelling around the islands for the sake of their business, originated themselves from the Cycladic islands of Syros, Naxos and Amorgos. A further 10% were seafarers (sailors and fishermen) and the remaining ones were either civil servants (like teachers and police officers) designated to the island from other parts of Greece or private entrepreneurs. The pattern is more or less the same for the period 1940-1979 with more entrepreneurs and some businessmen to appear at the end of this period. Hence, it seems that up to the 1970s there was no specific cause for immigration to Paros. The few outsiders were rather occasional immigrants, which were attracted from personal reasons.

The main pull factor for immigrants in Paros in the last twenty years was the booming tourist industry of the island, which created many employment opportunities especially in the sector of hotel services, tour operators and travel agencies. Although few of the hotels or restaurants are open off the tourist season, the activities that are associated with these services (maintenance of buildings, catering and banking) seem to be enough to sustain a growing population in the island all over the year. Apart from these activities, during the 1980s some extensive infrastructure operations had been undertaken, such as the construction of an airport, road network, and sewage systems for Paroikia and Naoussa, thus drawing more population to the island (Sofianou, 1989:107). At the same time, medical facilities and educational opportunities on the island have been improved and that fact alone helps in maintaining the population and encourages the settlement of those who, in previous years, would wish to stay in the island but were put off by the poor quality of these facilities.

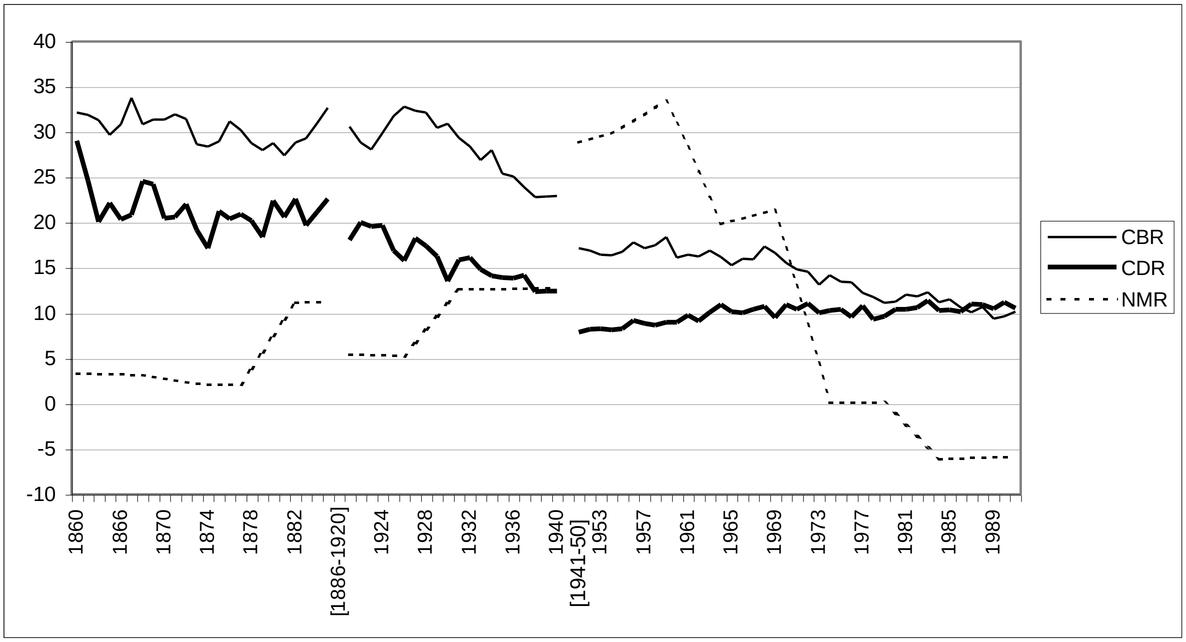
4.7 Discussion of the main findings

The main inference in this chapter is that migration has been, and continuous to be, the most important component of the demographic regime of the examined island populations. It is really peculiar that the theory of demographic transition associates changes in mortality and fertility with economic development but it does not take into account population mobility, which in many cases is indivisible from this development. In the relevant literature, there is the hypothesis of mobility transition (Zelinsky, 1971) that tries to relate different phases of migration (as this was experienced by West-European countries again) with the phases of demographic transition. According to this theory in pre-transitional societies, where both mortality and fertility are high and the growth rate of population is very low, mobility is limited and insignificant. In transitional societies, where mortality begins to decline but fertility remains high so that considerable population growth ensues, extensive internal and international migration moves take place. Finally, according always to Zelinsky's theory, when fertility declines, leading to contemporary developed societies with low fertility and mortality levels and low rate of population growth, the volume of migration is reduced and population mobility is restricted within the frame of rural to urban moves.

Although this theory has been devised to fit the historical experience of west-Europe, and even there, is not completely applicable, we have formulated three figures (4.2, 4.3 and 4.4) to test Zelinsky's theory to the study populations and to better understand the role of migration in the demographic system of these populations. The figures depict CBRs, CDRs and net migration rates (NMRs) for the Cyclades, Paros and Naoussa over the time span 1860-1997 for periods where data are available. The crude rates of births and deaths have been derived in appendix A and the reader can refer there for more details about their calculation. Data for the calculation of net migration rates have also been taken from tables A.1, A.2 and A.3 of appendix A. More specifically the numerators of NMRs are to be found in the column of those tables named "Annual net migration" and the corresponding denominators in the column named "Estimated population". What need be said here is that rates (CBRs, CDRs, NMRs) presented in figures 4.2, 4.3 and 4.4 are the five-year moving averages of the calculated ones. The only exceptions are the CBRs and the CDRs (but not the NMRs) pertaining to the Cyclades, which have not undergone any smoothing procedure.

Trying to discover any relationship between the phases of demographic transition and the fluctuations of migration, it was found that Zelinsky's theory does not apply to our populations. Figures 4.2, 4.3 and 4.4 show that first of all net emigration was always in high level and erratically increasing between the 1860s and 1970. Moreover, the proportionately highest level of net emigration (the one that exceeded natural increase most) was reached in the 1950s and the 1960s, in a period when fertility had already declined and the growth rate of the examined populations was limited. This observation holds true for all the three of our populations, although each one of them exhibits its own peculiarities. Thus, Zelinsky's theory cannot be used as an analytical tool in our case.

Figure 4.2: Net migration rate (NMR) and crude rate of births (CBR) and deaths (CDR); Cyclades 1860-1885, 1921-1940, 1951-1991. All rates are per 1000 population.



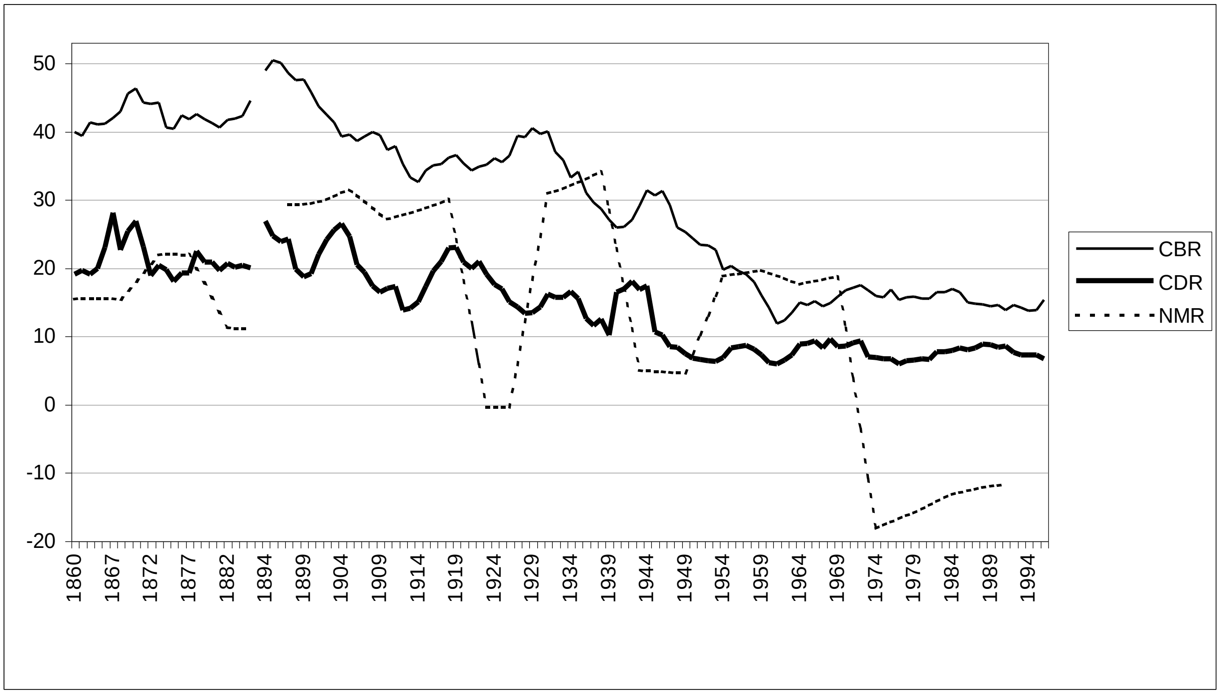
Source: table A.1

What can be said is that the great natural increase of the studied populations, in the pre-war years was counterbalanced almost entirely by emigration. Reductions in fertility up to 1940 were not enough to offset drops in mortality. Fertility became a reductive factor of natural increase only in post-war years, but migration, positive or negative (immigration or emigration), has always been and still is the factor that regulates the natural increase and determines the real increase of the population. Under this perspective it can be observed that in the early modern period emigration acted as a release valve whenever historical circumstances brought to the islands more population than they could sustain. This is particularly obvious in the case of Naoussa (figure 4.4) (and to a lesser extent in the Cyclades) where, when an influx of refugees arrived after 1922, in the immediately following years, net emigration was triggered in extraordinarily high levels and reached 35 per 1000 in 1935. In like manner when natural increase reached very low levels from the 1970s onwards, it was again migration, in the form of in-migration this time that saved the islands from depopulation and permanent stagnation.

Figure 4.3: Net migration rate (NMR) and crude rate of births (CBR) and deaths (CDR); Paros 1860-1885, 1951-1991. All rates are per 1000 population.

Source: table A.2

Figure 4.4: Net migration rate (NMR) and crude rate of births (CBR) and deaths (CDR); Naoussa 1860-1885, 1894-1997. Rates per 1000 population.



Source: table A.3

However, in the pre-1970s period, apart from being beneficial by releasing population pressure from the islands, emigration in such a big scale had also exerted unfavourable effects on the island communities. The one, which is most easily traceable through this demographic analysis, is the adverse effect of emigration on nuptiality. It was noticed in section 4.5 that availability of grooms in the two communities of Naoussa and Kostos was confined because of extensive emigration of males. Something that comes to further reinforce this finding is table 3.5 from chapter 3. It astonished us then to find out that in the Cyclades before the 1980s the percentage of female population that was never married by age 50, was over 6% in all periods since the beginning of the century. One can better understand now that this feature of the Cycladic marriage pattern was due to ample emigration of males.

Another impact of sex-selective emigration should have been a curtailment of fertility. However, as was discovered in chapter 3, in our populations fertility was higher than that of Greece at least until the first post-war decades. Nevertheless, if emigration had not taken place overall fertility would have been even higher, because presumably the percentage of never-married females by age 50 would have been lower. Moreover, even marital fertility would have been higher in the absence of migration, because many emigrants were married temporary migrants. Once again we arrive at the conclusion that migration was the main regulatory factor of the studied island populations.

CHAPTER 5 : THE PROCEDURE OF FAMILY RECONSTITUTION AS APPLIED IN THIS STUDY

5.1 Introduction

When Louis Henry published his study "Anciennes Familles Genevoises" in 1956 (Henry: 1956) he showed that family reconstitution is a path-breaking method, which opens new horizons to historical demography. Yet, for many years after its first debut, family reconstitution remained out of the mainstream of population studies, mainly because of the impracticalities that this method appeared in the past. Undertaken by one individual the method of family reconstitution, even applied to a small population size, say not more than 2000, and even for relatively short periods, not exceeding one century, required thousands of tedious work-hours to produce results involving, at the best case, few dozens of families. However, in recent years more and more such studies have been undertaken with great success, not only in France and in England, where the method was initially developed and perfected[19] by the *Institut National d' Etudes Demographique* and by the *Cambridge Group for the History of Population and Social Structure*, but also in very many European countries in such extent that we cannot talk anymore about historical demography without connecting it to family reconstitution.

The main reason behind this promotion of family reconstitution studies is the spectacular advances that took place in the field of information technology. Although computers performed nominal record linkage for the purposes of family reconstitution since the 1970s, the whole process required hardware equipment and specialised software not available to the individual researcher. It was only in the 1990s that family reconstitution could be performed by hardware and software equipment readily available in the market. Today the computerised method, though is still very time consuming, requires much less time than the manual method.

This chapter is a description of the methodology of family reconstitution and of the problems associated with its application to our data. The following paragraphs provide a basic

[19] Strictly speaking, there seem to have been studies where family reconstitution had been employed by others long before 1956. See, for example, a reference made by Knodel (1988:3) to a study concerning a town in Southern Germany, undertaken shortly after the turn of the 20th century, or a reference made by Wrigley et al. (1997:3) to a study about 12 Swedish parishes, undertaken in 1915. However, those studies had little impact on

idea of what family reconstitution is. Further on, a brief account of the strengths and limitations of the method is given. Following that, the sequence of operations necessary for the application of the method is exposed. In the end of the chapter a discussion is made about the reliability of our reconstituted data, as well as about the particularities of this study, which arise from the fact that the method of family reconstitution is here applied to a contemporary population, although it was primarily designed for (and is more effective when applied to) historical populations.

Family reconstitution implies a "process through which individual records of births, deaths and marriages contained in parish [or civil] registers are linked together into histories of vital events for individual families" (Knodel, 1988:3). Or, according to another definition: "family reconstitution is the bringing together of scattered information about the members of a family to enable its chief demographic characteristics to be described as fully as possible" (Wrigley, 1966:96). When every piece of wanted information for a family has been traced from books of civil (or parish) registration, the pieces of information are entered into a family reconstitution form (FRF). When family reconstitution is performed manually thousands of FRFs, such as the one illustrated in figure 5.1, are required. In this study, however, FRFs have been used only in their computerised format, stored in an electronic database, and not in slips of FRFs like the one in figure 5.1. In any case, the analysis of either conventional or electronic FRFs produces demographic indices, which can be used to demonstrate the demographic behaviour of the study population.

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the modern historical demography and thus the credit for introducing family reconstitution to demography is usually given to Louis Henry.

Figure 5.1: A family reconstitution form (FRF) like the ones used by the Cambridge Group for the History of Population and Social Structure.

MARRIAGE
M /no. /place /date /date of end ||date of next ||

LITERACY
L/husband /wife

HUSBAND
H /surname /names /date of baptism(birth) /date of burial (death) /order of marr. /earlier FRF no. /residence at baptism

/residence (occupation) at marriage /residence (occupation at burial) /date /residence (occupation) /date /residence (occupation)

Husband's father
HF /surname /name(s) /residence(occupation) /FRFno.

Husband's mother
HM /surname /name(s)

WIFE
W /surname /names /date of baptism(birth) /date of burial(death) /order of marr. /earlier FRF no. /residence at baptism

residence (occupation) at marriage /residence (occupation at burial) /date /residence (occupation) /date /residence (occupation)

Wife's father
WF /surname /name(s) /residence(occupation) /FRFno.

Wife's mother
WM /surname /name(s)

CHILDREN

		sex	date of burial (death)	status	Name(s)	Date of marr.	FRF no. of first marr.	surname of spouse	age at bur.	age at marr.	birth interval	age of mother
1	C	/ /	/	/	/	/	/					
2	C	/ /	/	/	/	/	/					
3	C	/ /	/	/	/	/	/					
4	C	/ /	/	/	/	/	/					
5	C	/ /	/	/	/	/	/					
6	C	/ /	/	/	/	/	/					
7	C	/ /	/	/	/	/	/					
8	C	/ /	/	/	/	/	/					
10	C	/ /	/	/	/	/	/					
11	C	/ /	/	/	/	/	/					
12	C	/ /	/	/	/	/	/					
13	C	/ /	/	/	/	/	/					

COMMENTS		Husband		Wife	Age group	Years marr.	No. of births
	Age at marriage				15-19		
	Age at end of marriage				20-24		
	Age at burial				25-29		
	Length of widowhood (mths)				30-34		
	Length of marriage (years)				35-39		
		Total	sons	daughters	40-44		

	Number of births				45-49		

5.2 Strengths and limitations of the method

There are two great advantages of family reconstitution compared to conventional demographic methods. First, it can derive demographic rates in the absence of the stock of population at risk and second it can infiltrate the demographic behaviour of a population in such detail that no aggregate method can do. On the other hand family reconstitution bears limitations that aggregate methods do not have. The main limitation is that due to the time-consuming and very tedious nature of the work that reconstitution requires, the method can only be applied to relatively small population sizes.

With respect to the first strength of family reconstitution, its ability to produce rates in the absence of the stock of population at risk, certain things need be said to clarify how does this work. Conventionally, a rate relates vital events to the population at risk of experiencing these events; for example, an age-specific fertility rate relates the annual number of births to women, say, 20-24, to the total number of women in that age group in the specified year. If either vital statistics or census-returns (or any kinds of population estimates) are missing, demographic rates cannot be calculated with aggregate methods. The lack of both reliable series of vital statistics and periodical censuses is a common phenomenon not only in historical populations but also in contemporary ones in countries with poor administrative infrastructure. Family reconstitution overcomes the problem of the lack of census-types statistics (i.e. population at risk) by introducing the concept of person-years. Thus, it derives demographic rates by relating vital events that occurred in a specified time interval of several years, to the number of years, within this specified time interval, lived by the persons at risk of experiencing these vital events, that is the person-years of exposure to the risk of the events.

To better comprehend the concept of person-years, let us take an example. Consider a birth cohort of ten women whose life history has been traced with the method of family reconstitution from the beginning of their life to the end of it and suppose that all these women outlived their reproductive period. If the required index is their age-specific fertility rate in the age group 20-24, then two questions should be asked. First, how many children in total did these women bear between their 20^{th} and 25^{th} birthday? Suppose that they had a total of 28 children. Second, what is the number of years lived by these ten women between their 20^{th} and 25^{th} birthday? Since these ten women lived five years each between their 20^{th} and 25^{th} birthday, the answer to this question is 10*5=50. Now, their age-specific fertility rate in the age group 20-24 will be (28/50*1000) 560 per thousand. In a similar way other types of rates (age-specific mortality rates, total fertility rates) can be calculated by relating vital events to the person-years at risk of experiencing these particular events.

The main feature of the rates derived in the aforementioned way is that, because of the relatively small population size involved in family reconstitution studies, they usually measure the experience of a cohort (a group of people born, if one talks about a birth cohort, or marrying, if one has to do with a marriage cohort, during a particular time interval) over time. In contrast with cohort rates, period rates, which are the ones that can be more readily calculated with aggregate methods when both the flow of events and the stock of population are available, look at the studied characteristic of the population transversally during a specified time period, normally a year. For example, a period fertility rate examines births occurring to many cohorts within the specified year, as opposed to a cohort fertility rate which examines births occurring to one only cohort over several years.

Although the ability of family reconstitution to produce (cohort) rates in the absence of census-returns is its great strength, cohort analysis based on family reconstitution data suffers from at least two drawbacks compared with period analysis. The first drawback, which is intrinsic to cohort analysis, is technically known as “censoring”, and has to do with the fact that the full demographic experience of a cohort is not known, unless all the members of the cohort pass through life, from birth to death. Consequently, the derivation of demographic characteristics of a population will stop several years before the date that our data cease. The second weakness is not inherent in cohort analysis but arises when family reconstitution results are used to calculate cohort rates. In most family reconstitution studies, the number of reconstituted marriages does not exceed a few hundreds per studied century[20]. That means that marriages of different years have to be grouped together so as to create sizeable marriage cohorts, each one of which will include marriages that took place within long time-spans, usually 10 years. Yet, a 10-year cohort rate cannot trace changes in fertility, mortality and nuptiality as accurately as, say, a yearly period measure can do.

[20] By “reconstituted marriages” we mean marriages for which the beginning and the end of the marriage are known. Such reconstituted marriages rarely exceed the number of 1000 per century in family reconstitution studies. For example in the study of Hionidou (1993:116) there are 933 reconstituted marriages for a period of 100 years. In the study of Knodel of fourteen German villages the village with the greater number of reconstituted marriages (Herbolzheim) contains 1947 such marriages for a period of 200 years, i.e. 974 reconstituted marriages per 100 years (Knodel, 1988:466).

Coming to the second advantage of the family reconstitution method, that is its aptitude to reveal the demographic behaviour of a population better than aggregate methods do, some examples will be cited so as to pinpoint this advantage. Consider the study of fertility transition in a given population. Aggregate methods based on published census-returns and vital statistics will reveal the declining fertility of the population and will provide accurate levels and trends for various time points during the fertility transition. However, they will not be able to say how the population regulated its reproductive behaviour to achieve a decline in fertility. Was declining fertility due to a "stopping" reproductive behaviour or a "spacing" one; or there was a time when couples start to lengthen the birth intervals switching from a "stopping" to a "spacing" procreative behaviour? These questions cannot be answered by conventional demographic methods based on published data sources, unless the registration system is very sophisticated, which is not usually the case with populations undergoing fertility transition. Family reconstitution on the other hand has the ability to monitor variables such as birth intervals and age of mother at last birth (and for that matter, age of both parents at every birth) and thus, to disclose how the population regulated its reproductive behaviour over time. This can be done by linking a couple's marriage record to the birth records of their children. Since, the dates of births exist in the birth records and the date of marriage in the marriage record, it is relatively straightforward to observe the interval between the date of marriage and the first birth and then the intervals between successive births. If marriage records mention the ages of the spouses (as is the case in the current study), this kind of link alone (birth records to their marriage of origin) will permit us to examine not only the birth intervals but also the age of spouses at marriage and at the birth of every child.

Furthermore, if marriage records provide the occupation of the groom, which they usually do, demographic behaviour can be correlated with occupational status and the reproductive habits of each occupational group can be examined in detail. Of course, in practice, to derive any kind of information is more complicated than it sounds in the above examples because, for reasons that are discussed in the next paragraph, family reconstitution cannot be based on one kind of link only. Yet, the above examples intend to show in a general manner some of the great potential of family reconstitution.

One could count among the drawbacks of family reconstitution the fact that, as was said in the previous paragraph, no serious results can be produced based on one kind of links only. Various links among all three kinds of vital events have to be established in order to determine the *presence in observation* for each individual, that is, the period of time that he or she can be considered to be at risk of experiencing a particular type of vital event. To cite an instance, linking birth records to their marriage of origin is not enough for studying marital fertility. More specifically, by linking birth records to their marriage of origin one knows the time that the couple enters observation, which is the date of marriage, but one does not know the time that the couple exits observation. For calculating marital fertility rates the time that the couple passes out of observation, which is the date that the first of the two spouses dies, should also be known. Consequently, one should have at hand the death records of both spouses or, where only the death record of one spouse is available, information indicating that the deceased spouse was the first of the spouses to die. Such information can be either a remarriage of the surviving spouse or an indication in the death certificate of the deceased that he or she was married (i.e. not widowed) when death occurred.

Population mobility is a factor that restricts the number of families that can be considered present in observation. For example, suppose that the death dates of a couple are known and it is also known that this couple was married because a number of registered births have been attributed to it. Yet, if a date of marriage is not provided, this couple cannot be considered as present in observation for calculating fertility measurements, since there might be births to this couple which occurred between marriage and the time that the couple moved to the study community. These previous births would not have been registered in the study community and hence the final parity of the couple could not be known. However, it could also be the case that the couple went away from the community only to be married (as is the case with our communities where, customarily, the marriage takes place in the parish of the bride). In this case we exclude from the analysis couples although we suspect that the number of children attributed to them is their completed family size. Thus, when the population exhibits even a moderate mobility, family reconstitution limits the number of families that can be studied because it requires couples to be subjected to the registration system of the study area for their entire life span. In fact, in every reconstitution study a significant proportion of the study population is excluded from the analysis and this introduces a selection bias to the results. This selection bias would be minimal if the demographic behaviour of migrants was similar to that of non-migrants, but in most family reconstitution studies there is no way to determine if this is the case.

5.3 Transcription and manipulation of data

All primary data were transcribed directly to an electronic database, namely Microsoft Access 7.0 and the same database was used for the record linkage and the derivation of FRFs. All data were input in three tables, one for each of the vital events; the tables were named “births”, “marriages” and “deaths” (see table 5.1). The first field in each of these three tables is called “ID” and attributes a unique identification number to every record. The last field is called “notes” and contains valuable information found in the civil or parish registers such as whether a child was illegitimate, fostered or twin, whether a spouse was married for second or third time and whether someone died unbaptised. Notes could also be personal comments about the illegibility of the certificates and the cases where a name was ambiguous. The fields called “literacy status” indicate, based on the signature at the end of the certificates, whether the person who reported the vital event was literate or not. In the case of marriage certificates both spouses have to sign the certificate, so there are two fields concerning literacy status: one for the groom and one for the bride.

Table 5.1: Information included in the three basic database tables on which family reconstitution is based.

Births	**Marriages**	**Deaths**
Birth ID	Marriage ID	Death ID
Forename of boy	Groom's forename	Date of registration
Surname of boy	Groom's surname	Date of death
Forename of girl	Age of groom	Place of death
Surname of girl	Origin of groom	Occupation of declaring
Date of birth	Occupation of groom	Declaring person
Father's forename	Bride's forename	Age of deceased
Father's middle name	Bride's surname	Occupation of deceased
Father's surname	Age of bride	Place of residence
Father's occupation	Origin of bride	Cause of death
Age of father	Bride's occupation	Marital status
Date of registration	Groom's father's forename	Forename of male deceased
Mother's forename	Groom's father's surname	Middle name of male deceased
Mother's middle name	Groom's mother's forename	Surname of male deceased
Mother's surname	Groom's mother's surname	Forename of female deceased
Date of baptism	Bride's father's forename	Father's forename of female deceased
Literacy status	Bride's father's surname	Husband's forename
Notes	Bride's mother's forename	Maiden surname
	Bride's mother's surname	Husband's surname
	Date of marriage	Literacy status
	Date of registration	Notes
	Place of marriage	
	Literacy status of groom	
	Literacy status of bride	
	Notes	

Source: Naoussa and Kostos family reconstitution

Manipulation of data is relatively easy when data are stored in a relational database, like the one used in this study. By defining relationships between tables, in a manner that shall be inspected in section 5.5, the database can display pieces of information from several tables at once. Thus, the birth record of an individual can be linked to his/her marriage and death record, and the wanted pieces of information can be presented in a separate table by using a "select query". In the database terminology a "query" is a way to retrieve data from one or more tables using specified criteria, and then display the manipulated data in the desired order. Moreover, new fields can be created in a table and updated using fields from other tables through "update queries". Certain records can be attached to a table with the use of "append queries" and deleted with "delete queries". Some of these terms will be used further on in this chapter and especially in section 5.5 where the sequence of operations in applying family reconstitution is stated.

When the family reconstitution had reached a final stage, all necessary information was exported to the statistical package “Stata” with which the completion and analysis of FRFs was carried out. Before describing the process of family reconstitution step by step, some issues associated with the appropriateness of Greek data as raw material for family reconstitution will be discussed.

5.4 Problems associated with Greek data

A first problem arose from the fact that some of the computer software used in the study does not support the Greek alphabet. Therefore, before transcribing any records, a conversion from Greek into Latin characters was necessary, given that any computer software supports Latin characters. The conversion was based on the sounding proximity of letters, except for the case of «ω», which was converted to «w» based on the visual similarity of these two letters. The following table 5.2 depicts how the Greek characters were transcribed into Latin ones.

Table 5.2: Correspondence of Latin characters to the Greek alphabet

	Greek Letters	Latin equivalent
1	Α α	A a
2	Β β	V v
3	Γ γ	G g
4	Δ δ	D d
5	Ε ε	E e
6	Ζ ζ	Z z
7	Η η	Ii
8	Θ θ	Th th
9	Ι ι	I (i)
10	Κ κ	K k
11	Λ λ	L l
12	Μ μ	M m
13	Ν ν	N n
14	Ξ ξ	X x
15	Ο ο	O o
16	Π π	P p
17	Ρ ρ	R r
18	Σ σ	S s
19	Τ τ	T t
20	Υ υ	Uu
21	Φ φ	F f
22	Χ χ	H h
23	Ψ ψ	Ps ps
24	Ω ω	W w
	Diphthongs	Corresponding Latin letters
1	Αυ	Au
2	Γγ	Gg
3	Γκ	Gk
4	Μπ	B
5	Ντ	Nt
6	Τζ	J
7	Τσ	Ts
8	Υι	Yi

When the data had been transcribed into the aforementioned three tables in the database, another problem had to be resolved: that of extended variability of names. All the three kinds of certificates (birth, marriage and death certificates) are full of variations belonging to the same name. For example, a female who on her birth certificate is referred to as «Άννα», can be referred to as «Ανεζώ» at her marriage certificate and as «Ανέζα» at her death certificate. The same kinds of inconsistencies exist in the case of surnames. To cite an instance, the surname «Βουτσουδάκης» is referred to as such in the early years of the study period, whereas it gradually changed to «Βουτσαδάκης» in later years and finally to «Βιτσαδάκης» in the last twenty years or so. Therefore, a standard name had to be attributed to all variations of the same name, before any linkages between records could be attempted.

However, it would be unwise to replace every name with its standard form on the original fields of our database tables, because that would lead us to lose some distinct names attributed as variations of the same name. For example the name «Μαρκέτα» is usually a variation of «Μαρία» ; however, it could be the case that two members of the same family bear the names «Μαρκέτα» and «Μαρία» as two distinct names.

To solve this problem four dictionaries of names were created: one for male forenames, one for female forenames, one for male surnames and one for female surnames. Each dictionary consists of two columns; the first column contains every different name as this has been found in the certificates (for example the dictionary for the male forenames contains in the first column every male forename) in alphabetical order. The second column contains the standard name that corresponds to the original name in the first column. Having created the name dictionaries, some new fields were generated in the three tables of our database. More specifically, beside the fields that contained the original names we created fields that would contain the respective standard names and we updated the new fields, based on the dictionaries and using "update queries". Thus, in the end of this standardisation procedure we were ready to move on to the record linkage using the fields containing the standard names, while the fields with the original names were retained so that in the case of ambiguities in the following steps we would be able to refer to the original names, which might help us to resolve the ambiguities.

During the linking procedure, however, another impeding issue had to be confronted. This is the established practice for married women to abandon their maiden surname and adopt their husband's surname. Thus, while in the marriage certificates a bride is registered with her maiden surname, in the birth certificates of her children she could be referred with her husband's surname. Had always this been the case (i.e. if a woman had always been referred with her husband's surname in the birth certificates of her children), things would have been relatively straightforward. However, in birth records the mother is not always registered with her husband's surname. In fact, in most of the cases she is referred with her maiden surname, but there are many cases also where her husband's surname is used instead. This lack of consistency regarding the surname with which a mother is mentioned in birth certificates poses serious limitations in the linkage of births to their parents' marriage. An explanation of how we dealt with this problem is given in step 1 of the following section.

5.5 Carrying out the reconstitution

Before embarking on the operation of carrying out family reconstitution, it is worth recalling that our raw data consist of 5202 birth, 1156 marriage and 2439 death records covering the period 1894-1998. The procedure followed in this study is essentially the same with that described by Wrigley and Schofield in the early 1970s (1973:64-101), adjusted to suit the needs of our data. In brief, the following steps took place:

1) Linkage of births to their parents' marriage
2) Creation of dummy marriages and linkage of remaining births to these marriages. 2a) Resolution of double matches
3) Linkage of grooms'/brides' marriage records to their birth records 3a) Resolution of double matches.
4) Linkage of grooms'/brides' marriage records to their death records. 4a) Resolution of double matches.
5) Linkage of birth to death records. 5a) Resolution of double matches
6) Find second and third marriages.
7) Testing the results of family reconstitution for logical errors.

Step 1

The objective of this step was to connect every birth to exactly one marriage. The computer attributed a birth to a marriage if the following matching criteria were fulfilled:

Table 5.3: Linkage of births to their parents' marriage.

Birth record		**Marriage record**
1)Father's forename	=	Groom's forename
2) Father's surname	=	Groom's surname
3) Mother's forename	=	Bride's forename
4) Mother's surname	=	Bride's surname

In fact, only the first two of these four criteria were rigid. In the case of the last two criteria, additional parameters were given to the computer enabling linkages to be made even if there were no entries in the fields "Mother's forename" and "Mother's surname" (but not if there was an entry which did not match the corresponding field in the marriage records). Links were also enabled in the case that the corresponding fields in the marriage records, i.e. "Bride's forename" and "Bride's surname" were also empty. This flexibility of the last two criteria was implemented so as to take into account the birth certificates that did not provide a mother's forename or surname (there are 568 records without mother's forename and 827 records without mother’s surname). For the few birth records that do not provide a father's forename and surname (81 records), no acceptance has been made because most of these records refer to an illegitimate child.

Apart from the aforementioned four basic criteria, some additional ones were also applied in order to eliminate double matches. Thus, the time interval between the marriage date and the birth date should have been greater than or equal to zero and smaller than 36 years ((date of birth- date of marriage) >=0 And <36). Another criterion was that the mother could not have exceeded the age of 50 at the birth of any of her children ([(year of birth- year of marriage)+age of bride]<50). In this last criterion an additional parameter was added to allow linkages to be done in the case that age of bride was missing.

All links that were generated in this step were inserted in a new table called “births to marriages”. Furthermore, a new field was created in the “births” table called “marriage ID”. This field was updated from the “births to marriages” table, so that in each one of the births that were linked to their marriage of origin, the identification number of the marriage record was allocated. At this point, we needed to solve the problem of the inconsistency concerning the surname with which a mother is mentioned in birth certificates. It has already been mentioned that in most cases she is referred to by her maiden surname, but there are many cases where her husband’s surname is used instead. So when the computer applies the above criteria to link birth to marriage records, it will link only those births in which the mother’s surname is her maiden surname, because criterion 4 in table 5.3 dictates that mother’s surname should be equal to bride’s surname. To take into account those cases where the mother’s surname is that of her husband, the program was run again for the remaining unlinked births, but this time criterion number 4 was removed. Some more births were linked to a marriage but still, in the end of step 1 there were 2095 birth records (out of 5202) that could not be linked to a marriage record. Step 2 is dealt with these unmatched births.

Step 2

A birth could not be linked to its marriage of origin in two situations; either the marriage took place before the starting point of the reconstitution, which is 1894, or it was performed out of the study communities. For these unlinked births, “dummy” (fake) marriages were created with groom’s names being the father’s names in the birth record, bride’s names being the mother’s names and so on. As date of marriage, the birth date of the earliest birth that linked to that marriage was used. Two new tables were created: one called “dummies”, which comprised the 815 newly created dummy marriages and one called “real and dummy marriages” which contained every record from the “marriages” and the “dummies” tables, comprising a total of 1971 marriages. From this point onwards, we attempted to connect the 2095 unlinked births to a marriage of origin from the “real and dummy marriages” table, applying the same criteria as in step 1. The new links were inserted in the “births to marriages” table and the field “marriage ID” in the “births” table was updated accordingly.

Step 2a

After all possible links of births to their parents’ marriage had been done, there remained to search for double matches, i.e. for births that had been linked to more than one marriage, and resolve them. Double matches, which in this step constituted 12.5% of all links, were traced with special queries (“find duplicates” queries) and were resolved manually. To decide which was the marriage of origin of a birth linked to more than one marriage, fields that had not been included in the matching criteria were compared, such as father’s middle name with groom’s father’s forename, mother’s middle name with bride’s father’s forename, father’s occupation with groom’s occupation and so on. When these pieces of information were missing (and that was the case with some of the birth records), the duplicates were resolved by asking local informants from Naoussa and Kostos and especially the former registrar of Naoussa. Having sorted out all double matches, the field “marriage ID” in the “births” table was updated all over again to ensure that it allocates the correct marriage of origin to every birth. In the end of this step there were 5118 births linked to their parents’ marriage and 84 births for which a marriage of origin could not be traced. The 84 unlinked births were either illegitimate ones or they are referred to persons who do not live in the two communities but they happened to baptise a child there, so that the child is registered in the books of reports.

Step 3

This step traced the birth records of grooms and brides and inserted the linked records into two separate tables, one for grooms (called “grooms-births”) and one for brides (called “brides-births”). The links were performed separately for grooms and for brides. The following matching criteria and the description of the procedure refers to the linkage of grooms to their own birth, but the same criteria were applied in the case of brides.

Marriage records		Birth records
Groom's forename	=	Forename of boy
Groom's surname	=	Surname of boy
Groom's father's forename	=	Father's forename
Groom's mother's forename	=	Mother's forename
Groom's mother's surname	=	Mother's surname

Again, only the first two criteria were rigid. The other three criteria were formulated in such a way as to enable linkages to be made even if there were no entries in the fields involved in these criteria (but not if there was an entry which did not match the corresponding field). For example, a link could not be performed if the "groom's father's forename" in the marriage record was different from the "father's forename" in the birth record, but a link could be established if one or both of these fields were empty.

On the top of the above basic criteria, some additional ones were implemented in order to depress wrong links and double matches. Hence, the real age at marriage, which was calculated as the date of marriage minus the birth date, had to be greater than 14 years and smaller than 70. Moreover, the real age at marriage should not deviate from the reported age at marriage by more than 6 years ((year of marriage- year of birth) < (age of groom + 6) And (year of marriage- year of birth) > (age of groom-6)). The same criteria were applied in the case of brides, with the only exception being that the real age at marriage had to be greater than 14 and smaller than 60, instead of 70 years.

Step 3a

Both real and dummy marriages were included in the links of step 3, although certain pieces of information necessary for the linkage of grooms' (and brides') dummy marriages to their birth, such as grooms father's forename, groom's mother's forename and surname, are not usually available in dummy marriages[21]. The lack of this information resulted in a great number of double matches, i.e. grooms (and brides) had been linked to more than one birth

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[21] It is worth remembering that the creation of dummy marriages was based on information provided in birth records. For example the groom's forename in a dummy marriage comes from the father's forename in a birth record, the bride's forename comes from the mother's forename and so on. Thus, the fields "groom's mother's forename" and "groom's mother's surname" are totally missing from dummy marriages, since there are no fields such as "father's mother's forename" and "father's mother's surname" in the birth records. The field "groom's father's forename" for dummy marriages has been taken from the field called "father's middle name" in the birth records. Yet, father's middle name is usually registered as an abbreviation, which is often ambiguous.

record. The search for double matches was carried out with the use of special queries. Double matches were resolved manually comparing the real with the reported age at marriage and taking as correct match the one where the real age at marriage (calculated as marriage date-birth date) was closer to the reported one. In the end of this step 711 birth records of grooms and 627 birth records of brides had been traced and linked to the respective marriage records. Two new fields were created in the "real and dummy marriages" table called "birth ID for grooms" and "birth ID for brides". Both fields were updated so that in every marriage record of a groom or of a bride that was linked to its birth record, the identification number of the birth record was allocated.

Step 4

This step connected grooms and brides with their death records. The following criteria were applied in the case of grooms:

Marriage record		**Death record**
Groom's forename	=	Forename of male deceased
Groom's surname	=	Surname of male deceased
Groom's father's forename	=	Middle name of male deceased

Dummy marriages are included in the marriage records in this step as well as real marriages. As was the case in previous steps, only the first two matching criteria were rigid. In the case of the last criterion additional parameters were given to the computer enabling linkages even if there were no entries in any of the fields "Groom's father's forename" and "Middle name of male deceased". This allowance was necessary because 727 out of 1971 real and dummy marriages do not provide a groom's father's forename and 203 death certificates do not provide a middle name of male deceased.

The above three basic criteria were not enough to establish correct links and, therefore, additional criteria were utilised. First of all, the date of death had to be greater than or equal to the date of marriage. Secondly, the age of deceased had to be greater than 14 years old, since it was unlikely for a younger person to be married. Another criterion is that the age of deceased had to be greater than or equal to the age of groom. However, since both these ages are reported and not necessarily real ones, some adjustment had to be made to this criterion, so as to take into account any age mis-reporting that could result in a situation where the age of deceased in the death record would be smaller than the age of the same person as groom in the marriage record. Thus, it was decided that the age of deceased had to be greater than the age that the groom had six years prior to his marriage (age of deceased > (age of groom-6 years)). An additional parameter was added to allow linkages to be made in the case that either the age of groom or the age of deceased were missing.

Furthermore, the estimated birth year from the marriage records (year of marriage – age of groom) should not deviate from the estimated birth year from the death records (year of death – age of deceased) by more than six years. I.e.: (year of marriage - age of groom) < ((year of death – age of deceased) +6) And (year of marriage - age of groom) > ((year of death – age of deceased) -6). Again, additional expressions were added to allow linkages to be done in the case that either the age of groom or the age of deceased was missing.

Trying to trace death records of brides the following criteria were applied:

Marriage record		**Death record**
Bride's forename	=	Forename of female deceased
Groom's forename	=	Husband's forename
Groom's surname	=	Husband's surname
Bride's surname	=	Maiden surname
Bride's father's forename	=	Father's forename of female

Once again, in the above set of criteria the last three are flexible so as to permit linkages to be done even if the respective fields are empty. Additional criteria were also implemented, the same ones that were used in the case of grooms. Subsequently, two new tables were created, called "grooms to deaths" and "brides to deaths" containing the linked marriage and death records for grooms and brides respectively.

Step 4a

Double matches i.e. cases where a groom's (or bride's) marriage record had been linked to more than one death record, were traced with special queries and were resolved manually. Two new fields were created in the "real and dummy marriages" table called "death ID for grooms" and "death ID for brides". These fields were updated from the newly created tables so that in every marriage record that was linked to the death records of the spouses, the identification numbers of the death records were allocated.

In the end of this step, out of 1971 real and dummy marriages, there were 541 marriages of grooms and 402 marriages of brides for whom a death had been traced, while there were only 273 marriages for which a death had been traced for both spouses. The reason that a death record could not be traced for the rest of the marriages was that most of the brides and grooms whose marriage took place towards the end of the study period were still alive in 1998, the year that our study period ends. Moreover, the excess emigration that characterised the examined communities meant that even deaths that occurred in the early years of the study period could not be traced, since they happened outside of the communities.

Step 5

This step, which connects births to their deaths, was somewhat problematic for married females. This is because the death record of a married female does not usually provide information on her maiden surname or on her father's forename; and without these pieces of information a death record cannot be linked to a birth record. Therefore, the majority of birth-to-death links for females concern females who died single. For males, things are more straightforward, since the surname of a male does not change upon marriage and that makes it easier to link birth to death records. However, in the case of males the middle name of the deceased (that is the father's forename), which is also an essential matching criterion, is consistently reported only for young children. A father's forename, or at least an abbreviation of it which is unambiguous, is reported only in 73.3% of death records of those older than 14 years, whereas this percentage is 88.3 for children younger than 15 years. Bearing these shortcomings of our data in mind, the following criteria were applied trying to trace death records of male births:

Birth record		**Death record**
Forename of boy	=	Forename of male deceased
Surname of boy	=	Surname of male deceased
Father's forename	=	Middle name of deceased

The last criterion is flexible so as to permit linkages even if either of the fields "father's forename" and "middle name of deceased" are empty. Moreover, two additional criteria were posed. Firstly, the date of death had to be greater than or equal to the birth date. Secondly, the estimated birth year from the death record (year of death –age of deceased) should not deviate from the year of birth, as this is found in the birth record, by more than three years. I.e.: (year of death - age of deceased) < (year of birth +3) And (year of death - age of deceased) >(year of birth -3).

In the case of females the following criteria were used:

Birth record		**Death record**
Forename of girl	=	Forename of female deceased
Surname of girl	=	Maiden surname
Father's forename	=	Father's forename

For the last criterion the same rules of flexibility were applied as in the case of males. Additional criteria were also implemented, the same ones that were used in the case of males.

Step 5a

Double matches were traced bi-directionally (i.e. both in the case that a birth was linked to more than one death and in the case that a death was linked to more than one birth) through "find duplicates" queries. All double matches were resolved manually by comparing the estimated birth date from the death record (date of death –age of deceased) with the birth date as found in the birth record and taking as a correct match the one in which those two dates had the smaller deviation.

Step 6

This step detects any remarriages and inserts the relevant information in two new tables called "male remarriages" and "female remarriages". First an exact copy of the table "marriages" was created and was named "mirror marriages". Trying to detect remarriages of males, the following criteria were applied:

Marriage record from "marriages"		**Marriage record from "mirror marriages"**
Groom's forename	=	Groom's forename
Groom's surname	=	Groom's surname
Groom's father's forename	=	Groom's father's forename
Groom's mother's forename	=	Groom's mother's forename

Since 4.6% of marriage records do not provide a groom's father's forename and 37.3% do not provide a groom's mother's forename, in the above set of criteria the last two are flexible so as to permit linkages even if the respective fields are empty. As is the usual practice, additional criteria need be implemented in order to establish correct links between the two record-sets (in this case correct remarriages of the same person). Since in this step the records in each record-set are exactly the same, a first concern is to apply a criterion that will

prevent a marriage in one table from linking to its mirror marriage in the other table. This has been done by linking only marriages whose identification number is different: (marriages ID <> mirror marriages ID). Moreover, having decided that we shall use the table “marriages” as the record-set containing the first marriages and the table “mirror marriages” as the record-set with the remarriages, the date of marriage in a record from “mirror marriages” had to be greater than the date of marriage in the matching record from “marriages”: (mirror marriages date of marriage >marriages date of marriage).

A last criterion is that the estimated birth year should not differ in the two records by more than 5 years. For simplicity in the depiction of this criterion in the following argument, 1 stands for records coming from “marriages” and 2 for records coming from “mirror marriages”: (year of marriage (1)- age of groom(1) > (year of marriage (2)- age of groom(2))-5) And (year of marriage (1)- age of groom(1) < (year of marriage (2)- age of groom(2))+5).

In order to trace female remarriages the same criteria were used. It is worth noting that in the marriage certificates, whenever a female remarriage is registered, the bride’s surname is that of her father (i.e. her maiden surname) and not that of her last husband. Whenever we tried to use the groom’s surname (1)= bride’s surname (2) as a criterion instead of bride’s surname (1) = bride’s surname (2), no remarriages were found.

In the end of this step 62 male and 28 female remarriages had been traced and input in the relevant tables. Among these remarriages is also contained every remarriage that had not been traced with the above-described procedure but for which there was a note in the marriage certificate mentioning that it was a second or third marriage. In nine cases the remarriage was between partners who were both previously married. That makes (1156-((62+28)-9)) 1069 out of the 1156 marriages (or 92.5%) primary ones i.e. marriages where both partners married for the first time.

Step 7

Although in every single step of family reconstitution additional criteria were applied so as to prevent the linkage of records in the case that a logical error was involved, there was still a possibility that such errors had crept in, not in any single step but in the reconstitution seen as an entity. Therefore, the results of the reconstitution were subjected to a series of tests for logical errors that the additional criteria in the step by step procedure, as described above, could not have traced. The purpose of these tests was to ensure that:

I) A birth could not have occurred after the mother's death.

II) A birth could not have taken place after nine months from the father's death.

III) The interval between two successive births is greater than 9 months.

IV) The mother could not have exceeded the age of 50 at the birth of any of her children. Although this criterion was applied in step 1, when linking births to their marriage of origin, it could not be applied when the marriage of origin was a dummy one, since age of bride is not mentioned in dummy marriages. Thus, this criterion was re-imposed at this stage, calculating the age of mother at birth not from her reported age at marriage (age of mother at birth =(year of birth- year of marriage)+age of bride), as we did in step 1, but from her linked birth date (age of mother at birth =(birth date of child- birth date of mother), where available. A problem with this criterion is that it excludes from the analysis any families in which the woman bore a child after the age of 50. Although the age of 50 is considered to be the biological limit for the fecund life of a woman, in our data-set there were at least two indubitable cases where a woman bore children at her early fifties. However, we chose to miss those valid cases, rather than include some cases where the linkage was wrong.

V) If a birth was linked to a death and was also linked to a marriage, the marriage had to be linked to the same death.

After inconsistencies detected by the above series of tests had been resolved, the linking procedure of the reconstitution was over. Table 5.4 summarises the results of the linking procedure. In the first row of this table the initial data are displayed together with the "dummy marriages" which were created in step 2. All data shown in the first row of table 5.4 were used as the raw material for the reconstitution. The type of new tables, which were created through the linking procedure, can be seen under the heading "type of link", while the number of records that each of these tables contains can be found under the "number of links" heading.

Table 5.4: Summary of the linking procedure results.

Number of records: Births: **5202** Real Marriages: **1156** Dummy marriages: **815** Deaths: **2439**		
Type of link	**Number of links**	**Notes**
Births to their parents' marriage	5118	2011 births link to dummy

		marriages
Grooms to their own births	711	142 grooms are from dummy marriages
Brides to their own births	627	85 brides are from dummy marriages
Grooms to their deaths	541	211 grooms are from dummy marriages
Brides to their deaths	402	143 brides are from dummy marriages
Male births to deaths	503	
Female births to deaths	381	
Male remarriages	62	Only real marriages are taken into account
Female remarriages	28	Only real marriages are taken into account

Source: Naoussa and Kostos family reconstitution.

5.6 Family Reconstitution Forms (FRFs)

When the linking procedure was completed, all necessary information was transferred from the tables created during the linking procedure to a new one, which was named "frfs", standing for family reconstitution forms. The base for this table was the 1971 marriages contained in the table "real and dummy marriages". Additional information, compiled from other tables, included the birth and death dates of the spouses, the number of children each couple had had, information on these children such as their sex, their birth and death dates and their marriage Ids, if they got married. In brief, table “frfs” contains every piece of information that a conventional family reconstitution form, like the one in figure 5.1, contains. The main difference is that, instead of having thousands of paper slips, one only has one table in the computer which accommodates 1971 records and each record contains all the fields that a conventional slip would contain. In this way one can manipulate family reconstitution forms in only a tiny fraction of the time that the manual method requires.

Table “frfs” was then transferred to a statistical program (Stata 5.0), which made it easier to create some new fields (or new variables, if one wants to switch from the database terminology to the statistical one). These new variables, such as age of mother at the birth of each child, birth-intervals and years of contribution of married women to the fecund five-year age groups, were necessary for the subsequent analysis of fertility, nuptiality and mortality.

5.7 A general assessment of the reconstituted data

Before proceeding with the analysis of the reconstituted couples, it would be useful to make a rough evaluation of the reliability of our data. A general assessment of the quality of the registers was made in chapter 2, while a rough estimation of the under-registration of vital events was attempted in chapter 3. As far as the former is concerned it was seen in chapter 2 that no major fluctuations were observed in the count of births from one year to another, except for the year 1898 for which the civil registration book is missing and only half of the expected births have been traced from other sources. In the case of deaths 1898 is a totally missing year but other than that there are no serious oscillations from one year to another with an exception being the year 1942. For that year there are more than three times more deaths than in the two adjacent years (65 deaths for 1942 compared to an average of 19.5 for 1941 and 1943), but this is due to a famine that hit the whole country that year. In the case of marriages 1898 is also a missing year. Apart from that, a pattern of erratic fluctuations is observed but this is not because of mis-reporting of the marriages but due to a rather superstitious wedding pattern of the population (see chapter 3, section 3.3.1).

The lack of erratic fluctuations in the annual series of vital events could be an indication that registration is fairly consistent from one year to another, but it does not assure us that registration is complete. It might be the case that there was a consistent under-registration all over the study period and thus major fluctuations are not observed. However, in chapter 3 it was established that at least in Naoussa registration of vital events did not suffer from any visible misreporting and in any case it was more complete from that of other parts of Greece. These remarks were made by using as a measure of comparison crude rates of births and deaths for Greece that had been previously adjusted for under-registration by Valaoras and by comparing these rates with the unadjusted rates that we derived for Naoussa for the study period.

However, even if the count of vital events is accurate, it does not guarantee that a family reconstitution based on these vital events will be reliable. The reliability of a reconstitution can be judged by the extent to which the marriages are fully reconstituted. In turn, a fully reconstituted marriage is considered one for which the beginning and the end of marital union is known, the ages of spouses at both ends of the union are known and all births to this marriage have been found and linked to it. That implies that missing marriages do not affect the reliability of the reconstitution. A failure to register marriages reduces the number of reconstituted couples and as a result many of the other vital events, i.e. births and deaths, will remain unusable, but it does not reduce the accuracy of the reconstitution. On the other hand, missing births and deaths have a detrimental effect on the reliability of reconstitution since they will result in an underestimation of most of the fertility and mortality indices.

The fact that 98.4% of the total registered births (5118 out of 5202) are linked to a marriage (real or dummy) is not enough to establish that the number of children attributed to each couple is the total number of children the couple ever had. A way to trace if there were children born to a couple, which for various reasons have not been linked to that couple, is the intergenesic interval test. Customarily, this test, as used by the Cambridge Group, denotes that if the interval between two successive birth events is more than 12 years then a missing birth must have occurred in between and the couple in question is excluded from the fertility analysis. This test makes sense when used in populations acting under natural fertility, but is of no avail when one studies a contemporary population whose fertility behaviour is controlled. Moreover, our population presents some particularities that make the birth-interval test useless even for the early years of the study period, the end of the 19th century, where most probably deliberate birth control had not been introduced yet. What is so particular about the study population is that at the beginning of the 20th century a lot of people from the two communities and especially from Naoussa emigrated to the USA. Many of these emigrants, who were almost exclusively males, were married in their community. These people visited their home every several years before their final return and in these infrequent visits they procreated and grew their family. Therefore, birth-intervals in our data set are long even in the early years of the study period. We were able to confirm that this is the case by asking local informants, who verify that indeed some families had children in infrequent intervals and with many years' space between them. However, the issue is that there is no concrete criterion to judge if there are any missing births to our reconstituted couples.

With respect to deaths, in family reconstitution studies there is no standard proportion of the total marriages or births that should link to a death. Provided that the registered vital events are complete, the proportion of marriages or births that will link to a death depends on two factors: the length of the study period and the mortality level of the population. Both these factors have to do with the truncation effect, which occurs in the end of the study period. If the study period is short, say 100 years, there will be few deaths for the marriages (and even less for the births) that took place in the last 20 years of the study period. On the other hand, if the study period expands to, say, 200 years, there will still be few deaths for the marriages (and births) that took place in the last 20 years of the study period, but in this case the proportion of marriages with the death of both spouses known (i.e. with the end of marital union known) will be larger for the total period under consideration.

This truncation effect has a greater impact on contemporary populations with high life expectancy than on historical ones, where life expectancy is low. For example in our study, someone who was born in 1930 is more likely to be alive by the end of the century (1998), whereas if our study period was one century back, say from 1794 to 1898, someone who was born in 1830 would be more likely to have died by 1898. As a result, the proportion of marriages with the end of union known is smaller in contemporary populations than in historical ones. This is the second disadvantage that contemporary populations have when they are used in family reconstitution studies compared with historical populations.

Table 5.5 presents the number of couples in our data set broken down by their reconstitution status.

Table 5.5: Real and dummy marriages (in first and second row respectively) by availability of information on both ends of marital union.

	End of union known		**End of union unknown**	**Row Totals**
	Wife's age at dissolution known	Wife's age at dissolution unknown		
Beginning of union known	210		946	**1156**
Beginning of union unknown	101	14	700	**815**

Source: Naoussa and Kostos family reconstitution.

The fully reconstituted couples are the 210 for whom all necessary information at both ends of the marital union is known. These are also the only couples that will be used for the analysis of fertility, which requires stricter criteria of selection than mortality and nuptiality. The use of only 210 couples for the analysis of fertility entails a selection effect, since these couples are the less mobile ones. This selection effect is inherent to the method of family reconstitution, as was discussed in section 5.2. Yet, the extent of the bias that this selection entails depends on how different was the reproductive behaviour of migrants compared to that of non-migrants. Although there is no accurate way to define this based on the material of family reconstitution, there is a test that can be used to compare, in a very rough manner, the reproductive behaviour of migrants with that of non-migrants. This test consists of comparing the birth intervals of migrants to those of non-migrants.

In applying the test a first concern is to define who is a migrant and who is a non-migrant. As migrants, for the purpose of this test, we take the “leavers”, that is, those for whom a marriage certificate is available, but not a death certificate. Those who married between 1894 and 1933 must have ended their marital union by 1998, when our data stop[22]. Therefore if the end of a marital union of those belonging to the marriage cohort 1894-1933 is unknown, that is if a death certificate for none of the spouses exists, then the couple should have left the study communities before dying. On the other hand, couples for which both the

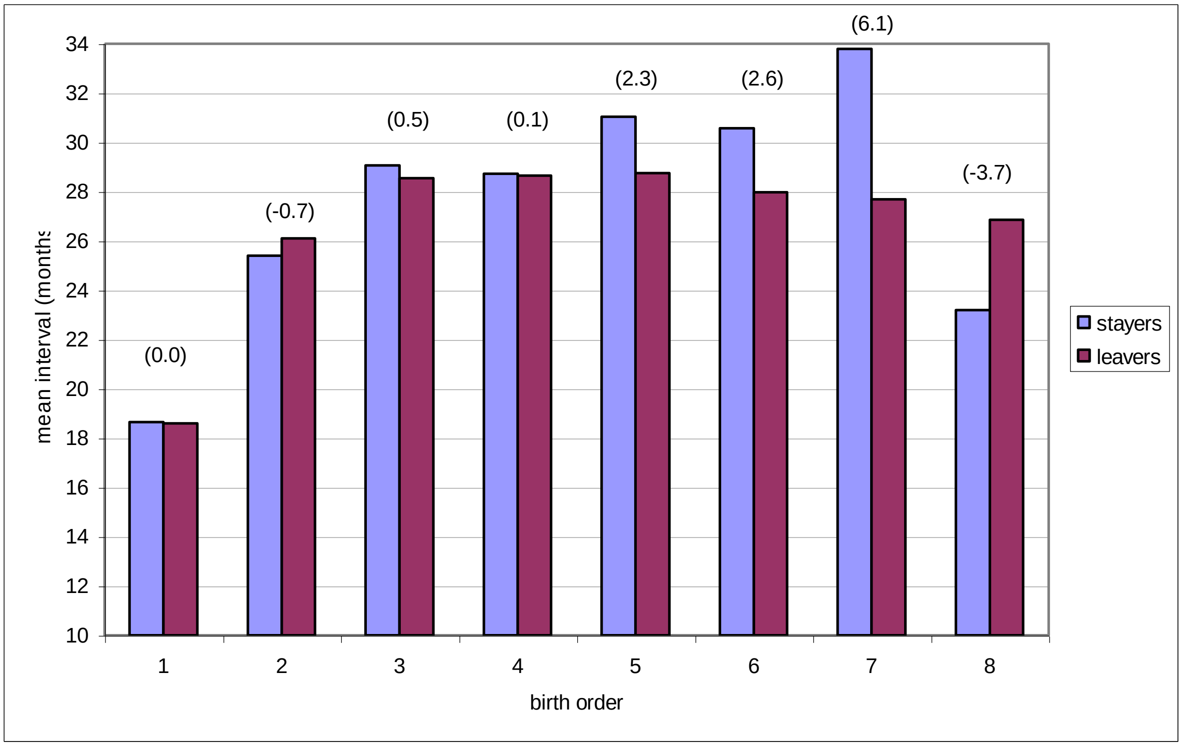
[22] Even if the groom, who was usually the oldest of the spouses, was 20 years old in 1933 (in fact mean age for bachelors was always above 27 as will be seen in the next chapter), he is expected to be dead by 1998, assuming a terminal age of 85 years.

beginning and the end of the marital union are known are considered as “stayers”, i.e. non-migrants.

Based on this definition of migrants and non-migrants, it was found that out of the 470 couples who married between 1894 and 1933, 183 were “stayers” and 287 were “leavers”. An analysis of birth intervals showed little difference between the birth intervals of those two categories. The mean interval between successive births from parity 0 to parity 13 (the highest parity encountered in our data) was 29.4 months for the “stayers” and 28.6 months for the “leavers”. These figures have been reached after excluding any prenuptially conceived births from the calculations (that is, first births that occurred within 240 days from the wedding date) and are weighed by the number of cases involved in each birth order. Since the difference between “stayers” and “leavers” is less than a month, this could be an indication that the level of fertility did not differ substantially from “stayers” to “leavers”.

However, this general comparison of the mean length of birth intervals may be misleading and further considerations must be taken into account. One has to bear in mind that the last birth interval is usually longer than the rest ones because of the physiology of reproduction (Leridon, 1977:160). The mean length of birth intervals of the “stayers” includes the last birth intervals, but this may not be the case with “leavers” since it is not known if the last recorded birth to a “leaver” is indeed her last birth. Consequently, by comparing the mean birth interval of “stayers” and “leavers” irrespective of birth order a source of bias may be introduced. A better way to compare the length of birth intervals between the two categories is to contrast intervals of the same birth order after making sure that these intervals do not belong to last births. This has been done in figure 5.2. The display of results stops at parity eight because for higher parities the number of cases is too small to give reliable comparisons.

Figure 5.2: Mean birth intervals in completed months by mobility status of the parents. Last intervals are excluded. Prenuptially conceived births are excluded. Marriage cohorts from Naoussa and Kostos 1894-1933. In parentheses the difference in months (stayers-leavers).



Note: number of cases on which birth intervals are based:

Birth order	1	2	3	4	5	6	7	8
"Stayers"	133	142	122	108	86	61	32	19
"Leavers"	123	123	102	83	68	50	40	31

Source: Naoussa and Kostos family reconstitution.

In most parities "stayers" had longer birth intervals than "leavers", but only in three parities this difference is significant (over two months). Moreover, this pattern of longer birth intervals for "stayers" is not consistent, since in at least two cases (in parity two and eight) "leavers" exhibited longer intervals than "stayers" did. Overall, the average difference in birth intervals between the two groups ("stayers"- "leavers"), using the data set of figure 5.2 and weighing the intervals by the number of cases involved in each birth order, is 0.8 months. Therefore, it appears that "stayers" tended to exhibit longer birth intervals than "leavers". This could signify lower fertility for the "stayers" but only if couples in both groups made no effort to stop childbearing before the end of the woman's reproductive span. However, the difference in the fertility level of the two groups, judging from the difference in their birth intervals, does not seem to have been substantial. Consequently, it would not be fallacious to argue that the 210 fully reconstituted couples that will be used for the study of fertility in a later chapter are not atypical of the population of the two examined communities.

It is also worth noting that only 18.2% of the real marriages (210 out of 1156) are fully reconstituted (see table 5.5). In comparison, in the reconstitution of the population of Mykonos by Hionidou (1993:115), in which the study period was 100 years extending from 1859 to 1959, the percentage of fully reconstituted couples was 25.1. That shows that the improvement in life expectancy that a forty year shift in the study period entails (1894-1998 our study period, as opposed to 1859-1959 of Hionidou’s study period) can reduce substantially the proportion of fully reconstituted couples.

In table 5.5 the end of marital union is considered known when the death records of both spouses are available or, where only the death record of one spouse exists, information is available indicating that the deceased spouse was the first of the spouses to die. Such information can be either a remarriage of the surviving spouse or an indication in the death certificate of the deceased that he or she was married (i.e. not widowed) when death occurred. In the 210 cases of fully reconstituted marriages the age of both spouses at the end of marital union is known but only that of wife is of interest for the fertility analysis, thus the reference in table 5.5. The age of spouses in the beginning of union is also known for 99% of real marriages. 47% of these ages are real, i.e. they have been calculated as date of marriage-date of birth. However, one of the advantages of our data compared with studies referring to historical populations, as the reconstitution studies of English parishes for example, is that the ages of the spouses at marriage are reported in the marriage certificates. If the reported age at marriage is accurate, it can be used in the family reconstitution in case that the real age is unknown. Indeed, in our study the difference between the real and reported age at marriage is surprisingly negligible, as the very next chapter will show.

5.8 Family reconstitution and statistical inference.

It has already been mentioned that due to the time-consuming and very tedious nature of the work that reconstitution requires, the method can only be applied to relatively small population sizes. This limitation is more restrictive when the method is undertaken by an individual researcher. Therefore, a common problem to many family reconstitution studies is the small number of reconstituted families and consequently the results that are based on those small numbers. This problem of statistical inference is especially felt in the analysis of fertility, which requires stricter criteria of selection than mortality and nuptiality. Several reconstitution studies report every result based on more than 20 cases but they treat with caution results based on fewer than 50 or fewer than 40 cases. (see for example Knodel, 1988; Reay, 1996 and Hionidou 1993). Some of them report results based on fewer than 20 cases, like for example the study of Hionidou (1993) and of Reay (1996) but either treat them with caution or do not take them into account in their analysis.

This study adopts a similar approach and considers results based on more than 20 cases as indicative estimators of the measured demographic trait. Results based on less than 20 cases are treated with caution. However, an attempt to take into consideration statistical significance has been made whenever results are based on few cases. Thus, for certain point estimates of a mean, as for example mean family size or mean birth interval, confidence intervals have been constructed and are shown in the tables thus providing a measure of how precise are the estimators. In other tables the standard deviation from the mean has been used as a measure of statistical precision. Some results are not statistically significant. Nevertheless, when these results follow a certain pattern over a period of time, they might be indicative of a genuine trend and therefore we consider it purposeful to comment on them.

CHAPTER 6: NUPTIALITY

The role of nuptiality in demographic transition and the patterns that prevailed in early modern Europe were briefly mentioned in chapter 1. In chapter 3, based on aggregate analysis, the marriage patterns that prevailed in Greece and the Cyclades since the end of the 19th century were described and it was established that the marriage pattern of the Cyclades differed moderately from that of mainland Greece for most of the examined period. This chapter deals with more particular issues of nuptiality in the two Cycladic communities, Naoussa and Kostos, by making use of the family reconstitution results. The examined issues start with the seasonal variation of marriages over the calendar year and the factors that cause this variation. Further on, family reconstitution enables us to test how accurate is the reported age at marriage and how well reported is the order of marriage. Following that, the trends in age at marriage and related matters are examined, such as age differentials among different occupational groups and age gap between spouses, over the 105 years of the examined period. Moreover, certain issues related to family formation and dissolution are covered, such as marital dissolution and remarriage, and illegitimacy and bridal pregnancy.

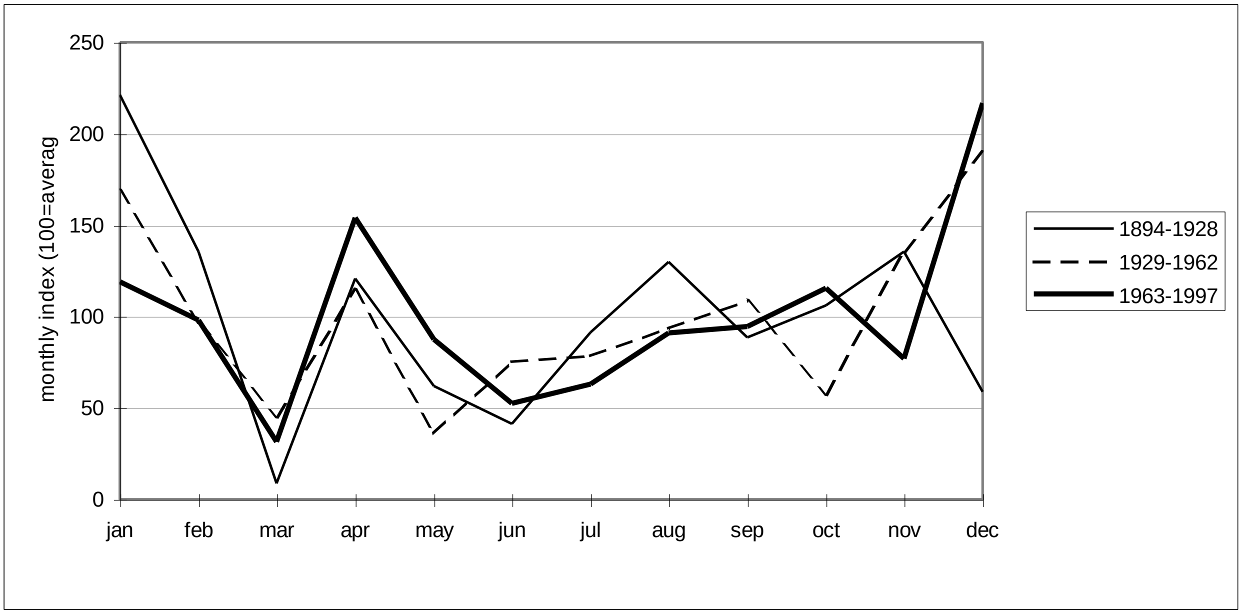
6.1 Seasonality of marriages

Seasonal variations of vital events can sometimes shed light on the community life and on the changes it has undergone over time, especially if these variations follow a pattern that can be interpreted. To study the distribution of vital events within a calendar year, in this and in subsequent chapters, a monthly index is being used. An index of 100 stands for the average number of events, marriages for example, in each month if marriages were evenly distributed throughout the year. An index higher than 100 implies a higher than average number of events in that month, higher by a percentage equal to the units following the 100 (for example a monthly index of 176 marriages indicates that in that month there were 76% more marriages than average). Indexes lower than 100 are interpreted in like manner. The study period 1894-1997 has been divided into three equal sub-periods, that is 1894-1928, 1929-1962 and 1963-1997, so as to examine changes in seasonality over time.

Figure 6.1 reveals that seasonal variations in marriages were clearly determined by two factors: religious regulations and the annual working cycle. The canon rules of the Orthodox Church regard as inappropriate for weddings the periods of Lent and Advent because of the fasting, which includes sexual abstinence and a more general soul-searching, that takes place in these periods. In all sub-periods there are almost no marriages in March, which is the month that corresponds to the Lent period. The impressive rise in marriages that take place in April is associated with the Easter festival and the end of the fasting period, while the peak in December-January follows the advent period immediately after Christmas.

Yet, it is noteworthy that in the first sub-period (1894-1928) relatively few marriages took place in December, in contrast with what happened in the next two sub-periods. In fact, the peaks in December in the periods 1929-1962 and 1963-1997 are misleading since December consists of marriages that in their overwhelming majority (85.5%) took place after (or on) the 25^{th} of December. In any case this differentiation between the first sub-period (1894-1928) and the later ones might have to do with a changing economic structure of the society. While in the first sub-period (1894-1928) the peak was in January and February, in the following sub-periods this peak has moved to January and December. A possible explanation for this is that January and February in a rural society are the least demanding months of the year, as far as fieldwork is concerned, and consequently marriages were concentrated on those two months. This pattern started to change over time as the society shifted to other activities and ceased to be predominantly agricultural. An after Christmas peak was established presumably because this time of the year is more convenient for people the occupation of whom is bound with the modern holidays and vacations rather than with the agricultural annual cycle.

Figure 6.1: Seasonality of marriages; Naousssa and Kostos 1894-1997



Source: elaboration of 1148 marriage records

In order to compare the seasonality of different sub-periods an index that summarises the extent of seasonal variations in each of these periods is being used. This index is the average deviation of the monthly indexes from their mean (which is 100). In other words we take the sum of the absolute differences between 100 and each monthly index and we divide this sum by 12. The greater the index, the greater the seasonality exhibited by the marriages within a calendar year will be.

Table 6.1: Extent of seasonality of marriages; Naoussa and Kostos 1894-1997.

Year of marriage	Index of the extent of seasonality
1894-1928	42
1929-1962	36
1963-1997	34

Source: elaboration of 1148 marriage records

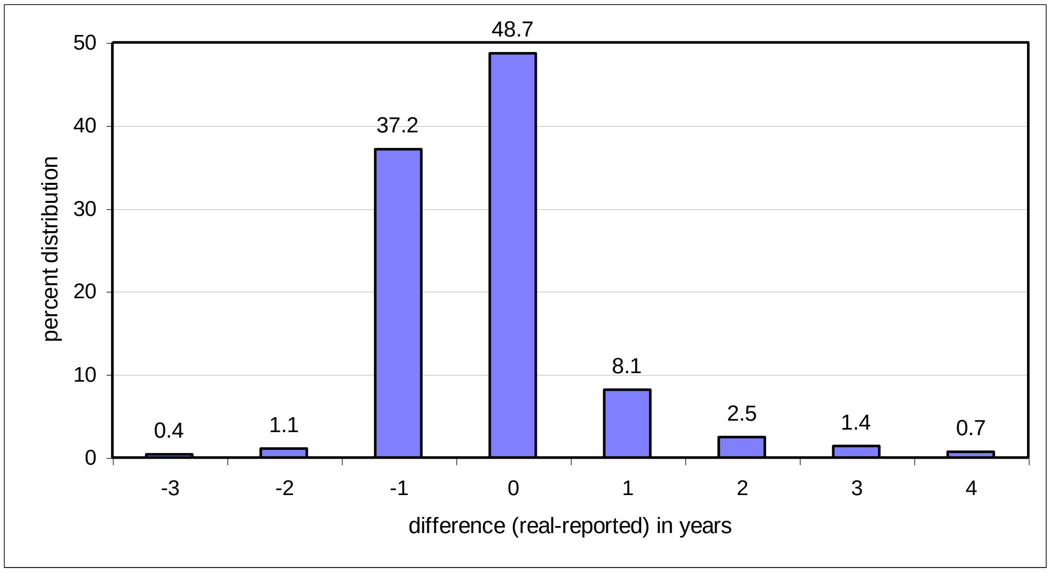
According to table 6.1 the examined communities demonstrated greater seasonality in the early years of the study period, while over time marriages tend to be more evenly distributed within calendar years. This may signify a change in the traditional working cycle as the society ceased to be predominantly agricultural and came to base its subsistence on tourism, as was seen in chapter 2. However, although seasonal variations in marriages are less sharp in the most recent period (1963-1997), these variations still exist and the pattern of seasonality remains almost intact in all three periods as can be seen in figure 6.1. An explanation for this might be that the annual working cycle in an agricultural society coincides with that of a society that lives on tourism. Summer months are the busiest in both societies and thus they have fewer marriages than average.

6.2 Real versus reported age at marriage

The accuracy of the reported age at marriage is an important issue because many published statistics, and in particular statistics on the natural movement of the population, make use of the reported age at marriage to calculate demographic indices. In our study the accuracy of the reported ages will also determine whether we can use them in cases that the real ages are not available from family reconstitution. The term *real age at marriage* in family reconstitution refers to the age at marriage calculated from the linked marriage and birth certificates as the date of marriage minus the date of birth of the person in question. Although real age is always preferable to the reported, its availability is restricted to a fraction of the real marriages (in our case real age is available for 49% of grooms and 47% of brides) because of two main reasons. The first reason is the truncation effect at the beginning of the study period. For example if our data start in 1894, those who were married in 1894 and the immediate subsequent years, would have been born several years before that date and consequently their birth certificates cannot be traced. Only after 17-20 years from the starting point of the reconstitution will some marriages be linked to a birth certificate and that only for those who were married at a young age. Therefore a mean age at marriage estimated from these links would be a gross under-estimation of the mean age at marriage of the entire population. The second reason that a birth record cannot be traced and linked to a marriage and thus a real age at marriage calculated is because grooms or brides have been born outside of the study communities or, for any other reason, their birth has not been recorded in the registration system of the study area.

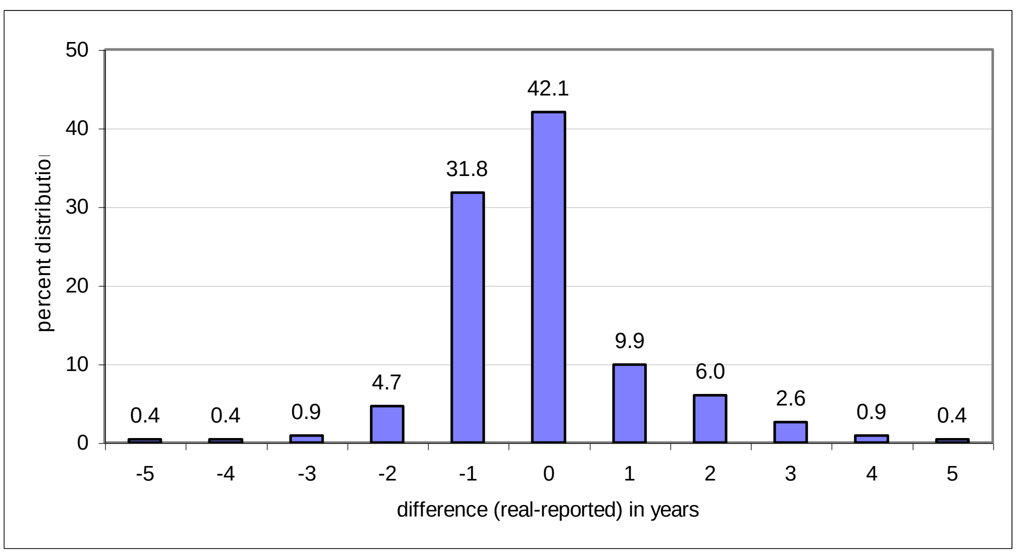
Hence, for the majority of marriages, for which a real age is not available, it is very convenient to use the reported age to analyse trends and patterns in nuptiality, since the certificates provide it. However, before using the reported ages at marriage, it should be inferred how reliable are these values, i.e. how close they are to the real ages. Figures 6.2 and 6.3 give the distribution of the inaccuracy between reported and real age in years wherever both these ages are available. It is worth noting that in the calculations involved, real ages at marriage are in completed years. Thus, for example, if the real age of a bride as found by her date of marriage minus her date of birth was 20.9 years, her age in completed years would be 20.

Figure 6.2: Percent distribution of the deviation of the reported age at marriage from the real one for grooms; Naoussa and Kostos 1894-1998.



Source: Naoussa and Kostos family reconstitution; N=569.

Figure 6.3: Percent distribution of the deviation of the reported age at marriage from the real one for brides; Naoussa and Kostos 1894-1998.



Source: Naoussa and Kostos family reconstitution; N=535.

It seems that age reporting of the newly married spouses was quite accurate in the two communities under consideration, since 94% of males and 84% of females reported their age at marriage with an accuracy of ±1 year. An interesting feature of the age reporting is that those who overstated their age were more numerous than those who understated their age at marriage. 38.6% of grooms and 38.1% of brides overstated their age, while only 12.7% of grooms and 19.8% of brides reported an age lower than their real one. This overstating of age reporting is a usual practice in Greece because of the way people calculate their age. They usually calculate their age by subtracting their year of birth from the current year without taking into account any dates. For example if someone was born on the 30th of June 1940 he will report his age as 20 years in January 1960, although in complete years he is 19. In other words they report their age in calendar years rather than age last birthday. As a result a part of the population is always reported to be older than it is because a person's age in calendar years is either equal to or greater than his/her age in complete years, but never lower. This pattern of age reporting has also been found to hold in Mykonos for periods with relatively good civil registration (Hionidou, 1993:175-176).

Another inference that can be made from the above figures (6.2 and 6.3) is that males are usually more trustworthy age reporters than females. This inference can be established by two facts. First, the discrepancy between real and reported age at marriage for males ranges from –3 to 4 years while for females ranges from –5 to 5 years. The percentage of those extreme age misreporters, although negligible for either sex, is also greater for females as is shown in figures 6.2 and 6.3. Secondly, the percentage of males whose reported age corresponds to their real one is somewhat higher than that of females (48.7% as opposed to 42.1%).

Table 6.2: Difference between mean real and mean reported age at marriage for grooms and brides; Naoussa and Kostos 1894-1998. (Only marriages with both real and reported ages available.)

Years	Cases	Mean real-mean reported age for grooms	Cases	Mean real-mean reported age for brides
1894-99				
1900-09				
1910-19	9	-0.22	23	-0.78
1920-29	80	0.45	68	0.54
1930-39	68	-0.01	69	0.22
1940-49	82	-0.12	84	0.12
1950-59	97	-0.44	83	-0.21
1960-69	61	-0.33	58	-0.36
1970-79	67	-0.45	61	-0.48
1980-89	64	-0.44	52	-0.50
1990-98	37	-0.43	37	-0.41
1894-1998	**565**	**-0.20**	**535**	**-0.12**

Source: Naoussa and Kostos family reconstitution.

Table 6.2 seems to confirm the above conclusions. Most of the time the reported age at marriage is greater than the real one for both sexes because of the aforementioned practice of the population to report age in calendar years rather than age last birthday. However, there are persons who understate their age and hence in some decades the reported age at marriage is slightly lower than the real one especially in the case of females. What is more important though in table 6.2 is that the mean difference between real and reported age at marriage never reaches ±1 year in any decade from 1910 to 1998 and that fact leads us to believe that the reported age can be regarded as accurate enough to be used when the real age is missing.

6.3 Age at first marriage

When age at first marriage for Naoussa and Kostos from aggregate data was examined in chapter 3, two issues regarding the reliability of data concerned us. The first was if the reported ages on marriage certificates, which were used to derive time series of mean age at first marriage, were accurate enough. The previous section showed that reported ages are quite reliable, since the difference between real and reported age at marriage was negligible all over the study period. The second concern was whether the failure of the certificates to state the order of marriage was so high as to distort the results by including second and third marriages, which would inflate the apparent age at first marriage. The 1156 marriage certificates of the study period (1894-1998) mention in their notes only 21 male and 20 female remarriages, and the mean age at first marriage as shown in figure 3.3 of chapter 3 was based on those data. Now, using the results of family reconstitution together with the notes on marriage certificates, 62 male and 28 female remarriages were traced. Table 6.3 is based on calculations that exclude all these remarriages, to compute mean and median age at first marriage for every decade from 1894 to 1998 for the two study communities.

The median age at marriage has been included because when the distribution of ages is not normal, the statistical mean is biased towards extreme values and therefore is not a representative measure of the central tendency. The median age on the other hand, will give us a point at both sides of which 50% of marriage ages will lie, the ages being sorted from the smallest to the greatest. Thus, the median in this case may be a better measure of the central tendency than the mean.

Another point in the construction of table 6.3 is that mean and median ages for both sexes are the reported ones but mean ages in parentheses are adjusted to take into account age misreporting as this was revealed in table 6.2. For the first two decades of the examine period, when a difference between real and reported age at marriage is not available, no adjustment has been made.

Table 6.3: Mean and median reported age at first marriage for grooms and brides. In parentheses ages adjusted to allow for age misstatement; Naoussa and Kostos 1894-1998.

Years	Number of cases	Grooms' mean	Grooms' median	Number of cases	Brides' mean	Brides' median
1894-99	75	28.9	27.0	75	24.0	22.0
1900-09	110	30.2	28.0	123	24.2	23.0
1910-19	78	29.4 (29.2)	27.0	82	23.8 (23.0)	22.0
1920-29	119	28.9 (29.3)	26.0	126	23.5 (24.0)	22.0
1930-39	100	27.7 (27.7)	26.0	103	22.9 (23.2)	22.0
1940-49	115	28.8 (28.6)	28.0	120	24.1 (24.2)	23.0
1950-59	120	29.9 (29.4)	30.0	122	23.7 (23.5)	23.0
1960-69	80	29.1 (28.8)	28.5	81	23.2 (22.8)	22.0
1970-79	84	27.8 (27.3)	27.0	84	21.8 (21.3)	22.0
1980-89	103	29.0 (28.6)	28.0	106	22.8 (22.3)	22.0
1990-98	87	29.8 (29.3)	29.0	85	25.6 (25.2)	24.0
1894-1998	**1071**	**29.1 (28.9)**	**28.0**	**1107**	**23.6 (23.4)**	**22.0**

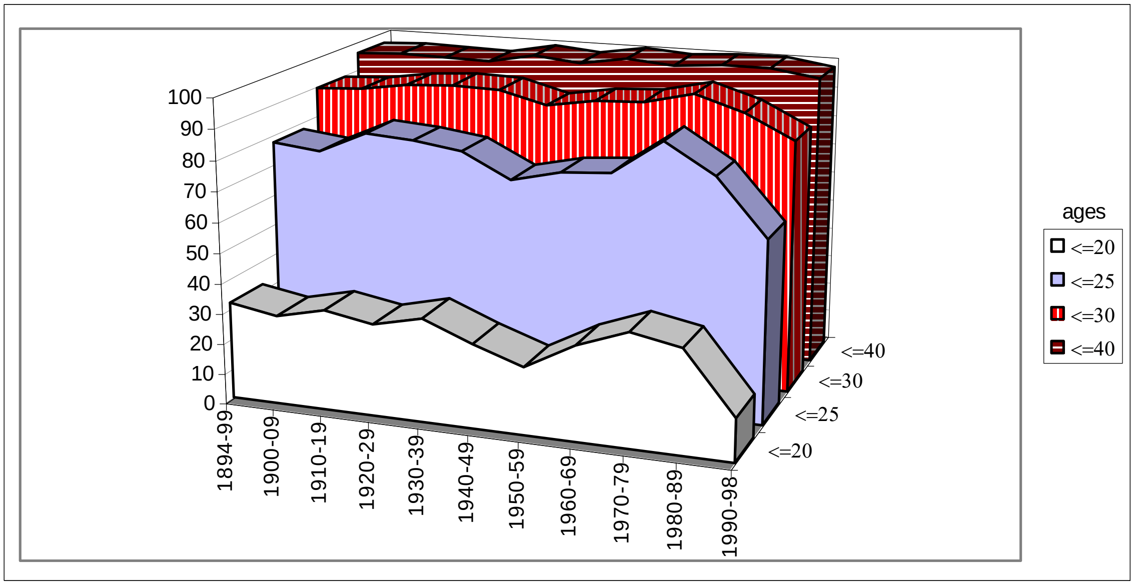
Source: Naoussa and Kostos family reconstitution.

Basically, values of mean age in table 6.3 do not differ from those of figure 3.3 of chapter 3. In most of the study period bachelors married at a median age of around 28, while the mean age was almost always one to two years greater indicating the existence of several marriages at older ages. The only decade the median was greater than the mean for males, was the 1950s, when many marriages, which had been postponed due to the warfare period 1940-49, took place. Spinsters until the 1970s entered marriage five to six years younger than bachelors, on average at 22 to 23 years old, and fluctuations in female age at marriage follow the same tendency as in the case of males. Nevertheless, the female age at first marriage rose sharply in the 1990s, resulting in a narrower age gap than that in the past. Thus, in the last decade of the study period the age gap between those who entered marriage for first time was around four years (see also table 6.4).

Generally, both sexes exhibit moderate fluctuations in age at marriage throughout the observed period, but it is noteworthy that no definite trend can be established for males while for females an ascending trend in the 1990s resulted in a female age at marriage higher than ever in the past 105 years.

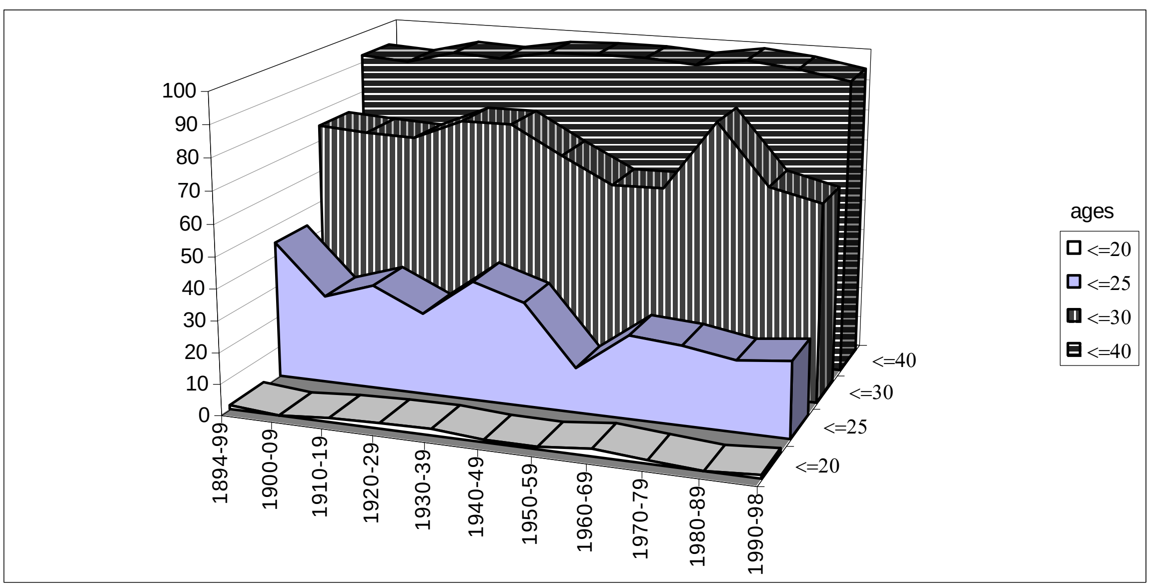
However, both mean and median ages, as measures of central tendency, fail to capture the heterogeneity in the distribution of ages at first marriage. To better comprehend the different age pattern at marriage between males and females, and to overview its changes over time, we use the proportion of bachelors and spinsters marrying by the age of 20, 25, 30 and 40 years, as shown in figures 6.4 and 6.5.

Figure 6.4: Cumulative percentages of brides marrying by selected ages (reported); first marriages only; Naoussa & Kostos 1894-1998.



Source: Naoussa and Kostos family reconstitution; N=1135.

Figure 6.5: Cumulative percentages of grooms marrying by selected ages (reported); only first marriages are included; Naoussa & Kostos 1894-1998.



Source: Naoussa and Kostos family reconstitution; N=1132.

The age patterns exhibited by men and women at marriage are completely unlike. Let us consider first the marriage pattern of spinsters. With the exception of the 1990s (and the immediate post-war decade of the 1950s where many postponed marriages took place), more than a quarter of the married females were married by the age of 20, and in some cases (in the 1970s) the percentage of teenage brides reached 37% of all first marriages. By the age of 25 usually more than 75% of first marriages for brides have taken place (again the 1990s is an exception to that rule) and this proportion reached almost 90% in the 1970s. More than 90% of the first marriages have occurred by the age of 30, with this percentage being again higher in the 1970s (96%) and lower in the 1990s (83%). Finally by the age of 40 almost all spinsters who are to be married have entered marriage. In this age pattern, as is obvious, two decades stand out: the 1970s and the 1990s. It seems that "young" marriages were very popular in the 1970s not only in the communities under consideration but all over Greece (NSSG, 1980:40) and for that matter, in most of West Europe (Coleman, 1980). In the case of Greece this decrease in age at marriage for spinsters is probably responsible for an instant increase in the period total fertility rate that occurred in the early 1970s.

The age pattern of bachelors on the other hand, is more tolerant to old ages. The percentages of grooms married by the age of 20 were always next to zero. Furthermore, figures 6.4 suggests that a woman who remains unmarried at her thirtieth birthday has few chances to get married afterwards, and almost no chance if she is still a spinster at her fortieth birthday. Antithetically, usually more than a quarter of grooms marry after their thirtieth birthday, while there is still some scope for marriage even after 40 years of age.

However, the female pattern seems to be changing rapidly in recent years. In the 1990s the percentage of teenage brides dropped steeply to 14% from the 35% that there had been in the 1980s and the proportion of the married women who were married by the age of 25 fell to 59% in the 1990s from 81% in the 1980s. Thus, for females a swift rise in age at first marriage is observed in the 1990s, while for males the pattern of distribution of ages at marriage appears more stable.

6.4 Age gap between spouses

The different age patterns at marriage exhibited by males and females imply a relatively large age gap between the spouses. In that respect the marriage pattern of the study population shows one of the characteristics of the Mediterranean marriage pattern, which is that husbands were considerably older than their wives. It would be interesting, however, to examine the issue of age difference between spouses in more detail, and to compare the pattern exhibited by Naoussa and Kostos (two island Mediterranean communities) with that of West-European populations.

Tables 6.4a and 6.5 are based on marriages for which the ages of both spouses are available. Real ages have been used where obtainable and reported ones in the case that real ages at marriage were not available. Thus, almost half of the ages (50.2% and 47.5% for grooms and brides respectively) are real in the data used to construct these tables and half of the ages are reported. Table 6.4b, on the other hand, is based on reported ages only and produces essentially the same results as table 6.4a. Its sole purpose is to show that there is no real difference between reported ages (table 6.4b) and a combination of real and reported ages (table 6.4a). The reason that reported ages are used where real ones are not available is that the problem of the truncation effect is effectively solved. If only real ages were used, the age gap between spouses in the first decades of the reconstitution would be artificially small since real ages in the early years from the starting point of the reconstitution are available only for those who got married at a young age. For example if a woman born in 1894, the year which our data begin, was married in 1912 her real age would be available, but if her husband was born in, say, 1884, his real age could not be traced and the 10-year age gap between them would not be shown. On the other hand, by taking into account reported ages, estimates of the age gap between the spouses give a clearer picture of the reality. A last point to be made is that tables 6.4 and 6.5 are based on primary marriages only, i.e. marriages where both partners married for the first time.

Table 6.4: Mean age difference in years between bachelors and spinsters; Naoussa and Kostos 1894-1998.

a) Using reported ages only if real ones are not available				**b)** Using reported ages alone		
Years	**Mean age difference**	**Standard deviation**	**Cases**	**Mean age difference**	**Standard deviation**	**Cases**
1894-99	4.8	5.0	74	4.8	5.0	74
1900-09	6.3	5.7	110	6.3	5.7	110
1910-19	5.9	3.8	79	5.7	3.7	78
1920-29	5.1	4.0	118	5.2	3.5	116
1930-39	5.0	5.6	99	5.2	4.8	99
1940-49	5.1	5.2	113	5.2	5.0	113
1950-59	5.9	4.7	120	6.1	4.6	120
1960-69	6.2	4.8	80	6.2	4.7	80
1970-79	6.0	4.6	84	6.0	4.6	84
1980-89	6.5	4.5	102	6.5	4.5	102
1990-98	4.0	5.2	84	4.0	5.1	84

Source: Naoussa and Kostos family reconstitution.

Note: in the calculations involved, real ages at marriage are in completed years.

For the whole period the average age gap between spouses at their first marriage was 5.5 years; it never exceeded 6.5 and, if the first and the last incomplete "decades" of the study period are excluded, it never fell below 5 years. In comparison, the average age gap between bachelors and spinsters in West European countries was considerably narrower, both in the early modern and in the contemporary period. In a sample of 14 German villages during the 18th and 19th centuries, studied by Knodel (1988:137), the age gap between spouses at their first marriage was 3.2 years. In a sample of English parishes in the mid-18th and early 19th centuries (1750-1837) the mean difference between bachelors and spinsters was 4.3 years (Wrigley et al., 1997:153). In the 20th century this age gap between bachelors and spinsters became even narrower in England falling to a value as low as 2.1 years in 1970 (Coleman, 1980:84). In contrast, in our population only in the 1990s does the age gap seem to reduce substantially, falling to 4 years. A similarly broad age-gap was found in Mykonos at the beginning of the 20th century by Hionidou (1993: 182-184). It is worth noting, however, that Hionidou found a somewhat narrower age gap in Mykonos for the last two decades of the 19th century (3.6 and 4.5 years for 1879-88 and 1889-98 respectively). But this is because by using, obviously, real ages only, which are susceptible to the truncation effect, in the early years of the study period she took into account only marriages that happened between young people and the age gap between them was narrower than that of the entire population. This becomes obvious when in subsequent decades the age gap between spouses rises substantially (5.2 in 1899-08 and 5.5 in 1909-18) and it never falls to the 3.6 of the early years of her study period.

Turning to the distribution of the age difference between bachelors and spinsters at marriage (table 6.5), the Mediterranean pattern is confirmed. Traditionally, that is excluding the 1990s, a small proportion (always less than 10%) of wives were older than their husbands, while almost always more than 85% of husbands were older than their wives, looking always at primary marriages. In comparison, more than 30%[23] of primary marriages in early 19th century England consisted of couples where the bride was older than the groom and this percentage was even higher in earlier periods (Wrigley et al., 1997:153).

[23] The actual percentage (35.2%) includes cases where the wife was older than the husband by less than one year and that is why it is so high. For approximately the same period (1800-1849) Knodel (1988:138), who regards spouses with age difference less than a year as being same age, estimates that 17.2% of wives were older than their husbands and this percentage fell to 11.3 in 1850-1899 in the 14 German villages he studied.

Table 6.5: Percent distribution of age differences between bachelors and spinsters at marriage; Naoussa and Kostos 1894-1998.

Years	Bride older by		Total brides older than grooms	Same age (within a year)	Total grooms older than brides	Groom older by			Cases
	5-9 years	1-4 years				1-4 years	5-9 years	10+ years	
1894-99	1.4	5.4	**6.8**	**5.4**	**87.8**	41.9	33.8	12.2	74
1900-09	0.9	2.7	**3.6**	**10.0**	**86.4**	32.7	30.9	22.7	110
1910-19	0.0	2.5	**2.5**	**3.8**	**93.7**	34.2	46.8	12.7	79
1920-29	1.7	3.4	**5.1**	**3.4**	**91.5**	41.5	36.4	13.6	118
1930-39	2.0	3.0	**5.1**	**6.1**	**88.9**	44.4	34.3	10.1	99
1940-49	1.8	7.1	**8.9**	**7.1**	**84.1**	30.1	36.3	17.7	113
1950-59	0.8	8.3	**9.2**	**4.2**	**86.7**	26.7	40.8	19.2	120
1960-69	2.5	2.5	**5.0**	**1.3**	**93.8**	32.5	35.0	26.3	80
1970-79	3.6	2.4	**6.0**	**1.2**	**92.9**	25.0	47.6	20.2	84
1980-89	0.0	4.9	**4.9**	**2.0**	**93.1**	30.4	36.3	26.5	102
1990-98	3.6	16.7	**20.2**	**7.1**	**72.6**	29.8	30.9	11.9	84

Source: Naoussa and Kostos family reconstitution.

Note: in the calculations involved, real ages at marriage are in completed years.

What is noteworthy in table 6.5, though, is that the distribution of age difference is quite dispersed all over the examined period. The proportion of husbands older than their wives by more than 10 years is always more than 10% and in the post war decades and up to and included the 1980s, this figure increased to more than 20%. In general it can be said that, contrary to what happened in West-Europe, in this island population of the Aegean a greater equality in the ages of spouses was not achieved over time. In fact, even in the 1990s the narrower age gap observed in table 6.4 is, to some extent, because the relatively large values at both extremes of the distribution counterbalanced each other and not because brides and grooms got married at closer ages. However, the pattern of the age gap between spouses in the 1990s diverges from the Mediterranean one because of the high proportion of wives older than their husbands.

6.5 Age at marriage and occupational status

Among the determinants of age at marriage is the occupation of the spouses, which is closely linked with their socio-economic status. In early modern West-Europe the social elite was married at earlier than average ages, while members of the working class delayed their marriage until the time that they would be able to earn enough to maintain independently a family. Differentials in age at marriage among different social groups stem, to some extent, from the fact that financial independence was a precondition for marriage, since marriage usually involved the establishment of a new household (Wrigley et al., 1997). However, the social norms and family structure in Southern Europe differed from those of the West and that makes it interesting to look at the age at first marriage by occupational group in our population.

Tables 6.6 and 6.7, which show the age of spouses at first marriage by year of marriage and occupational category of husband, are based on reported ages and on first marriages only. The occupational groups are those presented in chapter 2, with one modification: the categories craftsmen/salesmen and traders/businessmen in chapter 2 have been merged to what is called craft/sales here and is probably the most heterogeneous category. The rest of the occupational groups have remained intact, as they were described in chapter 2. It is worth recalling that “farmers” contains farmers, stockbreeders and proprietors, “seafarers” consists of sailors and fishermen, “labourers” of both agricultural and construction workers and “services” of service providers who, usually, because of the nature of their work, exhibited a higher educational level than the rest of the population. Another thing, which needs be said about tables 6.6 and 6.7, is that a visual effect has been applied to facilitate the reading of the tables. Whenever an age at marriage is higher than average (the averages being under the heading “All (including unknown)”) numbers are bolded. In every other case, i.e. when the age is below or equal to average, numbers are plain.

Table 6.6: Mean age at first marriage for grooms by occupational group of groom; Naoussa and Kostos 1894-1998. In parentheses results based on fewer than 20 cases.

Years	Crafts/sales	Labourers	Farmers	Seafarers	Services	All (including unknown)
1894-1928	**29.7**	28.5	29.5	**29.8**	**(34.0)**	29.5
1929-1963	28.5	28.6	**29.2**	**29.1**	**(30.8)**	28.9
1964-1998	28.8	27.7	28.3	**28.8**	**30.9**	28.8

Source: Naoussa and Kostos family reconstitution.

Note: number of cases on which results are based:

Years	Crafts/sales	Labourers	Farmers	Seafarers	Services	All (including unknown)
1894-1928	31	79	56	34	15	366
1929-1963	58	32	162	84	8	395
1964-1998	99	43	41	78	37	316

Table 6.7: Mean age at first marriage for brides by occupational group of their husband; Naoussa and Kostos 1894-1998. In parentheses results based on fewer than 20 cases.

Years	Crafts/sales	Labourers	Farmers	Seafarers	Services	All (including unknown)
1894-1928	22.8	23.8	**24.3**	22.7	**(27.1)**	23.9
1929-1963	**24.1**	22.8	23.7	23.7	**(24.5)**	23.7
1964-1998	**23.6**	22.1	21.3	**23.3**	**24.0**	23.2

Source: Naoussa and Kostos family reconstitution.

Note: number of cases on which results are based:

Years	Crafts/sales	Labourers	Farmers	Seafarers	Services	All (including unknown)
1894-1928	33	86	61	35	15	389
1929-1963	61	31	164	85	8	407
1964-1998	100	43	41	79	37	317

The most outstanding feature in both tables is the higher than average age at marriage for service providers and their wives. Although the results for service providers are based on few cases, the fact that their age at marriage is higher than average in every period and for both sexes suggests that this pattern is likely to be genuine and not due to statistical randomness. For men in the "service" category the deviation from the average age at marriage reaches four and a half years in the earlier period and around two years in the subsequent periods. For their wives the difference is not so striking but is still significant. An age at marriage higher than the average one for a similar category, that of "professionals"[24], has been found by Hionidou for Mykonos for the period 1899-1959 (Hionidou, 1993:184). A

[24] The category that Hionidou calls Professionals "… included the economic and status elite, that is the estate-owners, merchants, doctors, teachers as well as the civil servants" (Hionidou, 1993:183).

proposed explanation as to why the most educated members of the community married late is that it was difficult for them to find a suitable match. Although this explanation is proposed by Hionidou for the most wealthy ones and not for the most educated, it is also plausible to propose it for the case of the latter. It should not be surprising that in a small and relatively close society educated men like teachers, doctors, lawyers and even civil servants in earlier periods, could hardly find a young woman to match their qualifications in the restricted island society.

The other occupational group that exhibits a consistent pattern in age at marriage is that of labourers, which at least in the pre-war period consisted mainly of agricultural workers. Both they and their wives married at lower than average ages. Hionidou (1993), who has also found that labourers married at a younger age than any other occupational group in Mykonos, proposes an interesting explanation. She argues that “labourer” was not a lifetime occupation but rather a life stage, and that most of those reported as “labourers” at marriage became farmers after their marriage. She establishes this argument by the fact that 44.4% of those reported as labourers at marriage were, later on, reported as farmers on their children’s birth certificates. The land acquisition necessary for the transition from labourer to farmer came through the dowry, which the groom received upon marriage from the bride and which usually included fields. Apart from the dowry the groom may receive a “gift” from his parents, which also included fields. However, it might have been the case that the usage of the fields later given as “gifts” could be orally offered to the son even before marriage. Thus, as Hionidou (1993:187) poses it, “…those labourers who subsequently became farmers had exactly the same background with those reported as farmers at marriage. The difference in age at marriage was due to a ‘selection effect’: those married earlier were less likely to have received any ‘gift’ from their parents by the time of their marriage and there was therefore a higher probability that they would be recorded as labourers”.

However, we would argue that not all labourers who after marriage became farmers had the same background with those reported as farmers at marriage. It might have been the case that some of those who were reported as labourers at marriage came from land-less families or possessed little land and worked as agricultural labourers in the fields. Therefore they married early envisaging the dowry, which was customarily given by the family of bride to the groom upon marriage, in order to become farmers. And of course not all labourers were field workers. Significant proportions of them were builders and unskilled workers. For those the early age at marriage could be explained by the fact that their maximum earning capacity was reached at a young age, an argument that has been suggested as an explanation for the early age at marriage of the rural proletariat in 19th century West-Europe (Knodel, 1988:131).

The seafarers seem to marry at a higher than average age in every period. However, if a distinction between sailors and fishermen is made, it is realised that these two subcategories, which constitute the category seafarers, present a different pattern in age at marriage. Fishermen usually married earlier than sailors did, especially in the early years of the examined period. It is indicative that in the first period (1894-1928) fishermen's age at marriage was by far the lowest of any occupational group (25.3). This has changed in the last period (1963-1998) where sailors' and fishermen's age at marriage is almost the same. In any case, the sailors, being always more numerous than the fishermen, usually stretched the age at first marriage of the group seafarers to a relatively high level. Wives of seafarers on the other hand until the 1960s exhibited a lower than average age at marriage, something that shows that the age gap between spouses in this group was wider than usual.

The group that does not seem to exhibit any particular pattern is "crafts/sales". Their age at marriage represents the average, while the higher than average ages of their wives in the period 1929-1998 implies a narrower age gap between spouses in this group.

6.6 Marital dissolution

A marital union ends either by death of one of the spouses or by separation, which officially takes the form of divorce or annulment. However, in Greece divorce rates were at very low levels until the1980s. In 1907 there were 0.7 divorced males and 0.9 divorced females per 1000 population. Although this proportion gradually rose, it was still low in 1961 (3.6 divorced males and 7.2 divorced females per 1000 population) (Tsaousis, 1971:186). In the 1970s there were 5.6 divorces for every 100 marriages. This rate increased in subsequent years reaching, very roughly, 11.7% in the 1980s and 12.6% in the 1990s. These very crude figures express the percentage of divorces among marriages in the relevant decades. Numbers of divorces and marriages have been taken from Statistics of Justice (NSSG, 1983c-1997c) and Statistics of the Natural movement of the Population of Greece (NSSG, 1998a).[25] Consequently, ignoring the case of divorce as a termination of marriage will not bias substantially the study of marital dissolution up to and included the 1970s. For more recent years ages at dissolution given in subsequent tables will be somewhat higher than the actual ones since divorce, which tends to lower the age at marital dissolution, is not taken into account. Nevertheless, this bias is not very high because of the broad, 35-year periods (1894-1928, 1929-63 and 1964-1998) for which marital dissolution is studied. Therefore it makes sense to examine marital dissolution assuming that practically all marital unions were terminated by death, something that is true for the first 80 years of the study period.

Table 6.8 uses family reconstitution results to present the mean age of each spouse separately at the dissolution of marriage by survival status of the spouses. It is based on 325 real and dummy marriages for which the end of marital union is known and the ages of 325 husbands and 311 wives at the time of dissolution are also known. The reason that dummy marriages are included in the calculations is to reduce the truncation effect, which otherwise would be particularly acute in the first sub-period (1894-1928). It is worth recalling that real marriages took place from 1894 onwards, as 1894 is the year that our data start. In contrast, dummy marriages, that is marriages for which a certificate is not available but they were traced from birth certificates, since the names of the parents are mentioned on them, include many marriages that took place before 1894. Had only real marriages been used in the calculations of marital dissolution for the first sub-period (1894-1928), the mean age at dissolution would have been artificially low, since it would reflect the experience of those who died within 35 years from their wedding date (from 1894 to 1928). By taking into account dummy marriages as well, those who were married before 1894 (and died in our study period) are included in the calculations and thus the truncation effect is minimised.

A first observation is that the age of a dying wife is always lower than that of a dying husband. This age gap between a dying husband and a dying wife was huge in the first 35 years of the study period (1894-1928), reaching the amazing figure of 18.6 years. It dropped to 6.7 years in the period 1929-1963 and has been reduced to only 1.2 years in the last 35 years of the study period. The very young age of a dying wife in the first period (1894-1928) probably reflects high levels of maternal mortality. The spectacular rise in the age of dying wives in subsequent years should consequently reflect the impressive progress in maternal

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[25] In our data there is a note that the marriage was dissolved by divorce on only three marriage certificates. These three couples, one of which divorced in the 1980s and two in the 1990s, were excluded from the analysis of marital dissolution.

mortality that took place in Greece in the post-war years. The course of maternal mortality (expressed as maternal deaths per 100.000 births) in Greece is given by the following figures: 560 in 1931, 360 in 1938, 90 in 1956, 80 in 1961, 28.3 in 1970, 16.2 in 1980, 9 in 1985 and 1 in 1990 (Tsaousis, 1971:202 and NSSG, 1998a). However, the increasing age of dying husbands during the study period implies that advances were recorded not only in maternal mortality but also in adult mortality generally.

Table 6.8: Mean age at dissolution of marriage by survival status of the spouses; Naoussa and Kostos 1894-1998.

Year of dissolution	Husband		Wife		Number of marriages
	Survives	Dies	Survives	Dies	
1894-1928	42.9	56.7	47.8	38.1	102
1929-1963	64.5	67.1	59.3	60.4	126
1964-1998	78.8	77.1	71.7	75.9	97

Source: Naoussa and Kostos family reconstitution.

Coming to the age of surviving spouses it is worth noting that this index represents the age at widowhood. Thus, it can be seen that the age at widowhood for males at the beginning of the 20th century was around 43 years while for females it was around 48 years. It seems strange that men became widowers at a younger age than women did in that early period, given that the husband was much older than his wife (see section 6.3). However, this fact is not so surprising if one bears in mind that dying wives in the period 1894-1928 were dying early in life thus making their husbands widowers at a relatively young age. As female mortality decreased over time this relationship changed and in the next two periods (1928-1963 and 1964-1998) women became widows at a younger age than men.

Table 6.9: Mean age at widowhood by sex and year of marital dissolution for first and last marriages; Naoussa and Kostos 1894-1998.

Year of widowhood	Number of marriages	First marriages		Number of marriages	Last marriages	
		Males	**Females**		**Males**	**Females**
1894-1928	88	42.9	48.2	73	46.9	48.4
1929-1963	125	64.5	59.3	114	67.3	61.6
1964-1998	91	79.3	72.0	96	79.6	71.7

Source: Naoussa and Kostos family reconstitution.

Note: Last marriages contain first marriages also if these were not followed by a remarriage. Therefore, the sum of the two subtotals (first and last marriages) is different from the total of all marriages, which was used in table 6.8 and thus the slight discrepancy in the figures of the two tables (6.8 and 6.9).

Age at widowhood can be studied better from table 6.9, which gives the mean ages of surviving spouses at the end of first and last marriages. Last marriages contain any marriage that was not followed by a remarriage, thus including first marriages, together with second and third ones, if no remarriage was traced for them. Therefore, the age of the surviving spouse at the end of his/her last marriage is the age at permanent widowhood, which is usually greater than the age at widowhood for first marriages only. The age of permanent widowhood has increased spectacularly during the study period for both sexes, but even more so for males who at the end of the 20th century (1964-1998) became windows at almost 80 years of age compared with 47 at the beginning of that century, having gained 33 years of married life. Females on the other hand entered permanent widowhood at 72 in the period 1964-1998 compared with 48 in 1894-1928, having gained 23 years of married life.

Yet, what is the cause of this impressive increase in age at permanent widowhood in a relatively short time? This increase cannot be attributed to a single cause because four factors define age at permanent widowhood: adult mortality, age at marriage, age gap between spouses and extent of remarriage. The age of entry into marriage was more or less stable in our population over the study period. The age gap between spouses became narrower only in the 1990s and thus its effect in the age of marital dissolution is not visible here, since our data stop in 1998. Therefore any increase in the age at permanent widowhood should be attributed to progress in adult mortality and increase in the extent of remarriage. However, the proportion of remarriages increased substantially from one period to another only for females, while for males dropped slightly since the period 1894-1928 (see table 6.10). Consequently, it is rather reductions in adult mortality that contributed to the rise in age at permanent widowhood.

To better comprehend this, it is more convenient to look at the age of widowhood for first marriages at the table 6.9 as an indication of the prevailing adult mortality, since this age is not affected by the extent of remarriage. The continuous increase in the age of widowhood at first marriage implies great advances in adult mortality for both sexes. Moreover, the greater increase in the mean age of males at the end of first marriages compared to last marriages reveals a decline in remarriages for males, while the opposite is true for females.

6.7 Remarriage

Although remarriage is often regarded as a phenomenon only becoming important in recent years, it should not be forgotten that remarriage was a common situation in populations that experienced high mortality. Studies on England have shown that a percentage as high as

25-30 of those marrying in the 16th century were remarrying while in the 19th century this proportion had fallen to 10 percent.

For our communities the percentage of remarriages among all marriages is presented in table 6.10 for three 35-year periods within the entire period under examination. The table is based on 1156 real marriages for which 62 male and 28 female remarriages were traced. For the earlier period (1894-1928) the percentage of remarriages given in table 6.10 is an under-estimation of the real figure owing to the truncation effect. Any remarriages that took place in the first years after 1894 could not be recognised as such, since first marriages that took place before 1894 could not be traced. However, since the mean interval between the end of a marriage and a remarriage did not exceed 24 months for the first period (1894-1928)[26], figures in table 6.10 cannot be seriously biased. Therefore a reasonable assumption would be that true figures for that period were just over 6% for males and 1% for females.

Table 6.10: Percentage of remarriages among all marriages by year of remarriage; Naoussa and Kostos 1894-1998. In parentheses the number of remarriages.

Year	Males	Females
1894-1928	5.7 (23)	0.7 (3)
1929-1963	5.0 (20)	2.3 (9)
1964-1998	5.4 (19)	4.6 (16)

Source: Naoussa and Kostos family reconstitution.

Generally, it seems that in the early years of the study period remarriage was not unusual for males but it was rather uncommon for females. Hence, another trait of the Mediterranean marriage pattern is confirmed, the one suggesting that widows, though numerous because of the great age gap between husbands and wives, usually remained unmarried. Nevertheless, this situation changed over time and in the last 35 years of the study period (1964-1998) almost 5% of all female marriages are remarriages. This percentage is still lower than that for male remarriages but implies a significant change in social conventions, compared with the 1% at the beginning of the 20th century. It is also indicative of this liberalisation in morals that if only the 1990s are considered, the percentage of female remarriages is greater than that of males (8.4% for females compared with 7.4% for males).

[26] Reliable measures for remarriage intervals cannot be calculated from our data because of the very few cases available. There are only 20 male remarriages linked to a previous marriage for which the date of dissolution of the previous marriage is known and the date of the remarriage is also known. For the period 1894-1928 the average remarriage interval for males was 21.5 months based on 15 cases and for the entire study period was 33 months.

Another interesting feature of remarriage is the age of entrance into it. As one would expect this age has increased over time, since the age of the surviving spouse at the end of the first marriage increased dramatically during the 105 years of the study period (see table 6.9). Looking at table 6.11 one realises that in the first period (1894-1928) age at remarriage in the examined population was very low for both sexes compared with populations of West-Europe. It is indicative that mean age at remarriage in German villages in the last half of the19th century oscillated between 41 and 52 years for widowers and 35 and 41 for widows (Knodel, 1988:162). In 18 English parishes in an even earlier period (the first quarter of the 19th century) this index fluctuated between 40 and 46 years for widowers and 34 and 43 years for widows.

Table 6.11: Mean age at remarriage; Naoussa and Kostos 1894-1998. In parentheses the number of remarriages.

Years	Males	Females
1894-1928	37.4 (23)	29.6 (3)
1929-1963	45.1 (20)	35.8 (9)
1964-1998	44.1 (19)	40.2 (16)

Source: Naoussa and Kostos family reconstitution.

This difference in age at remarriage between the study population and West-European ones most probably reflects differences in adult mortality. A higher adult mortality in our communities at the beginning of the 20th century (1894-1928) compared to that in German villages at the end of the 19th century (1875-1899) is also implied by the mean age of widowhood at first marriage. In the German villages age at first widowhood for the period 1875 to 1899 was around 56 years for both sexes while in Naoussa and Kostos for the period 1894-1928 it was 43 years for males and 48 for females as was seen in the previous section. Of course this difference in age at first widowhood between Greek and German villages, at least in the case of males, should not be attributed only to higher adult (and especially maternal) mortality experienced in Greece. It is true that a higher female mortality would produce male widowers at a younger age. Yet, another factor for this difference is the lower marriage age of females which, through maternal mortality, would tend to reduce the age of males at widowhood and thus at remarriage.

6.8 Illegitimacy

In this section we examine an issue that is not directly associated with nuptiality but is connected with behaviours that breach social moral codes and question the role of nuptiality as the only setting within which reproductive activity can take place. This is the issue of non-marital childbearing or illegitimacy, as it is widely known. Compared to Western Europe, Greece traditionally exhibited lower levels of illegitimate births. For the entire country the percentage of illegitimate births among all births was, until recently, less than 2 (1.2% in 1926-28, 1.3% in 1936-38, 1,0% in 1966-68) and it reached 2.4 only in the 1990s (NSSG:1998a:17). It is characteristic that in Mykonos from the mid-19th until the mid-20th century illegitimate births were almost always less than 2% of all births (Hionidou, 1993:194). By contrast, in six German villages studied by Knodel (1988:193) the illegitimacy ratio (measured again as the percentage of illegitimate births among all births) gradually declined from a peak of 13 % in the 1820s to no less than 5% in the 1910s.

In our communities the level and trend of illegitimacy are shown in table 6.12 in terms of the percentage of illegitimate births among all births, a measurement that conventionally is called illegitimacy ratio. The most important observation is that illegitimacy declined more than six times within 105 years, from around 2% that it was at the beginning of the 20th century to a negligible 0.3% at the end of it. This decline in the illegitimacy ratio probably does not reflect a concomitant decrease in non-marital sexual activity but rather shows that people started using various means to prevent or stop an unwanted pregnancy.

Table 6.12: Illegitimate births as percentage of all births; Naoussa and Kostos 1894-1998.

Years	All births	Illegitimate births	% illegitimate
1894-1928	2463	46	1.9
1929-1963	1740	13	0.7
1964-1998	981	3	0.3

Source: Naoussa and Kostos civil registers.

Family reconstitution data could in some cases permit a more detailed study of illegitimacy. Some historical demographers, for example, make a distinction between legitimized and non-legitimized illegitimate births (see Laslett and Knodel). The two terms are used to distinguish between illegitimate births for which there is an indication that they were followed by the marriage of the parents (hence legitimized) and illegitimate births for which there is no such indication (hence non-legitimized). In our population the 62 illegitimate children were born to 37 women, 19 of which got married within 15 years from their unlawful birth. However, there is no indication in the books of civil registration showing whether they married the biological father of their children or someone else, and therefore is not possible to distinguish between legitimized and non-legitimized illegitimate births.

Nevertheless, our data permit a glimpse at another aspect of out-of-wedlock childbearing, that of repetitive illegitimacy. Before doing this, it is interesting to mention a theory about repetitive illegitimacy put forward by Laslett who explored the issue in English parishes from the mid-16th to the early 19th century. According to his perception there was a particular group of people, living in the same locality and tending to be related by kinship or marriage, that was inclined towards bearing illegitimate children (Laslett,1980:217-240). Laslett named this group with the derogatory term "bastardy prone sub-society". It seems that when illegitimacy was high, this sub-society contributed a disproportionately high percentage of illegitimate births, whereas when illegitimacy was low, repetitive illegitimacy was diminished. In our population, as was already implied in the previous paragraph, there was a significant proportion of women who had more than one illegitimate birth. More specifically, 10 out of 37 unmarried mothers[27] were repeaters, i.e. they had more than one illegitimate birth. The average number of illegitimate children born by each of these repeaters was 3.5. Interestingly enough, most of the mothers of multiple illegitimate children gave birth in the early years of the study period (1894-1928) when illegitimacy was at its height. It is indicative that 58.7% of all illegitimate births in the period 1894-1928 belonged to repeaters, while this percentage fell to 46.2 in the period 1929-63 and zero in the period 1964-1998.

It seems that repetitive out-of-marriage childbearing played an important role in illegitimacy in the two island communities in the past and especially in the late 19th and early 20th century. Yet, is difficult to say if the theory of Laslett about a "bastardy prone sub-society" holds true in the study communities. It appears that, before contraception and abortion became widely available, there were some individuals who followed a pattern of reproductive behaviour that did not conform to the established social codes. However, because the cases of unmarried mothers are too few in our data, and even fewer are the repeaters, one cannot define if repeaters came from a special social background or were

[27] By "unmarried mothers" here we mean mothers of illegitimate children and not unmarried mothers whose children have been recognised by the father. In the latter case the child will not register as illegitimate.

related to each other by kinship or marriage, (as Laslett would suggest) so as to constitute a "bastardy prone sub-society".

6.9 Bridal pregnancy

Another issue related to non-marital reproductive behaviour is bridal pregnancy. In certain West European countries it was not uncommon for the bride to be pregnant at the time of her marriage. In rural Germany of the 19th century 26% of brides were pregnant when they stood in front of the altar (Knodel, 1988:214), while this percentage was even higher in parts of rural England reaching 41 in the parishes studied by Reay (1996:181). By contrast, it seems that the code of moral behaviour was observed more stringently in parts of southern Europe. In Mykonos, for example, the percentage of fertile brides that were pregnant at marriage was only 2.5 in the 1860s and, though this proportion gradually rose, exceeded 6.5% only in the post Second World War period (Hionidou, 1993:194).

Before proceeding to examine the issue in our communities, some reference should be made on how bridal pregnancy is measured. Many studies of historical demography regard a woman as being pregnant at marriage if she gave birth within 240 days, that is by the start of the eighth elapsed month, from the wedding day. Although this cut-off point will include some births postnuptially conceived, since the biological period of gestation can be shorter for some women, it is thought that it excludes more prenuptially conceived births than falsely includes postnuptially conceived ones (Knodel, 1988:209). Therefore, this study adopts this approach and considers that all births born in less than 241 days from the wedding date are the result of pre-marital sexual intercourse. Moreover, in this study bridal pregnancy is measured among fertile brides only, since by expressing prenuptially conceived births as a percentage of all first legitimate births, we measure the percentage of brides with at least one postnuptial birth, (i.e. fertile brides) that were pregnant at marriage. This is the usual practice in studies of historical demography, although the results of family reconstitution permit us to relate pregnant brides to all brides or to reproductive-aged brides as well.

In contrast with illegitimacy, bridal pregnancy has increased over time rising gradually from around 7% at the beginning of the 20th century to 10% in the end of it (table 6.13). It is noteworthy that if one expresses illegitimacy in the same metric as bridal pregnancy, that is as the percent of illegitimate births among first births only, will arrive at the figures 15.1, 4.1, and 1.3 for the periods 1894-1928, 1929-1963 and 1964-1998 respectively. That means that the volume of decrease in illegitimacy was greater than the volume of increase in bridal pregnancy and thus it cannot be said that non-marital sexual activity that in the past resulted in illegitimate births, in more recent years resulted in bridal pregnancy.

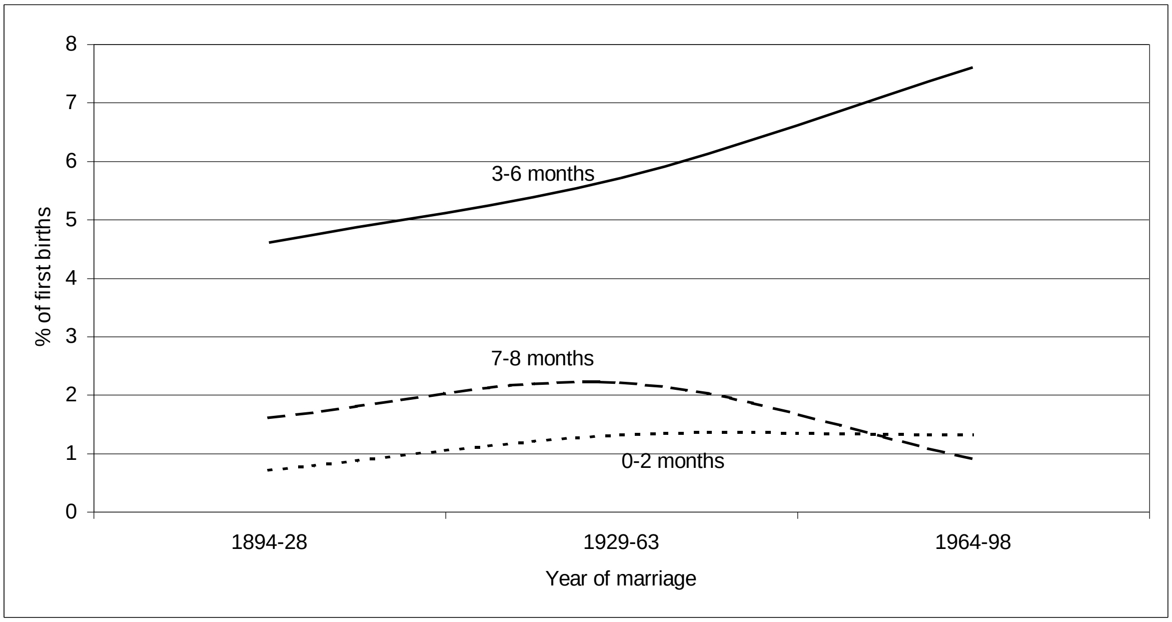
Table 6.13: Births born within eight months (240 days) from the date of marriage as percentage of all (legitimate) first births by year of marriage; Naoussa and Kostos 1894-1998.

Years	First births	Prenuptially Conceived births	% prenuptially conceived
1894-1928	304	21	6.9
1929-1963	315	29	9.2
1964-1998	223	22	9.9

Source: Naoussa and Kostos family reconstitution.

The breakdown of prenuptially conceived births according to how long before marriage they were conceived, shows a lot about the circumstances under which the marriage took place. In cases that such births were conceived one or two months prior to marriage, i.e. when births took place seven to eight months after marriage, it is likely that the spouses-to-be were not even aware of the pregnancy and the marriage had already been decided at the time of the conception. On the other hand, births conceived three or more months prior to marriage (i.e. born in less than seven months after marriage) are more likely to have precipitated marriage or even to have exerted an influence in the decision to marry in cases where no such intention existed. Figure 6.6 shows that the increase in bridal pregnancy in the examined population was not because of births conceived shortly before marriage, i.e. births born seven to eight months after marriage, but mainly due to births conceived three to six months before marriage. Since in the latter case the couple was probably aware of the pregnancy before marriage, it might have been the pregnancy that played a crucial role to their decision to marry. A similar trend of increased sexual activity three to six months before marriage has been found in 19th century England and Germany (Knodel, 1988:218).

Figure 6.6: Births born during selected intervals since marriage as percentage of all (postnuptially born) first births; Naoussa and Kostos 1894-1998.



Source: Naoussa and Kostos family reconstitution.

6.10 Overview of the marriage pattern in Naoussa and Kostos

In the above pages an attempt has been made to present the marriage pattern of an island population from the end of 19th to the end of 20th century, to the extent that this is possible through the results of a family reconstitution. These results confirmed that some characteristics of the Mediterranean marriage pattern were present in the study population for most of the examined period. Women entered their first marriage at a median age of 22 years and men at 28, thus fashioning a large age gap of six years between them. However, although the male age at first marriage remained remarkably stable over the examined period, the corresponding female one rose significantly in the 1990s reaching a mean of 25.6 and a median of 24, thus resulting in a narrower age gap between the spouses.

An examination of age at first marriage by occupational group revealed a significant social differentiation, since service providers and their wives were married at ages higher than any other occupational group, while labourers and their wives entered marriage at clearly younger ages than any other group. A fairly consistent pattern seems to be followed by seafarers as well, who were married at higher than average ages, though their wives were usually younger than average.

By studying marital dissolution it was discovered that in the period up to the 1920s (1894-1928), despite the fact that husbands were considerably older than their wives, they became widowers at a younger age than their wives. This peculiarity is attributed to the very high levels of maternal mortality prevailing in that period, which resulted in a premature death for many women and in an early widowhood for many men. As maternal mortality decreased over time this relationship changed and in the next two periods (1928-1963 and 1964-1998) women became widows at a younger age than men did. Generally, age at widowhood is probably the only feature of the marriage pattern that has changed so dramatically during the examined period. As was disclosed from our analysis men at the end of the 20th century (1964-1998) became widowers at almost 80 years of age compared with 47 at the beginning of that century, having gained 33 years of married life. Gains are less for females since they entered permanent widowhood at 72 in the period 1964-1998 compared with 48 in 1894-1928, having gained 23 years of married life. The order of change is similar for age at first widowhood, which is usually a few years lower than age for permanent widowhood (see table 6.9).

Although increases in age at first widowhood should have tended to decrease remarriages, only a small reduction has been observed in male remarriages and, in contrast, a huge rise in female remarriages. The reason for this is probably that in the study communities availability of spouses was very restricted, especially in the early years of the study period (see chapter 4, section 4.4) and consequently remarriages were fewer than one would expect. In particular, due to both demographic and societal reasons remarriages were at low levels for males (5.7% of all male marriages) and rare for females (0.7% of all female marriages) at the beginning of the 20th century. As the society became more open both culturally and demographically, mainly due to the tourist development from the 1970s onwards, traditional social conventions relaxed and remarriage became widely available. To this modernisation of the society one can also attribute the reduction in illegitimate births from two percent at the beginning of the 20th century to 0.3 at the end of it, since people got familiar with modern birth control techniques and started using various means to prevent or even stop an unwanted pregnancy. The observed increase in bridal pregnancy could signify, among other things, a liberalisation of morals but also that people deal with pre-marital relationships more responsibly than in the past, since these pregnancies do not end in illegitimate births as implied by the continuously decreasing rate of illegitimacy.

Nevertheless, a description of a marriage pattern would be incomplete without a reference to the extent of permanent celibacy. In fact one of the basic features of the Mediterranean marriage pattern, as this was proposed by Laslett (1983), was the universality of marriage. Unfortunately our family reconstitution material does not permit us to produce any estimates of proportions marrying for the two study communities. Yet, census results referring to the Cyclades, disclose that permanent celibacy was quite high by Laslett's Mediterranean standards in every census from 1907 to 1971 (see table 3.10). The percentage of never married males during that period was above seven and occasionally exceeded 10, and that of never married females above six, very often exceeding seven. It is logical to assume that the two study communities on Paros exhibited a similar level of permanent celibacy with the rest of the Cyclades, since the social and geo-demographic reasons that compelled high percentages of the population to remain unmarried were the same all over the Cycladic islands. Consequently, the marriage pattern of the study communities should have followed the general pattern of the Cyclades, as this has already been seen in chapter 3. More particularly, this marriage pattern, although until very recently (up to the 1980s) demonstrated certain characteristics of the Mediterranean pattern, such as rather low age at marriage for brides and high for grooms, diverges from the typical Mediterranean pattern because of the moderately high levels of permanent celibacy that traditionally exhibited.

CHAPTER 7: FERTILITY

The method of family reconstitution was primarily devised to measure fertility and especially to substantiate how close is the fertility of the examined population to natural fertility. For reasons relating to the difficulty of tracing the presence of unmarried persons in a community, the method can yield reliable results only when applied to married couples and thus it can only measure marital fertility. In our case however, marital fertility played the major role in overall fertility since extra-marital fertility was negligible all over the examined period and the marriage pattern did not undergo any significant changes at least until 1950, as shown in previous chapters.

The main aim of this chapter is to probe whether our data for the two communities of Paros have captured the fertility transition in the island. The research questions that this chapter tries to answer are: was fertility in Paros still natural at the beginning of the 20th century, when our data start? If the answer to the above question is positive, what was the timing and the rate of fertility decline? In what manner did the population switch from natural to controlled fertility? What was the contribution of different socio-economic groups to the fertility transition? What were the biological parameters of fertility, to the extent that these can be measured in a modern population? Were there any seasonal variations in births within the calendar year? How close was the fertility level of Paros to that of the rest of Greece? To answer these questions, several measures and indicators of the reproductive behaviour of the population were employed, some of which, like birth intervals and age of mothers at last birth, are not usually available from published statistics.

7.1 Concepts and definitions

Much of the discussion about fertility in studies of historical demography is consumed in the distinction between natural and controlled fertility. While natural fertility could simply mean the absence of any deliberate efforts to limit births, as was initially defined by Henry (1953), further definitions have been devised for one basic reason: demographers lack the analytical tools to distinguish with certainty a population acting under natural fertility from one that applies any kind of birth control. This is so because the number of births under conditions of natural fertility is not determined only by biological factors but also by patterns of behaviour, which can differ substantially from one population to another. Such behavioural factors, which can alter unintentionally the number of births born to a couple, can be frequency of intercourse, breast-feeding habits, postnatal abstinence and short-term migration separating spouses. These factors are usually socially and culturally defined and consequently vary among different populations. Therefore it is not so straightforward to decide to what extent a population practises, say, breast-feeding as a means of limiting its final family size and to what extent it does this without any such intention.

This difficulty in distinguishing natural from controlled fertility has led to another definition of natural fertility, proposed again by Henry (1961), and which is widely used in demography. The broader concept of this definition is that natural is the fertility in the absence of parity-dependent birth control. According to Henry (1961:81) "control can be said to exist when the behaviour of the couple is bound to the number of children already born and is modified when this number reaches the maximum which the couple does not want to exceed". His definition implies that if a population applies deliberate birth control that is not parity-dependent it is still acting under natural fertility. So, if for example, couples employ birth spacing practices, such as post-natal abstinence or prolonged breast-feeding, and these practices remain unchanged as the number of children born to them progressively increases, their fertility is still regarded as natural even if their behaviour is intended to limit final family size.

The advantage of this definition, however, is that it makes it easier for the demographer to distinguish between populations acting under natural fertility and populations deviating from it. This is so because if age-specific marital fertility rates (ASMFRs) are used to measure fertility, although the *level* of natural fertility may vary, the *shape* (or *age pattern)* of ASMFRs, that is the way they change from one age group to another, in natural fertility populations is identical. On the other hand, if the shape of some given ASMFRs is not matching that of a certain standard then the population is supposed to act under controlled fertility. However, this concept of natural and of controlled fertility has come in for criticism because it does not cover all cases of controlled fertility. Wrigley et al. (1997:457) have pointed out that a population can exhibit a "natural" age pattern of fertility without this being conclusive evidence of the absence of fertility control. They argue that "…the shape of fertility by age might be 'natural' even though couples practised control of fertility within marriage, provided that they did so uniformly throughout marriage by some form of 'spacing' behaviour." (Ibid.). To overcome this ambiguity of the definition the relevant literature usually identifies two types of fertility control: birth control and family limitation.

According to an often used concept in anglophone literature, birth control is a more general term than family limitation and covers every case of fertility control. Thus, it includes deliberate spacing practices even if these practices are not parity-dependent. Family limitation, on the other hand, includes such practices only if they are dependent on the number of children already born. (Knodel, 1988:253). The definition of natural fertility given by Henry (1961) perceives controlled fertility to be family limitation only and thus a population is acting under natural fertility when it does not practise family limitation. In the following discussion the terms natural and controlled fertility are used in this connotation. It should be said however that while in theory a population could practise birth control without practising family limitation and thus without deviating from the standard of natural fertility, in practice this is rather unlikely. In most actual populations birth control usually leads to a change in the reproductive behaviour of couples once they reach the number of children they do not want to exceed.

7.2 Marital fertility

The basic indexes for the measurement of marital fertility are the age-specific marital fertility rates (ASMFRs). Before examining these rates, a few words need be said about the technicalities involved in their derivation. It has already been explained in chapter 5 how one can use family reconstitution data to derive demographic rates without having at hand the population at risk of experiencing the vital events. In the case of marital fertility rates one needs to relate the legitimate births that occurred in a specified time interval, to the person-years of exposure to the risk of childbearing experienced by married women within the specified time interval. However not all married women and their corresponding births qualify for inclusion in the calculations of the fertility rates. Only those for whom there is enough evidence to suggest a continuous *presence in observation* can take part in the calculations. Therefore some selection criteria have been imposed to ensure that only women who were under observation from the beginning of their marriage to the end of it have been converted to woman-years and related to their corresponding births. That means that the selected data set includes only real marriages with both the beginning and the end of the union known. Moreover the age of wife at both ends of the marital union is also known.

With respect to the age of wife at marriage, real ages have been used where obtainable and reported ones in cases where real ages at marriage were not available. This combination of ages does not affect seriously the graduation of women in the age groups, since, as was assessed in chapter 6, the reported age of our population is accurate enough to be used when the real age is missing. The calculation of ASMFRs stops in the 1924-1933 marriage cohort because for subsequent decadal marriage cohorts, due to the truncation phenomenon, the woman-years involved in each age group are less than 100, something that has a detrimental effect on the reliability of the results. The age group 15-19 is excluded from the calculation of total marital fertility rates (TMFRs) because again the number of woman-years involved in this age group is too small to give reliable results.

Table 7.1: Age-specific and total marital fertility rates per woman for four marriage cohorts. In parentheses the woman-years involved in the relevant age groups. Naoussa and Kostos marriage cohorts of 1894-1933.

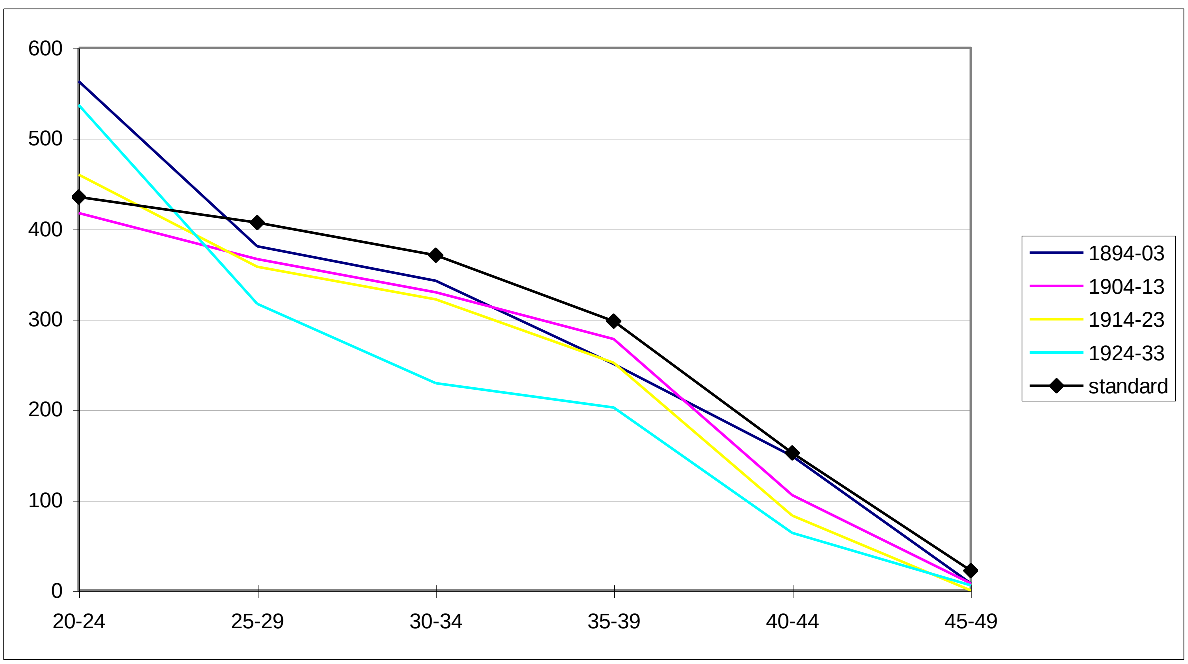
	Age groups							
Year of marriage	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**TMFR 20-49**
1894-1903	0.600 (10)	0.563 (119)	0.381 (176)	0.342 (167)	0.251 (156)	0.148 (142)	0.008 (127)	**8.47**
1904-1913	0.667 (6)	0.417 (70)	0.366 (161)	0.330 (176)	0.278 (162)	0.106 (142)	0.008 (127)	**7.52**
1914-1923	0.400 (3)	0.460 (100)	0.358 (199)	0.322 (190)	0.252 (175)	0.083 (169)	0.000 (156)	**7.37**
1924-1933	0.706 (9)	0.537 (101)	0.317 (193)	0.229 (192)	0.202 (183)	0.064 (173)	0.006 (170)	**6.78**

Source: Naoussa and Kostos family reconstitution.

According to table 7.1, the level of marital fertility was quite high at the turn of the 20th century with a value of 8.47 children per married woman, but it swiftly declined to 6.78 children for women marrying between 1924 and 1933. This is a rather steep drop in the course of forty years. In comparison, marital fertility in rural Germany showed little change in the 150 years from 1750 to 1899 with rates (TMFR 20-49) fluctuating between 8.46 and 8.88 (Knodel, 1988: 257). Similarly, fertility within marriage in the English parishes studied by the Cambridge group exhibited no definite trend in the course of more than a century with TMFRs for the ages 20-49 being around 7.5 from 1700 to 1824 (Wrigley et al.,1997:355). In our population, the relatively high level of marital fertility at the beginning of the examined period (1894-1903) and its subsequent swift and steady decline might suggest that we have captured a 40 year period in the beginning of which fertility was still natural but subsequently became controlled.

To test this hypothesis, the ASMFRs of the four decadal marriage cohorts under consideration have been plotted (figure 7.1) against the standard age-specific schedule of natural fertility proposed by Louis Henry (1961:84). This schedule is based on 13 populations, both historical and contemporary (at the time Henry published his article), for which little or no voluntary control of births is thought to have existed. Their fertility level varied greatly, ranging from 10.9 to 6.2 children per woman but the shape of the distribution of ASMFRs for each of these populations exhibits a convex curve, indicating no (parity-dependent) family limitation. The standard natural fertility pattern proposed by Henry is simply the arithmetic average of the ASMFRs of these populations.

Figure 7.1: ASMFRs of Naoussa and Kostos by marriage cohort plotted against Henry's natural fertility standard. Rates per thousand women.

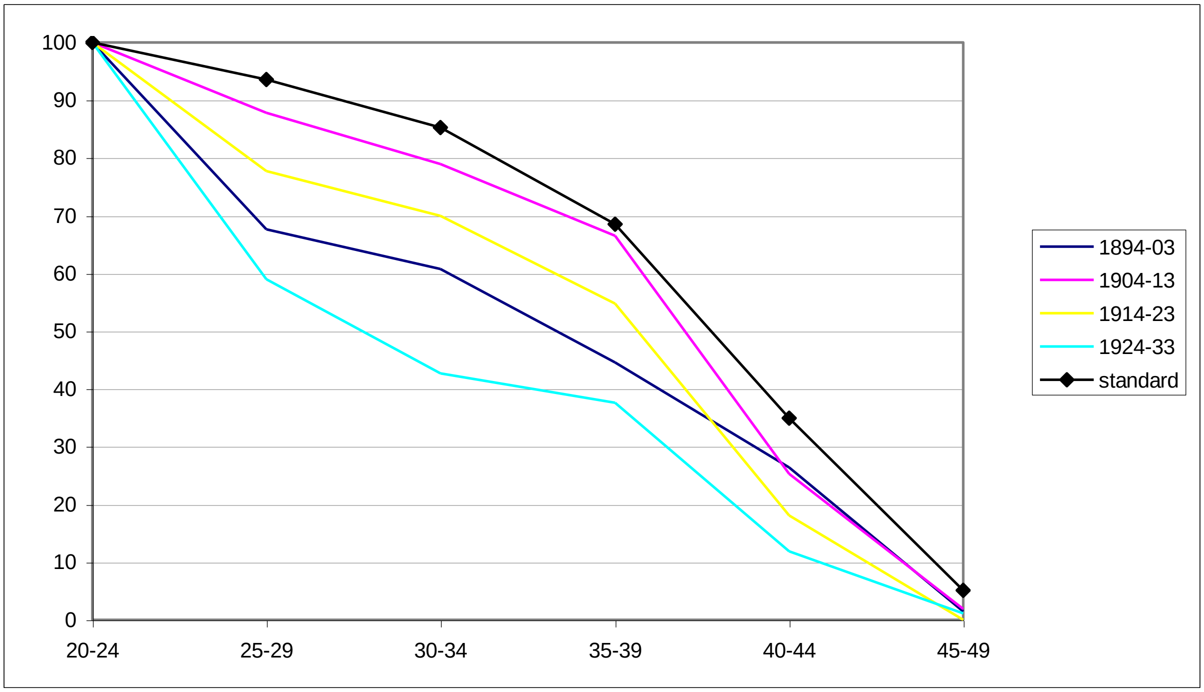


Source: see text.

The only confident conclusion that can be drawn from figure 7.1 is that the curve for the 1924-1933 marriage cohort clearly departs from that of natural fertility, having a concave shape, which implies practice of family limitation. For the rest of the marriage cohorts things are not so clear. For the initial cohort of 1894-1903, although it follows the shape of natural fertility from the ages 25-29 onwards, an irregularity is evident in the beginning of the curve as the fertility drops abruptly from the age group 20-24 to 25-29. However, this might have been a random fluctuation attributed to the small number of cases. On the other hand, the marriage cohort of 1904-1913 seems to follow more closely the pattern of natural fertility, although there are signs of deviation, becoming more obvious in the next cohort of 1914-1923, in the older age groups (40-44 and 45-49).

A better way to monitor the age pattern of fertility is to normalise the rates in each age group taking the 20-24 age group as being 100. Having done this (figure 7.2), it is easier to observe that the two marriage cohorts of 1914-23 and 1924-33 deviate from the natural pattern, with that deviation being more visible for the latter cohort, while the curve for the 1914-23 cohort still retains a convex shape in the central ages of childbearing 25-39 but it turns into concave in the old ages 40-49. The 1904-1913 marriage cohort is clearly matching the standard natural fertility schedule, but, surprisingly, this is not the case with the 1894-1903 marriage cohort. This is so because this cohort exhibits very high fertility rate in the age group 20-24 (see table 7.1) and therefore, although the fertility curve for the ages 25-49 is perfectly convex, thus matching the natural fertility schedule, the age group 20-24 distorts the overall pattern.

Figure 7.2: ASMFRs as percentage of the rate of the 20-24 age group. Marriage cohorts from Naoussa and Kostos and natural fertility standard.



Source: see text

To make our observations more concrete, the ratio of marital fertility over age 30 (TMF 30-49) to the total marital fertility 20-49 (TMF 20-49) is being used. This very simple index is probably the best way to assess if a population practises family limitation or not. This is so because the age pattern of natural fertility is stable irrespective of the overall level of fertility and therefore the contribution of the age groups 30 and above to the total fertility is relatively fixed for populations acting under natural fertility (Knodel, 1988:259-260). In the 13 populations considered as "natural" by Henry, marital fertility after age 30 is responsible for between 46 and 53 percent of the overall marital fertility from 20 to 49. Therefore, since the ratio TMF30+/TMF20+ is unaffected by the overall fertility level, values below 0.46 denote evidence of family limitation, and of course the lower the value the greater the extent of family limitation will be.

Table 7.2: Proportion of total marital fertility (20-49) that occurs after age 30; Naoussa and Kostos marriage cohorts of 1894-1933.

Year of marriage	**TMFR 30+ / TMFR 20+**
1894-1903	0.44
1904-1913	0.48
1914-1923	0.45
1924-1933	0.37

Source: table 7.1

In table 7.2 the ratio TMF 30+/TMF 20+ gradually declines but only falls decisively bellow the critical value of 0.46 in the marriage cohort 1924-1933. The value 0.45 for 1914-1923 might also be a sign that some kind of family limitation was already practised in the middle and old childbearing ages by couples who married in 1914-1923.

However, what is odd in table 7.2 is the figure 0.44 for the 1894-1903 marriage cohort, when one would expect no or little family limitation to exist (and in any case less than in the subsequent cohorts), as implied by the course of TMFRs in table 7.1. This inconsistency, which is obvious in figures 7.2 and 7.3 as well, is due to the very high fertility rate exhibited by the age group 20-24 (see table 7.1). This irregularity is most probably associated with the inferior quality of the primary data in the decade 1894-1903. It is worth remembering that there are no data on marriages and deaths for 1898 due to missing books of civil registration, while only half of the expected births have been traced from other sources for that year. Moreover, in that decade (1894-1903) there are many years where the recording of vital events started with considerable delay, thus affecting the coverage of the registration system (see chapter 2, section 2.2.1). Therefore, one can regard the figure 0.44 in table 7.2 for the 1894-1903 marriage cohort as biased and consider a value closer to 0.50 more logical for this marriage cohort. In any case, even if one leaves the 1894-1903 marriage cohort out of the picture, the declining trend of the ratio over successive marriage cohorts implies that an increasing number of couples practised family limitation.

Having enough evidence to believe that family limitation started diffusing firstly among those who married between 1914 and 1923 and was well-established in the 1924-1933 marriage cohort, it is useful to observe the trends in fertility for the whole period 1894-1933 for each age-group separately. Looking at figure 7.3 the dominant trend is towards lower fertility for women in their 40s. For the 1924-1933 marriage cohort a reduction in fertility is also evident in younger age groups such as 35-39 and even 30-34. In fact, the only age group that seems to have remained unaffected by family limitation is that of 20-24, for which the fertility rate is almost the same in the beginning of the examined period and in the end of it. Fertility in the age group 25-29 could also have remained stable since the slight reduction in the end of the period (1923-1933) is not enough to establish a definite trend. Generally, it seems that deliberate fertility control was initially practised among women in older age groups and was progressively extended to younger women. However, controlled fertility does not appear to affect, at least not in the examined period, women in their 20s, presumably because at these ages women have not still reached the number of children they do not want to exceed and thus it is unlikely that they would apply any kind of fertility control.

Figure 7.3: Age-specific marital fertility rates for four marriage cohorts from Naoussa and Kostos.

Source: table 7.1

7.3 Age of mother at last birth

The age of women at the birth of their last child is an indication of whether couples stop childbearing before the end of the woman's reproductive span. In natural fertility populations age of mother at last birth is around 40 years, although there can be moderate variations depending on the age at marriage (Reay, 1996:56). The main reason for these variations is a selection effect resulting from the way age at last birth is measured. The customary practice in calculating age of mother at last birth (and the one used here as well) is to take into account only married women who had at least one child and whose marital union remained intact until the end of their reproductive span. In this way, mean age at last birth is lower for women who marry young and have at least one child because they are at risk of becoming sterile at a younger age than women who marry late and also bear a child. This is so because of women who marry late, say at their 30s, a greater proportion will already be sterile on entry into marriage, and thus this proportion will not be included in the relevant calculations. Women who marry late and do bear a child will be included in the calculations but these will be only the most fecund of women and thus the selection effect due to which late age at marriage results in higher age at the birth of the last child (Wrigley et al. 1997:387).

Nevertheless, provided that changes in age at marriage are taken into account, trends in age of mother at last birth are effective indications of the prevalence of a stopping reproductive behaviour, that is whether or not couples stop childbearing before the end of the woman's reproductive span. Table 7.3 is based on real completed marriages only, where the marriage remained intact at least until the wife's 45th birthday. It examines six successive decadal marriage cohorts and reveals a continuous reduction in age at last birth from the 1894-1903 to 1924-1933 marriage cohort. The corresponding age at marriage for the examined sample of women remained stable, or increased slightly, between 1894 and 1933. Since the age at last birth was 40 for those who married between 1894 and 1903, this marriage cohort was probably acting under natural fertility. The reduction in age at last birth from 40 to 39 years for those who married between 1904 and 1913 implies that some couples in the 1904-1913 marriage cohort started applying family limitation. This kind of stopping behaviour became widespread in the subsequent marriage cohorts up to and included that of 1924-1933, as the monotonic reduction in age at last birth reveals. Age at last birth increased in the marriage cohort of 1934-1943 to 38 years but this is probably because the women who constitute our sample for that period happened to be married at a considerably older age than the previous marriage cohorts. Thus, a four-year increase in the age at marriage (from 22 to 26) caused a two-year increase in the age of mother at last birth (from 36 to 38). Therefore, allowing for the age at marriage it could be said that the prevalence of family limitation was in an advanced stage for those who married in 1934-43 as well. The prevalence of stopping behaviour should have been even higher in the 1944-1953 cohort because although age at marriage is very high in our sample for that cohort (eight years higher than that of the 1924-1933 marriage cohort), the age at last birth is as low as 37 (only one year higher than that of the 1924-1933 cohort). However, the small number of cases for the 1944-1953 marriage cohort does not permit any reliable inference to be made.

Table 7.3: Age of mother at last birth by year of marriage and by age at marriage; Naoussa and Kostos marriage cohorts of 1894-1953. In parentheses the standard deviation from the mean.

Year of marriage	Number of families	Median age at last birth	Median age at marriage
1894-1903	25	40 (3.3)	21 (3.9)
1904-1913	25	39 (4.4)	22 (4.1)
1914-1923	30	38 (3.3)	22 (2.8)
1924-1933	31	36 (5.3)	22 (2.6)
1934-1943	15	38 (4.6)	26 (3.7)
1944-1953	5	37 (5.8)	30 (7.3)

Source: Naoussa and Kostos family reconstitution.

7.4 Birth intervals

Although age of mother at last birth is an effective indicator in detecting attempts to stop childbearing, it does not tell us anything about birth spacing patterns. Such patterns can be revealed by monitoring the length of birth intervals. Though the length of birth intervals can vary substantially under conditions of natural fertility, the general pattern of these intervals is essentially the same in natural fertility populations. More specifically, intervals tend to increase with birth order within given final family sizes, and this increase is even longer for the last interval. The progressively longer birth intervals by birth order are associated mainly with a decline in fecundability, which comes with age. Hence, the lengthening of birth intervals is also related to the age of mother and since birth order and age of mother are closely associated, it is difficult to distinguish between their effect on the length of intervals (Knodel, 1988: 319). The last birth interval owes its excessive length to a greater drop in fecundity that occurs when permanent sterility is near (Leridon, 1977:160).

Therefore a last interval that is longer than preceding intervals does not necessarily indicate the existence of family limitation since it can be associated with the physiology of reproduction. Nevertheless, a lengthening of the last birth interval over successive marriage cohorts does indicate the existence of birth control in a parity-specific way, although it is not clear if it discloses a stopping or a spacing behaviour. The reason that one cannot be sure whether the lengthening of the last birth interval over time indicates stopping or spacing behaviour is that in the early stages of family limitation, when the modern means of contraception were lacking, there would be "…accidental but delayed pregnancies, changes of mind or desires to replace a child who has died" (Knodel, 1988:320). Consequently, an increase in the duration of the last birth interval over time could suggest either deliberate birth spacing or increasing efforts to stop childbearing at a child who was meant to be the last, but accidentally became the second last.

Fortunately, there is a way to discern stopping as opposed to spacing reproductive behaviour. It has been observed that in natural fertility populations, women with a great number of confinements have shorter birth intervals than women with few confinements (Knodel, 1988:325). If fertility control is applied only by stopping behaviour then, other things being equal, such as the underlying level of natural marital fertility and the entry age at childbearing, a reduction in the average length of birth intervals within given final family sizes would be expected. To comprehend this, consider a woman who under natural fertility would have 12 confinements. This woman will exhibit short birth intervals if she does not practise any deliberate birth spacing. As a result, if this woman manages with some kind of stopping behaviour to reduce her final number of confinements from 12 to 10, she will still exhibit shorter birth intervals than women who under natural fertility have 10 confinements. Consequently, this woman, being classified as final family size 10, will tend to reduce the average length of the birth intervals within this final family size. Providing that a sufficient number of couples apply stopping behaviour, an overall reduction in the average interval within given final family sizes will be observed.

On the other hand, if the same woman switches from 12 to 10 confinements not with stopping behaviour but with spacing, then she has to adopt the longer birth intervals of final family size 10. By doing this she does not affect the average interval of the category with final family size 10, but she alters the distribution of women with given final family sizes. Consequently, if couples apply only birth spacing and do nothing to change the age at which childbearing ceases the average interval within given final family sizes will theoretically remain unchanged. However, in practice, spacing tends to lengthen birth intervals even within given final family sizes because of the differential age at which childbearing ceases for women who under natural fertility achieve different final family sizes (ibid: 325-326). To better comprehend this, let us consider an example. Providing that age at the beginning of childbearing is the same for all women, a woman who under natural fertility achieves a parity of 12 will usually have a higher age at which childbearing ceases than a woman who achieves a parity of 10. Therefore, if the woman with 12 confinements wants to switch to 10 by applying only spacing she has to adopt longer birth intervals than the woman with 10 confinements, given that the age at last birth of the former will be higher than that of the latter. Thus birth spacing lengthens birth intervals even within each final family size.

Before proceeding to see how all this theoretical background relates to our population, some technical issues regarding our approach to birth intervals need be clarified. In the subsequent analysis intervals of zero length, that is intervals between a pair of twins or a trinity of triplets, are not taken into account.[28] Thus, the term birth intervals signifies inter-confinement intervals rather than intervals between births per se. Another technical detail is that in the calculations involved, birth intervals are measured in complete months. Therefore, the birth intervals presented in the following tabulations are somewhat shorter than the actual ones, since if a birth occurred, say, 14.9 months after the previous confinement, its length in complete months will be 14 months only.

Figure 7.4 shows average birth intervals by birth order and by final family size for those who married between 1894 and 1933. The data set upon which this figure is based consists of 154 real marriages for which the date of dissolution is known. Two general observations can be made from figure 7.4. First of all final family size seems to be inversely associated with the length of birth intervals. Women with big family sizes, that is with a great number of confinements, exhibit shorter birth intervals than women with small family sizes. Secondly, *within each family size* there appears to be a positive correlation between the length

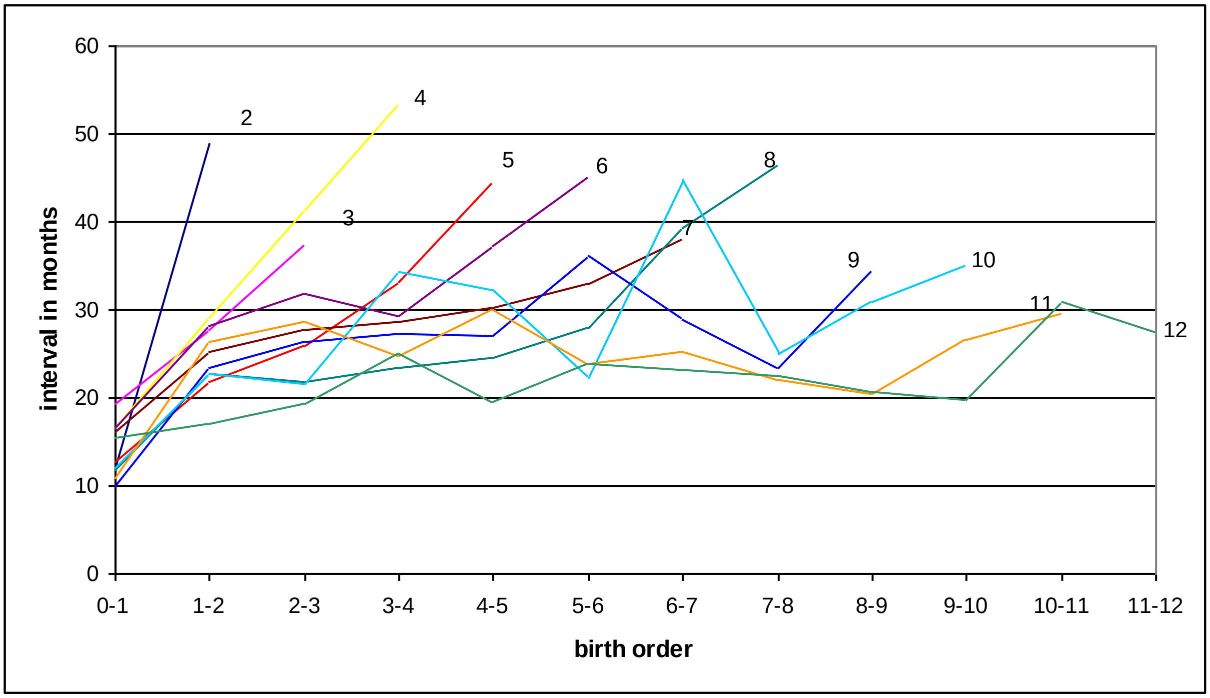
[28] For example if a woman had three confinements with the second one being twins, then the interval between her second and third child, which is zero, is excluded from the analysis. On the other hand the interval between her third and fourth child, which is the interval between the second twin and a subsequent birth is included in the calculations.

of intervals and the birth order. The higher the birth order the longer the birth interval seems to be. Both observations lack consistency as our birth intervals present certain irregularities, especially in family size 10, and to a lesser extent in family size nine and three.

However, one should bear in mind that the above described pattern of birth intervals holds true mostly in natural fertility populations (Knodel,1988:319) . Considering that the examined marriage cohort 1894-1933 cannot be regarded as a natural fertility cohort, since, as seen in previous paragraphs, those who married from 1914 onwards started progressively to apply family limitation, the irregularities in the birth intervals can be accounted for by this fact. Another reason for the erratic fluctuations in birth intervals could be the excess emigration of males that characterised the examined communities in this period (see chapter 4). Many of the emigrants, who at that period were mostly overseas emigrants to the USA, were married in their community. These people visited their home every now and then before their final return and in these infrequent visits they procreated and grew their family. This pattern of temporary separation of spouses, which becomes more prevalent due to the existence of a substantial number of sailors in the two communities[29], might have been responsible for the inconsistencies observed in the birth intervals. Another reason for these inconsistencies is probably the small sample size (154 families), which gives us even smaller number of intervals involved in each final family size.

[29] According to marriage certificates 11% of grooms who reported their occupation in the period 1894-1933 were sailors.

Figure 7.4: Mean inter-confinement intervals by final family size and birth order; Naoussa and Kostos marriage cohorts 1894-1933.



Source: Naoussa and Kostos family reconstitution.

Table 7.4 presents the average last inter-confinement interval according to the final number of confinements for four marriage cohorts. It is based on 165 real marriages, which contributed at least two confinements each, and for which the date of dissolution is known. The number of cases involved in each final family size is often too small to permit any reliable inference. However, looking at the mean last interval irrespective of the family size, that is looking only at the total, it is apparent that the last interval increased substantially only after 1924.

Table 7.4: Mean length of **last** inter-confinement interval in months. Marriage cohorts from Naoussa and Kostos 1894-1943; in parentheses cases based on fewer than 5 intervals.

Year of marriage	**Final number of confinements**						
	2	**3**	**4**	**5**	**6+**	**Total**	Cases
1894-1903	(64.5)	25.2	(46.5)	(26.5)	39.6	**38.1**	39
1904-1913	(20.0)	(40.0)	(43.0)	(38.8)	40.0	**39.6**	34
1914-1923	(29.7)	(28.3)	47.2	(53.5)	33.5	**36.9**	36
1924-1933	60.4	50.7	(75.0)	51.8	49.3	**53.8**	41
1934-1943	(60.7)	(117.7)	82.8	(41)	(39.3)	**73.9**	15

Source: Naoussa and Kostos family reconstitution.

To study the mean of intermediate (elsewhere referred as middle) intervals, that is the mean of all birth intervals excluding the last and the first (that from marriage to first birth), a different approach was adopted, which allows us to include a greater number of cases in our data set. Since to trace intermediate intervals one only needs to exclude the first and the last *recorded births* to a couple, the date of dissolution of the marital union need not be known. Of course by not knowing the date of dissolution one cannot be sure that the last recorded birth to a woman is indeed her last birth. Nevertheless, it is known that intermediate intervals are truly intermediate even if we leave out some intervals, which although intermediate they appear as last.

From table 7.5 it appears that in the early stages of family limitation (1904-1913) the intermediate intervals for women with a great number of confinements (6+), who were the most likely to want to stop childbearing, tended to shorten slightly, something that, according to what was mentioned in the previous paragraphs, suggests the applying of a stopping rather than a spacing reproductive behaviour. For the total of those who married from 1924 onwards the intermediate birth intervals started lengthening, something that might suggest the adoption of a birth spacing in conjunction with efforts to stop childbearing. However, although a stopping behaviour is readily substantiated by a remarkable increase in the last interval (table 7.4), a spacing behaviour is difficult to substantiate by observing the course of the intermediate intervals.

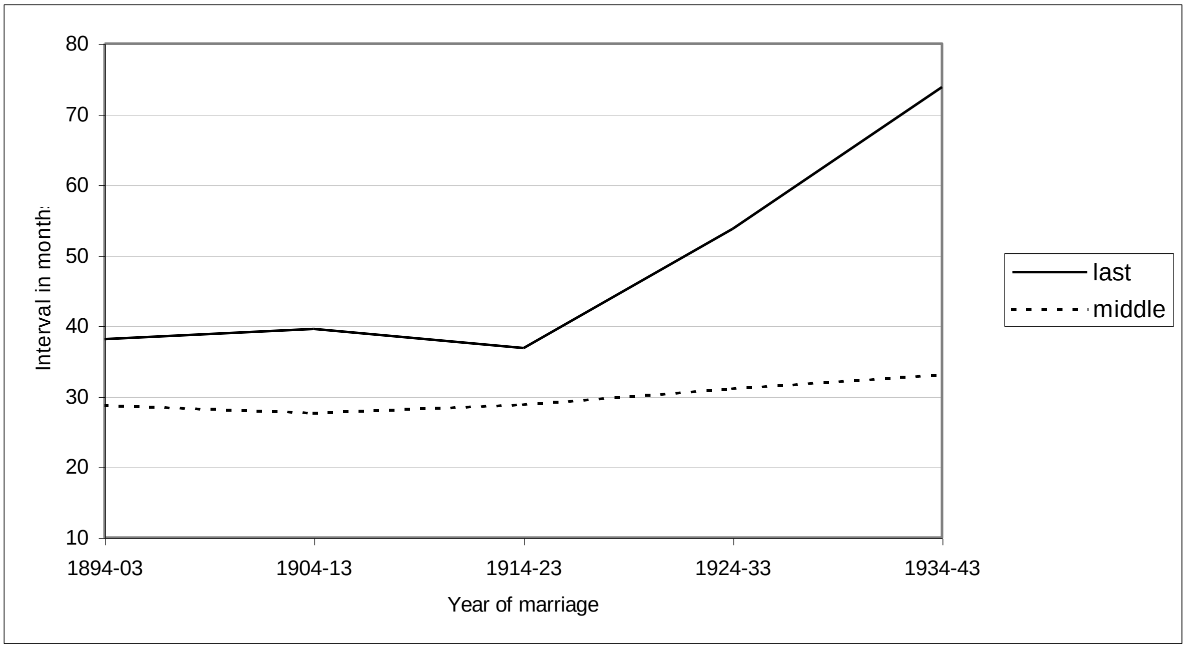
Table 7.5: Mean length of **intermediate** intervals in months. Marriage cohorts from Naoussa and Kostos 1894-1943; in parentheses cases based on fewer than 10 intervals.

Year of marriage	**Final number of confinements**			
	6+	Cases	**Total**	Cases
1894-1903	29.1	43	**28.7**	72
1904-1913	27.4	40	**27.6**	67
1914-1923	27.5	36	**28.8**	53
1924-1933	29.0	38	**31.1**	75
1934-1943	25.3	14	**33.1**	63

Source: Naoussa and Kostos family reconstitution.

Figure 7.5 attempts to illustrate more clearly the above deductions. It is based on the columns headed "total" in tables 7.4 and 7.5. It is obvious that after 1924 the length of the last birth interval increases dramatically, while the length of the intermediate intervals, after a trivial decline between 1894-1903 and 1904-1913, rose very slowly from 1914 onwards. Again the conclusion that can be drawn is that while the spectacular increase in the mean last interval reveals effective attempts to stop childbearing, the lengthening of the intermediate intervals might suggest a deliberate birth spacing applied gradually by those who married from 1914 onwards. It is worth noting that, although small, the lengthening of the intermediate intervals is not negligible. From 1904-1913 to 1934-1943 a gradual and monotonic increase is observed which leads to an increase of 5.5 months in the mean length of intermediate birth intervals. This is evidence that the increase in the length of intermediate intervals is genuine and that some birth spacing must have been applied at least by the later of the examined marriage cohorts.

Figure 7.5: Mean length of last and middle inter-confinement intervals in months ("middle" excludes first and last intervals). Marriage cohorts from Naoussa and Kostos 1894-1943.

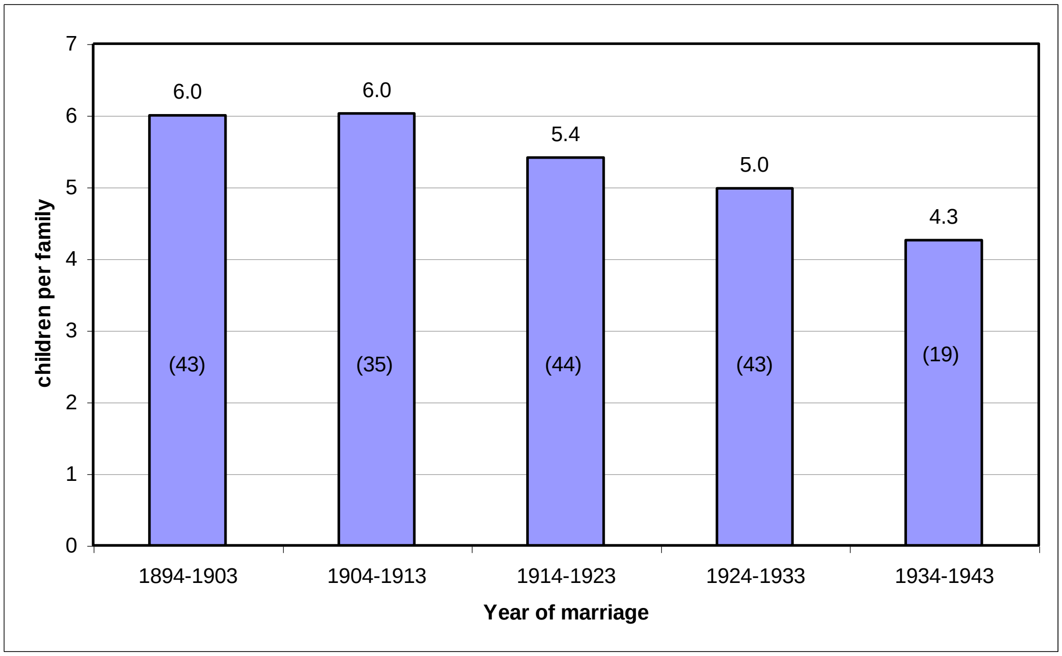


Source: tables 7.4 and 7.5.

7.5 Fertility and occupation

It would be interesting to examine the fertility of different occupational groups since family limitation is usually initiated by certain socio-economic groups. However, measuring the fertility of separate groups can be problematic because of the small number of cases involved in each occupational group. A further difficulty is that the reporting of occupation was not consistent in the marriage certificates. Nevertheless, there is a fertility measure that does not necessitate as many cases as the ASFRs to be reliable and therefore can depict occupational differentials in fertility. This is the mean completed family size, which can readily be calculated from family reconstitution data. It is based on real marriages only with at least one child, and with an end of marriage available.

Figure 7.6: Mean completed family size of fertile couples by year of marriage; Naoussa and Kostos. In parentheses the number of completed families upon which results are based.



Source: Naoussa and Kostos family reconstitution

Figure 7.6 presents the mean completed family size of the entire population in a decadal base for those who married between 1894 and 1943. The family size remained stable (for those who married) in the first 20 years of the study period (1894-1913), averaging six children per family. For those who married from 1914 onwards family size was continuously reducing and reached 4.3 children per family in the 1934-1943 marriage cohort. The question with respect to occupation is: was fertility homogeneous among different occupational and quasi socio-economic groups and if not which group initiated fertility transition?

Table 7.6: Mean completed family size of fertile coupes (adjusted to allow for differential female age at marriage) by year of marriage and husband's occupational group. Naoussa and Kostos; In parentheses results based on fewer than 20 cases. Where possible, 90% confidence intervals are shown in brackets.

Year of marriage	Labourers	Farmers	Seafarers	Crafts/sales	Services	All (including unknown)
1894-1922	6.4 [±1.0]	6.6 [±0.6]	6.0 [±0.9]	(4.8) [±1.1]	(2.8)	**5.8**
1923-1950	(6.2)	5.0 [±0.7]	4.3 [±0.7]	(4.4) [±1.0]	(2.6)	**4.6**
1894-1950	**6.3** [±0.8]	**5.9** [±0.5]	**5.0** [±0.6]	**4.6** [±0.8]	**(2.8)**	**5.4**

Source: Naoussa and Kostos family reconstitution.

Note 1: For details on how values of mean family size have been adjusted see appendix D.

Note 2: Number of cases upon which results are based:

Marr. Year	Labourers	Farmers	Seafarers	Crafts/sales	Services	All (including unknown)
1894-1922	27	46	10	15	1	116
1923-1950	4	36	17	10	1	73
1894-1950	31	82	27	25	2	189

What is noteworthy in table 7.6 is that there were substantial occupational variations in marital fertility even in the early years of the examined period (1894-1922). This may suggest that even among the natural fertility cohort of 1894-1913, fertility was not homogeneous. In fact, if the 1894-1913 marriage cohort is examined separately, the results do not differ much from those for the 1894-1922 cohort, as can be seen in the following table:

Table 7.7: Mean completed family size of fertile couples (adjusted to allow for differential female age at marriage) by husband's occupation for the natural fertility marriage cohort 1894-1913; Naoussa and Kostos. In parentheses results based on fewer than 20 cases. Where possible, 90% confidence intervals are shown in brackets.

Year of marriage	Labourers	Farmers	Seafarers	Crafts/sales	Services	All (including unknown)
1894-1913	6.2 [±1.0]	6.3 [±0.8]	(5.9)	(5.0) [±1.4]	(2.8)	**6.0**
Cases	26	32	9	10	1	**78**

Source: Naoussa and Kostos family reconstitution.

Note: For details on how values of mean family size have been adjusted see appendix D.

Both tables 7.6 and 7.7 are based on relatively few cases, something that renders their findings prone to statistical randomness. An attempt to take into consideration statistical precision has been made by constructing confidence intervals at the 0.1 level of significance. In some cases the width of the confidence interval suggests that the difference in MCFS between certain occupational groups is not statistically significant. This is certainly the case between labourers and farmers and maybe between seafarers and crafts/sales. However, one should bear in mind that within a small and homogeneous community differences in family size might not be great. Really big differences would be expected in a huge urban centre where the population is diverse and class stratification is more distinct. That is why here we consider that even small differences in family size between occupational groups may imply a differentiation in their reproductive behaviour. Of course there is no hard evidence for this, since even small and rural populations can present heterogeneity. In any case, even following strict rules, table 7.6 shows that at least for the total period under examination (1894-1950) there seems to have been some perceptible difference in the family sizes of different occupational groups.

Although it seems that service providers had had the fewest children, the number of cases in this occupational group is too small to allow any conclusion to be drawn. Therefore it cannot be said whether they were the first to apply family limitation. And even if service providers were the forerunners of family limitation they constituted only 5.5% of the male employed population (see tables 2.5 and 2.6) and thus their fertility decline would have only a trivial effect on the fertility of the entire population. On the other hand, the "crafts/sales" category, for which some more cases are available, exhibited much smaller family sizes than any other occupational group excluding "services". Consequently, it seems that craftsmen, salesmen, traders and generally "artisans" as they are referred to in other similar studies, were among the first to control their family size. Tables 7.6 and 7.7 tend to suggest that this group of people, "crafts/sales", started applying family limitation in an effective way even before the end of the 19th century.

7.6 The proximate determinants of natural marital fertility

The level of marital fertility in natural fertility populations can be though of as a function of four components: permanent sterility, fecundability, postpartum non-susceptible period and intrauterine mortality. These components are known as proximate determinants of fertility and can be measured quantitatively. Their importance lies in the fact that provided that the age pattern of marriage was the same in every population the different fertility levels among natural fertility populations could be accounted for by the difference in the level of these determinants. Even in populations acting under controlled fertility, the proximate determinants of natural fertility are of some use because they exert a direct effect on the underlying level of natural fertility, which also affects the actual level of fertility.

In our population three of the four proximate determinants of marital fertility can be examined to some extent. The only one that cannot be studied is intrauterine mortality, commonly known as miscarriage, because data on this issue are not provided in civil registration. Nevertheless, intrauterine mortality is considered the least important proximate determinant because variations in its level are not substantial and therefore they account little for the fluctuation of fertility among populations (Bongaarts,1993). Thus, the study of the rest of the proximate determinants of fertility will suffice to show how the actual or the underlying level of natural fertility was determined, bearing in mind that fertility started to turn from natural to controlled, though not in a decisive manner, by those who married between 1914 and 1923.

7.6.1 Sterility

Referring to female sterility demographic studies usually distinguish two kinds of permanent sterility: primary and secondary. Primary sterility for a woman means that she is not capable to conceive and carry a foetus to terms at any point of her life. Secondary sterility on the other hand, means that a woman was fecund for a time period but ceased to be so because of various reasons, the most common being the process of ageing which renders every woman sterile by the age of 50 or soon thereafter. Other reasons for secondary sterility may be a trauma of childbirth or the effect of a disease (Wrigley et al., 1997:358).

Primary sterility can only be measured if everyone marries at her teens. This is hardly the case, however, in European populations where many marriages occur later in life and thus many women who marry, say, in their 30s and remain childless cannot be characterised as primary sterile since they may not have been so if they had married earlier. Consequently, in a population where teenage marriage is not universal primary sterility cannot be measured based on marriages that proved childless.

Secondary sterility on the other hand, could be readily approximated from the results of family reconstitution. One could look at the birth history of a group of women who married at their teens or early 20s and observe the proportions that become gradually sterile as these women progress from one age group to the other up to the age 50. Nevertheless, this would only make sense if the examined population was acting under natural fertility. If any kind of birth control is applied, as is the case with our population for those who married from around 1914 onwards, reliable measures of secondary sterility cannot be derived, since couples can stop childbearing at their own will.

Nevertheless, there is a sterility measure that can be calculated for our population, based on the very plausible, even for a modern population, assumption that no married couple remains voluntarily childless. This is the *entry sterility*, that is "…the proportion of women in a given age at marriage group who were not fecund" (Wrigley et al., 1997:360). Entry sterility reflects both primary and secondary sterility and its complement is entry fecundity[30]. Its importance, though, lies in the fact that entry sterility has a direct effect on the underlying level of natural fertility. All other things being equal, that is the rest of the proximate determinants of natural fertility and the age pattern of marriage, the different fertility levels among natural fertility populations can be accounted for by the differences in the level of entry sterility.

Table 7.8 presents the percent of married women remaining childless by age at marriage. This is only an approximation to entry sterility, since at ages 35 and above there are not enough cases to yield reliable results. The small number of cases at old ages is mainly due to the age pattern of marriage and to some extent to the strict selection criteria that have been imposed. More specifically the data shown in table 7.8 consist of real marriages for which the end of marriage is known, the age of wife at marriage is also known and which lasted at least five completed years (four completed years for the age group 45-49). Hence, we eliminate cases where the couple did not bear a child not because the marriage was sterile but because they did not have the time to do it. Here the assumption is that is not very likely for a couple to bear a child if it has not done so in the first five years of its marriage.

30 For example if 10% of women in a given age group are sterile, 90% in that same age group are fecund.

Table 7.8: Entry sterility by wife's age at marriage; Naoussa and Kostos. Complete marriages that lasted at least five years; marriages from 1894 to 1950.

Age group	Married women	Childless	% childless
15-19	23	0	0.0
20-24	113	4	3.5
25-29	38	4	10.5
30-34	10	2	20.0
35-39	(9)	(3)	(33.3) [a]
40-44	4	3	75.0
45-49	1	1	100.0

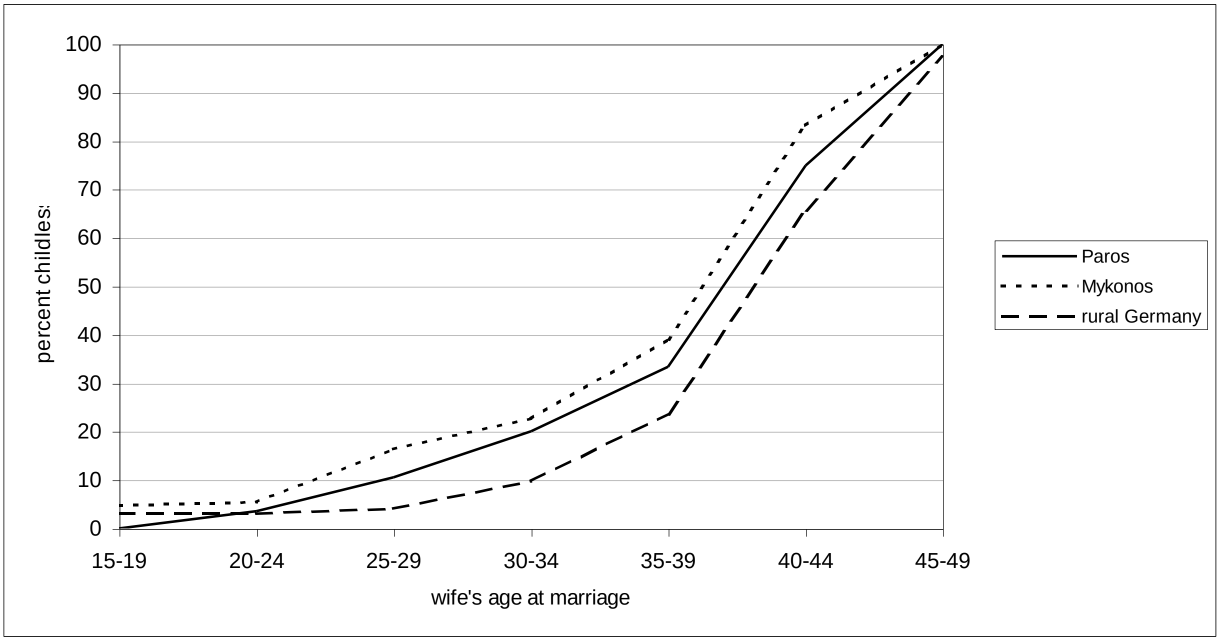
Source: Naoussa and Kostos family reconstitution.

[a] For the derivation of this value see the following paragraph.

Entry sterility seems to progress rapidly from 30 and above, although there are not enough data for the age group 35-39 to show us the exact course of sterility. The value 33.3 quoted for this age group is a very rough approximation. It has been reached by using the percentage of childless women who entered marriage at 35-39 but for whom the end of marriage is not necessarily known. To reduce the bias resulting from the fact that incomplete marriages have been used, our sample for this age group has been limited to only marriages that occurred up to and included 1935. This gave us a 33.3 percent of entry sterility in the age group 35-39 (3 out of 9 marriages were childless).

Figure 7.7 compares entry sterility among three populations: those of Paros, Mykonos and rural Germany. Paros is represented by Naoussa and Kostos and data have been taken from table 7.8. Data on Mykonos are based on marriages that took place from 1859 to 1919 or soon thereafter and have been taken from Hionidou (1993: 226). Data on rural Germany have been taken from Knodel (1988:270) and refer to complete marriages that took place from 1750 to 1899.

Figure 7.7: Entry sterility by wife's age at marriage.



Source: see text.

It is obvious from figure 7.7 that both Mediterranean populations exhibit higher levels of entry sterility from the age group 25-29 onwards than the 14 German villages studied by Knodel. Nevertheless, higher sterility at these ages does not have a significant effect on marital fertility because both in Paros and in Mykonos more than three quarters of female marriages had already taken place by the age of 25 (for Paros see chapter 6 and for Mykonos see Hionidou, 1993:226). In fact if one standardises the results for Naoussa and Kostos using the age distribution at marriage as provided in table 7.8, the overall entry sterility is only 3.4% whereas the standardised (for age at marriage) value for the German villages never fell below 10.3% from 1750 to 1899 (Knodel, 1988:272).

7.6.2 Fecundability

Fecundability is defined as "the probability of conception during a menstrual cycle in the absence of contraception…" (Knodel, 1988: 272). However, not all conceptions result in a live birth. A fraction of all fertilised ova either fail to implant or abort spontaneously during gestation (Bongaarts, 1975:646). Therefore, for measurement reasons, fecundability is distinguished in three types. According to Bongaarts (ibid):

"(1) Total fecundability *(TF)* is the probability that any conception occurs during a cycle; this includes non-implanted fertilized ova and conceptions aborted spontaneously before the end of the cycle.

(2) Recognizable fecundability *(RF)* is the probability of a conception which is recognizable at the end of the conception cycle by the non-occurrence of the menstruation…

(3) Effective fecundability *(EF)* is the probability of a conception which will end in a live birth. A fraction of the recognizable conceptions aborts spontaneously after the first cycle of gestation. "

The level of fecundability is determined by both biological and behavioural factors with the main behavioural factor being coital frequency (Bongaarts, 1993:10). Measures of fecundability may be gross or net. The difference between the two is that "the former is used for the probability of conception in females actually engaging in regular intercourse while the latter measures the conception probability in a population living in a normal social and biological environment in which temporary separation and illnesses occur" (Bongaarts, 1975:646-647). In the following discussion the term fecundability will refer to net recognisable fecundability only. Normally, fecundability is readily measured in natural fertility populations but there is still scope for measuring fecundability even in populations that deviate from natural fertility, under certain conditions. For our population the assumption can be made that couples acted under natural fertility from the date of their marriage until the birth of their first child. This was of course the case for the natural fertility marriage cohorts of 1894-1913 but it seems to have been the case for later marriage cohorts as well, at least until the early 1950s, since the interval between marriage and first birth had not undergone any significant lengthening up to that date (see table 7.9).

Table 7.9: Mean interval between marriage and first birth in months; only first births that took place between 8 and 120 elapsed months since the wedding are included. Real marriages from Naoussa and Kostos.

Year of marriage	Mean interval 0-1	Cases
1894- 03	21.2	83
1904-13	21.3	77
1914-23	23.2	73
1924-33	14.2	91
1934-43	18.0	80
1944-53	17.6	87
1954-63	27.9	64
1964-73	25.4	56
1974-83	24.1	78
1984-93	26.5	57

Source: Naoussa and Kostos family reconstitution

The method used here to estimate fecundability has been proposed by Bongaarts (1975) and is based on the proportion of first births that occur during the first year of marriage, excluding births that occur before the 9th completed month. This proportion is translated into a value of fecundability, which is given in a reference table provided in the paper of Bongaarts. The values of mean fecundability estimated by this method incorporate the assumption that the proportion of recognisable conceptions ending in a spontaneous abortion for first pregnancies is 16.2%[31]. Therefore, values for mean fecundability in table 7.10, although they have been derived from reproductive histories, refer to recognisable and not to effective fecundability. It should also be noted that in our analysis first births that occurred more than ten years after the wedding are excluded from the calculations for fear of not really being first, but births of higher order.

However, Bongaarts reference table provides values of mean fecundability corresponding to a limited range of the aforementioned ratio of births. More specifically the said ratio for which values of mean fecundability are provided ranges from 0.211 to 0.520 and the corresponding mean fecundability from 0.10 to 0.35. Nevertheless in our data there are two decades where the ratio of births in the first year of marriage to all first births falls beyond this range. To solve this problem in table 7.10 values of mean fecundability greater

[31] This value is based on a study made in Hawaii in the early 1960s by French and Bierman. The study showed that the incidence of late spontaneous abortion in Hawaii for women of all parities was 23.7%. The value of 16.2% for first pregnancies only is an estimate by Leridon using French and Bierman's data (Bongaart, 1975, 651).

than 0.35 or smaller than 0.10 have been calculated with simple linear regression taking fecundability as the dependent variable and the said ratio of birth as the independent. The regression model is expressed by the formula $Y_i=a+bXi+e_i$ where "Y_i" stands for fecundability, "Xi" for the aforementioned ratio of births, "b" is the slope, "a" the constant and e_i the residual of the regression. By using Bongaarts' table to solve the regression it was found that a=-0.0861 and b=0.802. The correlation coefficient "r" is 0.99 and the coefficient of determination r^2 is also 0.99. All factors (a, b, r and r^2) are statistically significant at the 0.001 level of significance.

Table 7.10: Mean fecundability of newly married couples by year of marriage. Naoussa and Kostos.

Year of marriage	First birth occurring 9-11 elapsed months since marriage. (1)	First birth occurring 9-120 elapsed months since marriage. (2)	(1)/(2)	Corresponding mean fecundability.
1894-03	30	75	0.400	0.22
1904-13	29	70	0.414	0.24
1914-23	25	68	0.368	0.20
1924-33	53	87	0.609	0.40
1934-43	35	76	0.461	0.28
1944-53	35	81	0.432	0.25
1954-63	18	63	0.286	0.14
1964-73	14	52	0.269	0.13
1974-83	15	71	0.211	0.10
1984-93	7	54	0.130	0.05

Source: Naoussa and Kostos family reconstitution.

A first observation from table 7.10 is that fecundability declines abnormally after 1954. Most probably those who married from 1954 onwards deliberately delayed their first child, and consequently their fecundability cannot be regarded as natural. Turning to those who exhibited natural fecundability, that is marriage cohorts up to 1953, it is observed that in the period 1894-1923 fecundability was more or less stable at around 0.22. This level lies in the middle of the observed scale for historical populations. Indicatively, fecundability in the five historical populations studied by Bongaarts fluctuated between 0.18 (the lowest, for Crulai) and 0.25 (the highest, for Tunis) with the Canadian population being an outlier with

0.31 (Bongaarts, 1975: 655). German villages studied by Knodel oscillated between 0.20 and 0.29 from 1750 to 1899 (Knodel, 1988:274).

In the following decade (1924-1933) fecundability rises to a spectacular 0.40. This practically means that a newly married woman engaging in sexual intercourse at a rather moderate rate, since Bongaarts' model allows for temporary spousal separation and illnesses, had a 40% chance of conceiving in any given month at the beginning of her marriage. This level of fecundability is very high even for the most prolific population. It may be that the model we use to estimate this value (linear regression) is not appropriate for estimating fecundability, although all factors of the regression (a, b, r and r^2) are statistically significant at the 0.001 level of significance and the coefficients of correlation (r) and determination (r^2) imply a very good fitting model. But in any case a ratio (of births in the first year of marriage to all first births) above 0.520 suggests a mean fecundability above 0.35 (which is the greatest value given in the reference table of Bongaarts). Consequently, even if linear regression is inappropriate to extrapolate values of fecundability beyond the range of Bongaarts reference table, mean fecundability in the decade 1924-1933 is above 0.35 indicating that the upsurge in that period (1924-1933) must have been genuine.

The 1920s are associated with several events, which could give an explanation as to what caused the rise in fecundability. A first reason might have been the influx of refugees from Asia Minor that flooded into the country in 1922-23. From a general rise in fertility observed in national level in the 1920s (see chapter 3) it seems that the refugees, due to either biological or behavioural factors or both, were more prolific than native inhabitants and this may have caused a rise in fecundability during 1924-1933. However, in the case of Naoussa and Kostos only 6% of the population in 1928 were refugees who came from Asia Minor after 1922 (as opposed to 22% for the whole Greece) (Statistique Generale de la Grece, 1933:130-131 **Vol. 1**). An unknown number of refugees had come shortly before 1922 as well (ibid) but in any case the percentage was too low to cause so great an increase in fecundability. Another reason that contributed to that increase is the return in 1922 of men from a period of war, which had lasted more than ten years (1912-1922). Moreover, the 1920s are associated with a recession in emigration, which until 1921 was in high levels with the majority of the emigrants being males as was seen in chapter 4. It is characteristic that after 1922 fecundability did not fall to previous low levels until the early 1950s when reproductive behaviour from marriage to first birth ceased to be natural. Therefore, it would not be irrational to assume that in 1914-1923 marriage cohort fecundability was depressed due to the wars and to mass emigration of males as well.

7.6.3 Postpartum non-susceptible period

Family reconstitution data permit us to examine postpartum non-susceptibility, i.e. the period after birth during which a woman is not susceptible to conception due to amenorrhea. This period can be as short as 50 days if a woman is not nursing her baby at all, but prolonged lactation can extend it up to two years (McNeilley, 1993). Although other factors also contribute to the non-susceptible period, such as decreasing fecundity with age, the length of breast-feeding is the main determinant of this period. During lactation a woman is usually amenorrheic, but supplemental feeding of the infant with other foods tends to decrease the effect of breast-feeding on amenorrhea. It is understandable of course that non-susceptibility cannot be measured from birth histories unless the examined population does not apply any spacing reproductive behaviour. In our population birth spacing seems to have been applied only by those who married from 1924 onwards, as was established earlier in this chapter. Consequently, any measures of the non-susceptible period, and hence of the length of breast-feeding, will refer to the marriage cohort of 1894-1923.

Two methods have been employed to measure the mean duration of non-susceptibility. The first method, termed here birth interval method, compares the interval between marriage and first birth with the interval between first and second birth. The difference between the two intervals should give a rough estimate of the non-susceptible period, since the main reason that the first interval is shorter than the second is the lack of postpartum non-susceptibility in the case of the former[32]. For this method to be reliable four restrictions on the data have been applied. First of all, any premarital conceptions have been excluded, since otherwise the mean interval from wedding to first birth would be artificially short. Secondly, in estimating the mean interval from first to second birth, intervals following an infant death have also been excluded. The reason for this is that after an infant's death lactation is forcibly interrupted, menstruation resumes and thus the full effect of breast-feeding on the non-susceptible period cannot be seen. The third restriction is that only women with more than two confinements are included in the calculations. This is because the interval before a woman's last birth tends to

[32] Other factors such as intra-uterine mortality and coital frequency may be responsible for the difference between the first and second birth interval but these factors are of minor significance.

be unusually long, even in natural fertility cohorts. Consequently, if women with only two confinements were included in the calculations, estimates of the non-susceptible period would be biased upwards. The fourth restriction is that only those first births that took place within ten completed years from marriage have been included in the calculations. This restriction is necessary in order to limit the possibility that higher order births have been recorded as first.

The second method for the estimation of the non-susceptible period, known as the child survival method, compares the mean interval from first to second birth in cases where the first child survived infancy and in cases where the first child died within a month from its birth. The difference between the two should reveal the duration of breast-feeding. In deriving estimates of the non-susceptible period with this method the restrictions of the "birth interval method" have been applied, where applicable.

Table 7.11: Postpartum non-susceptible period (NSP) in complete months for the marriage cohort 1894-1923; Naoussa and Kostos. In parentheses the number of cases. In brackets 90% confidence intervals.

Birth interval method		**Child survival method**	
Interval 0-1	19.0 (178) [± 2.3]	Interval 1-2 if 1 died within a month from birth.	16.5 (6) [± 2.2]
Interval 1-2 if 1 survived infancy.	26.5 (169) [± 1.6]	Interval 1-2 if 1 survived infancy.	26.5 (169) [± 1.6]
NSP	**7.5**	**NSP**	**10.0**

Source: Naoussa and Kostos family reconstitution.

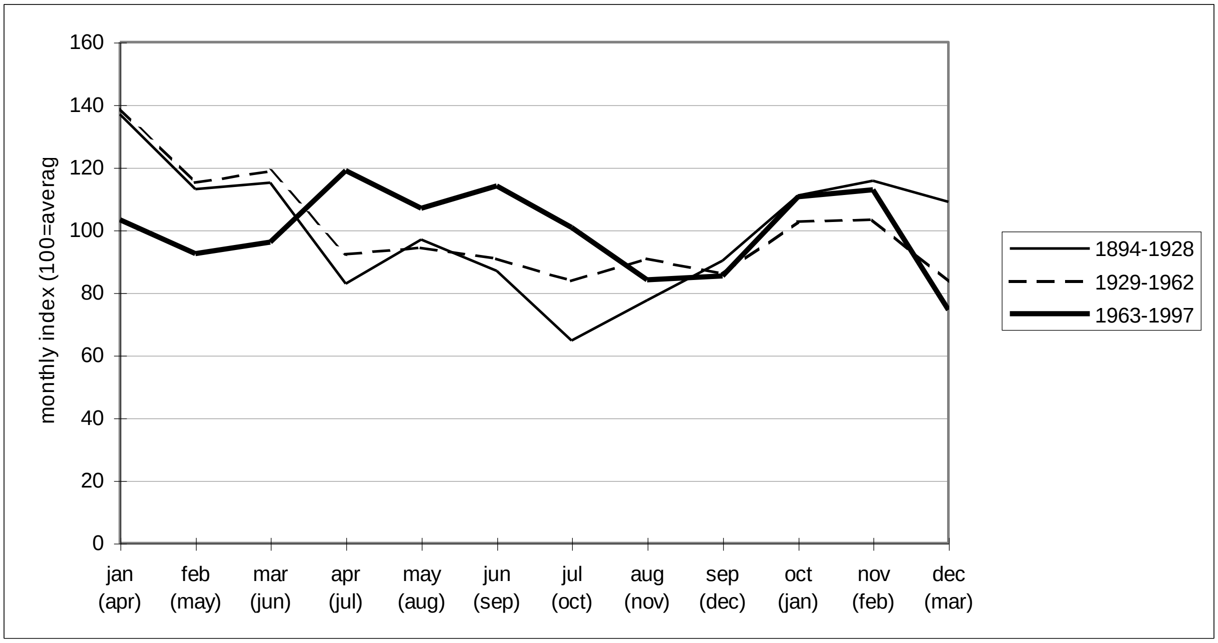
As can be seen in table 7.11 the child survival method involves few cases where the first child died within a month from its birth. However, the mean interval from first to second birth, even in these cases, seems to be a fairly good estimator since the confidence interval is quite narrow (2.2 months). Although the two methods produced somewhat different results, the difference is not big (2.5 months) and the average of the figures produced by the two methods can be taken as better representing the mean length of non-susceptibility. It seems that the non-susceptible period in the beginning of the 20th century was around 9 months and consequently the average duration of breast-feeding may have reached or even exceeded one year. This is a rather long duration for a European population. Comparatively, in the German villages studied by Knodel values of non-susceptibility (defined as above) similar or even higher with our population had been observed in earlier periods up to the mid-19th century, but in the last quarter of that century non-susceptible period had dropped to 5.8-7.5 months (Knodel, 1988: 278). In a sample of English parishes in the 19th century non-susceptibility ranged from 4.6 to 9.2 months (Reay, 1996:80-81) while the French Canadians in the beginning of the 18th century exhibited even lower non-susceptibility (five to six months) (Hionidou, 1993:232). However, the length of non-susceptibility and consequently breast-feeding in Naoussa and Kostos seems to have been shorter than in other parts of Greece. The non-susceptible period in Mykonos was around 12 months for the marriage cohorts of 1859-1918, while a survey conducted in Athens and Salonika in the 1960s revealed that “approximately 65% of the children were breast-fed for at least 15 months” (Ibid. 231).

7.7 Seasonality of births

Seasonality of births is not related to fertility in an obvious manner, though a seasonal pattern that changes over time could affect fertility (Knodel, 1988: 281). However, it is interesting to examine seasonal variations in births in the study communities because these variations can disclose information about factors that delineate the reproductive behaviour of the population within a calendar year. A changing seasonal pattern over time could also reveal cultural or economic changes.

Seasonality of births is explored in parallel with that of the corresponding conceptions. For this purpose, the assumption has been made that all conceptions took place nine months before the corresponding births. However, since the period of gestation varies moderately from one woman to another, only two thirds of the conceptions result in a birth nine months later (Bongaarts, 1975: 650) and one should bear this in mind while examining the following graph (figure 7.8). The study period has been divided into three 34-year sub-periods. The y-axis of the graph indicates the monthly index (with the average being 100 in each sub-period) and the x-axis indicates month of births and in parentheses month of conceptions.

Figure 7.8 Seasonality of births (and of conceptions); Naoussa and Kostos 1894-1997



Source: elaboration of 5021 birth records.

Note: 1894-1928 N=2303; 1929-1962 N=1719; 1963-1997 N=999.

The seasonality pattern of conceptions and births is quite similar for the first two periods (1894-1928 and 1929-1962), while it has changed considerably in the more recent period (1963-1997). The pattern of conceptions for the first two periods suggests a low level of conceptions during the summer and autumn months with the exception of June and a high level during the winter and spring with the exception of March in the second period (1929-1962). This pattern is in accordance with the one found in pre-war Mykonos by Hionidou (1993:45) and it has been connected with the particular economic activities of the population. The trough of conceptions during summer can be associated with the increased agricultural work that is required at that time of the year. As it has been shown in chapter 2, both our communities were agricultural in the first two sub-periods, their main products being grapes and olives. The period from mid-August to mid-September is related with the grape harvest while October and November are linked with the olive-harvest. Both tasks are labor-intensive and usually all the members of a peasant's family were involved in these jobs. The hard work on the fields, or according to Hionidou the lack of privacy, which resulted from the simplicity of the rural dwellings where many families stayed during those months, was probably accounted for reduction in coital frequency and subsequently in conceptions.

The above described pattern of seasonal conceptions that prevailed until the 1950s (though more obvious in the first period (1894-1928)) resulted in many births in the months of January, February and March, while there was a relative dearth of births in the summer months. This pattern, which had a rather beneficial effect on infant mortality, as will be revealed in the next chapter, changed from the 1960s onwards. The higher than average number of births in April, May and June in the latest period (1963-1997) and their corresponding months of conception in July, August and September reflect the fact that the society is not dominated by a rural economy anymore and that work conditions that used to impede sexual activity during the summer months have changed.

As a summary measure of the seasonal variations exhibited in the three periods under consideration, the index of the extent of seasonality is presented in table 7.12. This index, which was introduced in the previous chapter, is the average deviation of the monthly indexes from their mean (which is 100). The greater the index, the greater the seasonality exhibited by the births within a calendar year will be.

Table 7.12: Extent of seasonality of births; Naoussa and Kostos 1894-1997.

Year of birth	Index of the extent of seasonality
1894-1928	17
1929-1962	13
1963-1997	11

Source: elaboration of 5021 birth records

As was the case with marriages in the previous chapter, the variability in the seasonal variations of births has declined over time. This could mean that the two main factors that determine the seasonality of these vital events, that is the religious regulations and the annual working cycle, exert less influence in the family and childbearing decision-making in recent years than was the case in the past.

7.8 Marital fertility in a national context

The above analysis produced evidence that two main communities of Paros acted under a regime of natural fertility at least until the 1920s. The last marriage cohort that was undoubtedly a natural fertility one was that of 1904-1913, but even the 1914-1923 cohort only slightly deviated from natural fertility by applying some kind of stopping behaviour at older reproductive ages. It seems that people belonging to that marriage cohort (1914-1923) tried to stop childbearing only after having reached a number of children they did not want to exceed, and that, most probably, could have happened at least ten years after their marriage. Thus the turning point from natural to controlled fertility for the examined communities and inferentially for the entire island of Paros should be posed between the late 1920s and early 1930s. Not surprisingly, the late 1920s are proposed by Hionidou (1993: 233) as the date that fertility decline started in the adjacent island of Mykonos.

This is a rather late date for fertility decline compared to Greece as a whole. According to Siampos and Valaoras (1969: 606) "Within the 1900 boundaries of the country, the point of inflection towards lower fertility, that is, the date when marital fertility reached 10 per cent below its "plateau" level in a sustained decline, may be put around the year 1890". Of course there were great regional variations across the country in the beginning of the 20^{th} century with Capital area and the Ionian islands being in a more advanced stage of fertility decline than the rest of Greece, while the Cyclades exhibited an average or even higher than the national average fertility at that time (ibid: 604-605).

However, there is a problem of comparability if one wants to compare the fertility level of the examined communities with that of Greece and the Cyclades. For the period that our ASMFRs refer to (1894-1933), there are no published data that would permit the calculation of age-specific marital fertility rates for Greece and the Cyclades. Siampos and Valaoras measured marital fertility by using the Coale's index of marital fertility (I_g). To solve this comparability problem an index of marital fertility proposed by Knodel (1988:248) has been adopted. This index is a modified version of Coale's index of marital fertility (I_g). The original I_g is the ratio of the legitimate births of the examined population to the births this population would have under maximum natural fertility. The modified version of this index, denoted as I_g', is the ratio of the births a standard population would have under the fertility schedule of the examined population to the births the same standard population would have under maximum natural fertility. The only difference between the original I_g and the modified I_g' is that the latter makes use of the age-specific marital fertility rates available from family reconstitution. The advantage of this modified index of marital fertility (I_g') is that one can compare the marital fertility of the examined population with that of populations for which only the original I_g is available "…since the value of the original and the modified indices do not differ greatly from one another under most circumstances" (Knodel, 1988:250).

Table 7.13 compares the level of marital fertility in the examined communities with that of Greece and the Cyclades. For the calculation of I_g' the age structure of married women of Greece aged 15-49 in 1928 was used as standard. More details about how I_g' has been derived and why the population of 1928 was chosen as standard can be found in appendix E. To allow for the fact that we compare cohort (I_g') with period (I_g) fertility a time lag is proposed when comparing I_g' and I_g. Thus, in table 7.13 marital fertility of Greece and the Cyclades in 1921 is compared with that attained by those who married between 1904 and 1913 in Naoussa and Kostos, and marital fertility of Greece and the Cyclades in 1928 is compared with that attained by the 1914-1923 marriage cohort in Naoussa and Kostos.

Table 7.13: Knodel's index of marital fertility (I_g') by year of marriage for Naoussa and Kostos and Coale's index of marital fertility (I_g) for Greece and the Cyclades by year of reference.

Year of marriage	**Naoussa & Kostos**	**Year**	**Cyclades**	**Greece**
	$\mathbf{I_g'}$		$\mathbf{I_g}$	$\mathbf{I_g}$
1894-1903	0.78			
1904-1913	0.72	1921	0.65	0.56
1914-1923	0.68	1928	0.63	0.59
1924-1933	0.63			

Note: Values for Greece and the Cyclades have been taken from table A.1. For the calculation of values for Naoussa and Kostos see appendix E.

As shown in table 7.13 marital fertility in Naoussa and Kostos declined gradually and monotonically from an index of 0.78 for those who married in the turn of the 20^{th} century to 0.63 for the 1924-1933 marriage cohort. Comparatively, the original I_g for Greece, as calculated from official statistics (see appendix A, table A.1), was substantially lower in the two dates, 1921 and 1928, where data are available. On the other hand marital fertility in the Cyclades was closer to that of the study communities, although somewhat lower. Although official statistics do not provide data for the calculation of I_g in earlier dates, some estimates give an identical I_g for Greece and the Cyclades in 1900, around 0.68 (Siampos and Valaoras, 1969:605). This may suggest two things. First that the Cyclades in 1900 attained same levels of marital fertility with Greece but they subsequently lagged behind as fertility transition proceeded more rapidly in other areas of Greece. The second inference that can be made from the time series of I_g mentioned above, is that the examined communities were more delayed in fertility transition than the Cyclades and even more so than Greece as a whole.

A peculiarity about values of I_g for Greece in table 7.13 is their increase between 1921 and 1928. Nevertheless, the rapid ascent in I_g of Greece from 1921 to 1928 was only a temporary trend owing to the influx of refugees from Asia Minor and the fertility resumed its descending course again in the 1930s as it was shown in some detail in chapter 3.

7.9 Conclusions

This chapter explored marital fertility in the Aegean island of Paros based on data from one main town and one village of the island, namely Naoussa and Kostos. The conclusion that might be of some interest to the wider public is that fertility was still "natural" in the island at the beginning of the 20th century, while a substantial fertility decline made itself visible only in the late 1920s and early 1930s.

One of the measures used to probe marital fertility was the age-specific fertility rates. The age pattern of these rates started deviating from that of a natural fertility standard for those who married between 1914 and 1923. Other measures, such as age of mother at last birth and the length of the last inter-confinement interval showed that there was indeed a differentiation in the reproductive behaviour of this marriage cohort from previous ones, although this differentiation towards family limitation was neither spectacular nor decisive. It was rather a continuation of a trend that had probably already started a decade earlier. Nevertheless, though the 1914-1923 marriage cohort lies between natural and controlled fertility, since the proportion of marital fertility that occurred after age 30 was marginally lower than that characterising natural fertility populations, the mean completed family size fell substantially from around 6 children per family for the 1894-1913 marriage cohort to 5.4 in the 1914-1923 marriage cohort, and thus it can be accepted that, conventionally, this was the marriage cohort that initiated family limitation.

However, a more discernible move towards family limitation came with the next marriage cohort, that of 1924-1933. Age of mother at last birth dropped from 38 to 36 years, the mean last inter-confinement interval became 17 months longer than that of the previous marriage cohort and the proportion of fertility occurring after age 30 was only 37% of the total fertility compared with 45% that was in the 1914-1923 marriage cohort. All these revealed that those who married between 1924 and 1933 were in an advanced stage of family limitation. This tendency towards birth control in a parity-dependent way became even more intense in the next marriage cohort, that of 1934-1943, which is practically the last marriage cohort whose reproductive behaviour can be surveyed with our data.

To investigate how the population switched from natural to controlled fertility a birth interval analysis was employed. This suggested that any attempts to reduce family size among those who married before 1924 were confined to stopping childbearing only after having reached a number of children they did not want to exceed. Birth intervals of almost all orders started to lengthen only after 1923 and this is an indication that birth spacing started to be used in conjunction with birth stopping by those who married from 1924 onwards. The use of birth spacing seems to have been limited until the 1930s but it became increasingly more important in subsequent marriage cohorts.

Dissagregating fertility by occupational group revealed that even among the natural fertility cohorts in the beginning of the study period (1894-1913) fertility was not homogeneous. The group with the lowest fertility was most likely the service providers but the very small number of cases does not permit any firm conclusions on this. On the other hand the greater number of those belonging to the "crafts/sales" category testifies that their small family sizes was probably representative of their group. Consequently, it seems that this occupational group controlled its fertility from the end of the nineteenth century (or even earlier) and probably was the group that spread the idea of family limitation.

Turning to the proximate determinants of fertility, it was found that levels of sterility fluctuated in average levels and its effect on marital fertility was limited mostly in ages 30 and above. Fecundability oscillated in moderate levels until 1923 and then it was boosted to extremely high levels due to population movements that changed the composition of the native population. The high fecundability observed in the 1920s and the early 1930s declined gradually in the next decades as reproductive behaviour from marriage to first birth ceased to be natural. The non-susceptible period after a confinement was around 9 months in the years 1894-1923 and that implies a breast-feeding period of almost a year. This relatively long period of breast-feeding must have had a reducing effect on marital fertility in the beginning of the 20th century.

Finally an attempt was made to place the fertility of Naoussa and Kostos in national context by comparing the indexes of marital fertility of the examined communities with those of Greece and the Cyclades. It was found that in the first third of the 20th century the study communities exhibited a marital fertility quite close to that of the Cyclades, although slightly higher. Nevertheless, the level of marital fertility of both the Cyclades and the examined communities was rather high compared to that of Greece as a whole.

CHAPTER 8: MORTALITY

In the previous two chapters family reconstitution was used effectively in the study of nuptiality and fertility. Here, we make use of family reconstitution results to examine the mortality of the two study communities throughout the period under consideration (1894-1998). However, in the study of mortality the method of family reconstitution, for reasons explained further on, is effective only when dealing with young ages, conventionally with children under 15 years old. Therefore, in addition to family reconstitution this chapter makes extensive use of aggregative methods and non-quantitative community archives in order to study certain mortality issues. The first of these issues is the transformation of the mortality regime in terms of the causes of death and the reasons behind this transformation. Moreover, the seasonal pattern of mortality in different age groups is explored. Further on family reconstitution results provide an insight into infant mortality prevailing in the first 60 years of the examined period (1894-1953). Levels and trends of childhood mortality up to age 15 are also investigated, though in a rather sketchy way because the restricted data set used for the analysis of child mortality does not permit us to enter into many details. The chapter finishes with a reference to the mortality crisis of 1942 (the only mortality crisis found in our data), which was the local version of a wider crisis that afflicted many areas of Greece during the Second World War.

8.1 Causes of death

The examination of causes of death constitutes an important stage in the study of mortality. Unfortunately, reliable data on the causes of death made their appearance only in the 19th century and that only in the civil registers of developed countries. Therefore, most family reconstitution studies, which draw their data from parish registers, do not examine causes of death in a systematic way, or present cause-specific mortality rates. One of the particularities of this study, however, is that it applies family reconstitution to a recent rather than to a historical population and thus the majority of the death certificates used in the study are taken from civil registration and provide a cause of death. This information will permit a breakdown of mortality by cause of death and will give us an insight into the mortality regime of the examined communities and the changes this underwent during the 20th century.

It was mentioned in chapter 2 that our primary data include 2439 death certificates covering the period 1894-1998. A cause of death is mentioned in 1606 of the death certificates, that is in 66% of them. Causes of death are totally missing from death records of the years 1894 and 1916-1931. Why there is no such information in the death records of 1894 is not known. As for the period 1916-1931, as has been said in chapter 2, vital statistics were kept only by the church during that period. Those parish registers contain less information than proper books of civil registration and one of the missing fields of information is cause of death. Therefore our analysis about causes of death has to be based on the periods 1895-1915 and 1932-1998, where a cause of death is usually mentioned in death certificates. Even in these periods, however, the cause of death is not mentioned invariably in every death certificate. In the period 1895-1915 54.9% of the death records provide a cause of death, while this percentage rises to 97.7% in the period 1932-1998.

A major concern relating to causes of death is their classification in a comparable and comprehensible way. At international level the World Health Organisation (WHO) is entrusted with the classification of diseases and periodically produces revised lists of such classifications. In this study it was decided to follow the last (9^{th}) revision of classification of deaths which was recommended by WHO in 1975 (WHO, 1977). The basic tabulation list proposed by the 9^{th} revision conference of WHO is flexible enough "…to allow users to construct their own tabulation lists from the rubrics of a basic list" (ibid.:745). Thus it is possible in table 8.1 to show ten broad categories of causes of death, while the three-digit numbers in parentheses beside each category refer to numbers in the basic tabulation list of the 9^{th} revision conference of WHO.

Table 8.1: Causes of death (percentages among all deaths) by year of death; Naoussa and Kostos.

	Cause of death	1895-1915	1932-1965	1966-1998
1	Infectious and parasitic diseases (001-002, 010-138)	33.8	11.0	0.4
	Diarrhoeal and intestinal diseases (007-009)	6.8	7.8	1.8
	Diseases of the respiratory system (460-508)	15.5	16.8	6.3
2	Diseases of the circulatory system (390-427)	3.5	13.0	43.2
	Cerebral incidences (430-440)	2.0	9.0	13.7
	Diseases of urinary system (580-599)	1.8	2.8	6.3
	Diabetes mellitus (250)	0.0	0.5	1.3
	Malignant neoplasms (140-208)	0.5	8.3	13.0
3	Accidents and violence (E800-E999)	0.8	2.6	3.8
	Direct and indirect obstetric deaths (630-676)	1.5	0.5	0.0
	Other causes	33.8	27.6	10.2
	All infectious and contagious diseases (1)	**56.0**	**35.7**	**8.5**
	All degenerative conditions (2)	**7.75**	**33.6**	**77.6**
	Number of deaths upon which percentages are based.	400	653	553

Source: Naoussa and Kostos civil registers.

Before commenting on figures in table 8.1 a few things should be said about the ten broad causes of death because in some cases they are broader than the legend implies. Hence, the category "direct and indirect obstetric deaths" contains not only maternal deaths due to complications during and after labour, but also deaths due to abortion, which in Greece was illegal up to the early 1980s. The category "Accidents and violence", apart from accidents of all kinds, includes homicides, suicides and generally deaths due to violence. The category "Diseases of the circulatory system" contains, apart form heart diseases, rheumatic fevers as well. The rest of the categories are more explicit.

Causes of death in table 8.1 have been classified in such a way as to reflect the level of social development of the examined communities. Most causes of death have been further grouped in two major categories at the end of the table: "Infectious and contagious diseases" (category 1) and "Degenerative conditions" (category 2). The first category contains diseases that can be transmitted from one person to another or through the environment. These diseases are dominant in societies with high mortality and a low level of social development, affect mainly younger ages and cause premature deaths. The second main category contains conditions that appear mainly in old ages and imply a degeneration of the inflicted person. Causes of death contained in the second category, such as heart diseases, strokes, cancers and nephritis are characteristic of societies with low mortality and high indexes of social development.

In the beginning of the 20^{th} century (1895-1915) the majority of deaths (56%) were caused by infectious and contagious diseases (category 1). This fact implies poor hygienic conditions and lack of advanced medical services. On the other hand in the same period (1895-1915) deaths from cancer, strokes and diabetes were almost non-existent, something which is also characteristic of high-mortality regimes.

In the next period, however, that of 1932-1965, the mortality regime had already changed. Degenerative conditions claimed almost equal number of deaths as infectious diseases (33.6% and 35.7% respectively). Actually, in that period the recession of infectious diseases was achieved exclusively due to elimination of diseases like tuberculosis, diphtheria, malaria and typhoid fever, termed "Infectious and parasitic" in the first row of table 8.1. The proportion of deaths due to diseases of the respiratory system and diarrhoeal ones was increased slightly. There could be two reasons for this. First of all infections of the respiratory system like pneumonia, bronchitis and generally “colds” are more lethal when they afflict the elderly rather than young people. Consequently, in an environment where "infectious and parasitic" diseases have been eliminated people have a better chance of surviving to old age and subsequently more chances to die of an illness of the respiratory system. A second reason for the increase in the proportion of deaths from respiratory ailments in the period 1932-1965 can be the improved quality of the registration of the cause of death compared with that of the previous period (1895-1915). It is indicative that in the first years of the examined period doctors who certified deaths tended to resort to a very poor description of the cause of death, such as "natural" or "ageing" or "advanced ageing". In the period 1895-1915 21% of the causes of deaths are "ageing" and 10.25% "natural". In the period 1932-1965 the relevant percentages have reduced to 15.2 and 0.31 for "ageing " and "natural" respectively, while in the period 1966-1998 only 4.7% of deaths were due to "ageing" and none due to "natural cause". It would be reasonable to assume that many deaths from ageing or from natural causes in the first period (1895-1915) were in fact deaths due to respiratory diseases and when the quality of causes-of-death-reporting improved in the 1932-1965 period these deaths appeared to increase. The slight increase in the proportion of deaths due to diarrhoeal and intestinal diseases, however, might be genuine since these afflictions were at high levels in the 1930s and the 1940s (11.4% and 7.8% of all deaths for the two decades respectively) and they were reduced substantially only in the 1950s. Nevertheless, it could still be the case that a lot of deaths due to diarrhoea were reported as being “natural” in the period 1895-1915.

In the last period (1966-1998) the overwhelming majority of deaths (77.6%) were due to degenerative conditions, while deaths form infectious and parasitic diseases (other than diarrhoeal and respiratory diseases) had virtually disappeared.

One of the causes of death that exhibited an increase over time is “accidents”. This increase was somewhat expected as traffic accidents, which are very common in the island in recent years due to the presence of very many cars and motorcycles, were rare in the past. A quite common category of accidents in recent years is also "drowns in the sea" or “drowns in diving”, which attest the increased tourist activity during summer months.

The above-described changes in the mortality regime, which in the course of a century (1895-1998) presented a dramatic transformation, imply great achievements in public and personal sanitation, immunisation, provision of medical services and (more implicitly) a rise in the standard of living. The evidence for the progress achieved in these issues is scattered and most is based on the meeting minutes of the community council of Naoussa and on accounts of local informants. Nevertheless these sources provide an insight into the social development of the examined communities. As far as public health is concerned the town of Naoussa until the early 1930s relied on two public springs for potable water, from where the housewives had to carry the water daily to their homes. In the countryside around the village, where many rural families lived, dwellings usually had their own well. At least one of Naoussa's springs, with its waters gushing up all over the area, contributed to contamination. In the minutes recorded at the council meeting of 21/10/1933 is written that the council “…taking into account the protests of the inhabitants that this spring and the bubbling water within a range of 100 meters have become a source of infectious diseases and of transmission of malaria…unanimously decides to expropriate the upper public spring and the adjacent waters and to convey them in an aqueduct…in order to protect the health of the inhabitants and to supply the community with water”[33].

Thus, a rudimentary network of running water was built in Naoussa in the 1930s but this system supplied only the households situated in the centre of the town. The rest of the households continued to rely on the public fountains or, in the case of rural dwellings, on their own well. In 1959 a greater project was approved by the local council, leading to the construction of a proper network of running water, which covered the whole village[34]. What is noteworthy is the timing of these developments. Most probably people knew that the public fountain was a source of contamination and of malarial, diarrhoeal and other water-spread diseases years before they decided to build the aqueduct. Yet, it was in the early 1930s that the circumstances made it possible for an aqueduct to be built. In the minutes of the same meeting (21/10/1933), which approved the aqueduct, it was found that the decision of the local council to drain the waters followed a decision taken by the union of Naoussians in Piraeus to finance the construction of an aqueduct; and that the completion of the project was made possible by large donations made by local people who had migrated to the USA. Here one can see a link between economic development and improvements in public health.

With respect to the sewage system it is obvious that households without running water could not have had a water closet. It is known from local informants that most households until the 1950s were using a cesspool instead of a toilet with a drain. A few households in the centre of the town obtained proper toilets (water closets) in the 1930s when the first network of running water was established, but most of them installed water closets in the 1960s, when the network of running water was serving the entire town. Therefore, it is sensible to assume that a fairly hygienic environment in the village of Naoussa was achieved only in the 1960s.

Nevertheless, apart from improvements in public health and personal sanitation, another factor that contributed to the above-described changes in the causes of death should have been medical progress and better provision of medical services. Although there is not enough evidence to prove this, there are some indications showing that medicine and its services were becoming more prominent over time. The first evidence is the increasing number of death certificates with a recorded cause of death, something that means that a doctor certified the death. In the period 1895-1915 only 54.9% of the death records provide a cause of death, while this percentage rises to 96.3% in the period 1932-1965 and to 99.5% in the most recent period (1966-1998). The ever-increasing number of death certificates with a cause of death might imply that a doctor was becoming available more readily over time.

Another piece of evidence that testifies to the importance of medical progress has been found at the meeting minutes of the community council of Naoussa. The minutes recorded at the council meeting of 26/11/1933 read that the council "…taking into account the number

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33 Community archives of Naoussa. Minutes from a council meeting on 21/10/1933.
34 Community archives of Naoussa. Minutes from a council meeting on 11/6/1959.

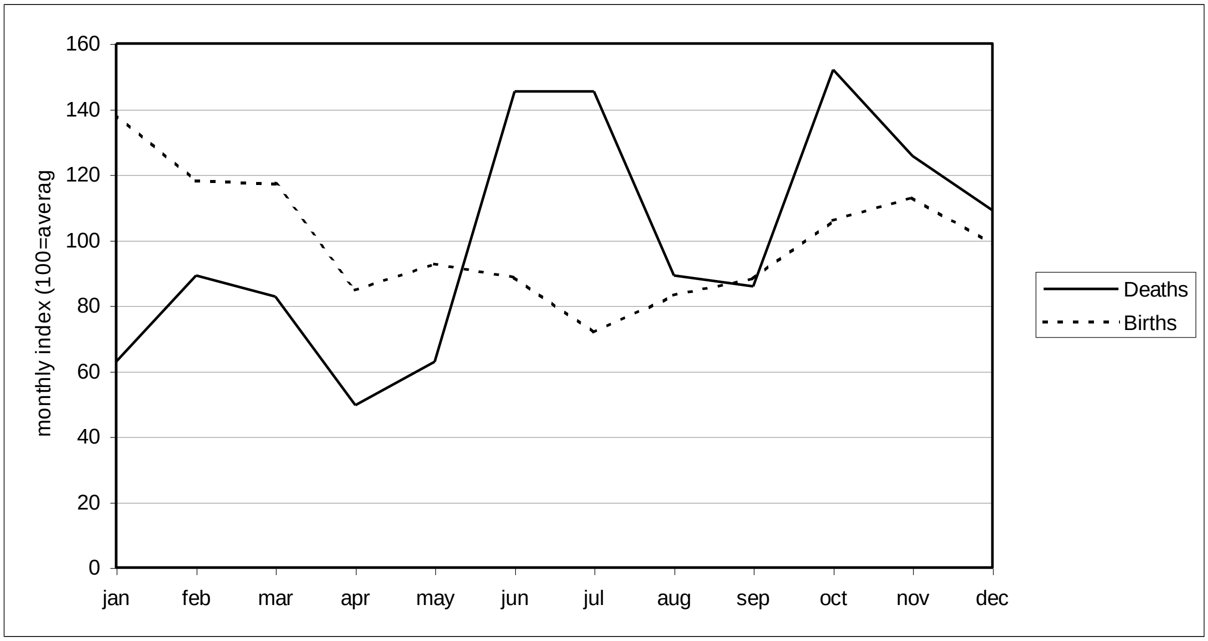
94708 directive of the Ministry of Public Health confirmed by the number 1759 document of the district doctor of the Cyclades concerning the assignment of the inoculation of community inhabitants to a private doctor unanimously decides to assign the inoculation of the nhabitants of the community to the private doctor Emmanouil Pyrgi…". From other sources it is known that inoculation against smallpox was compulsory in the beginning of the 20th century in Greece and that in the Cycladic islands sporadic inoculations of the population were taking place as early as the beginning of the 19th century (Hionidou, 1993:141).

8.2 Seasonality of deaths

After experimenting with our data we confirmed what has been shown in other studies of historical demography as well: that the seasonal pattern of mortality differed with age. Thus, an age breakdown was adopted so as to demarcate the distinct seasonal mortality exhibited by different age groups. A division into three age groups has been adopted, after realizing that a further graduation of those groups provides little difference in the seasonality of their sub-groups. The first age group contains infant deaths i.e. those who died before completing the first year of life; the second group comprises the age band 1-14; and the third group everyone who died after his/her fifteenth birthday (15+). The studied era is divided into two periods: 1894-1947 and 1948-1997. From the first period the year 1942 has been subtracted, as it was a year of famine (the crude death rate of Naoussa rose to 41.8 per thousand in that year from around 10 per thousand previously) and its seasonal pattern of mortality was different from that of a normal year. The y-axis of the graph 8.1 indicates the monthly index. An index of 100 stands for the average number of deaths in each month if deaths were evenly distributed throughout the year. The x-axis indicates the months that deaths took place.

The seasonality of infant (figure 8.1) and childhood (figure 8.2) deaths is examined only for the first period 1894-1947, because the number of infant and childhood deaths in the second period (1948-1997) is too small to give a credible seasonality pattern. More specifically, in the second period (1948-1997) there are only 24 infant deaths, 14 of which are concentrated in the decade 1948-1957, and only 17 childhood deaths.

Figure 8.1 Seasonality of births and infant deaths; Naoussa and Kostos 1894-1947 (excluding 1942)



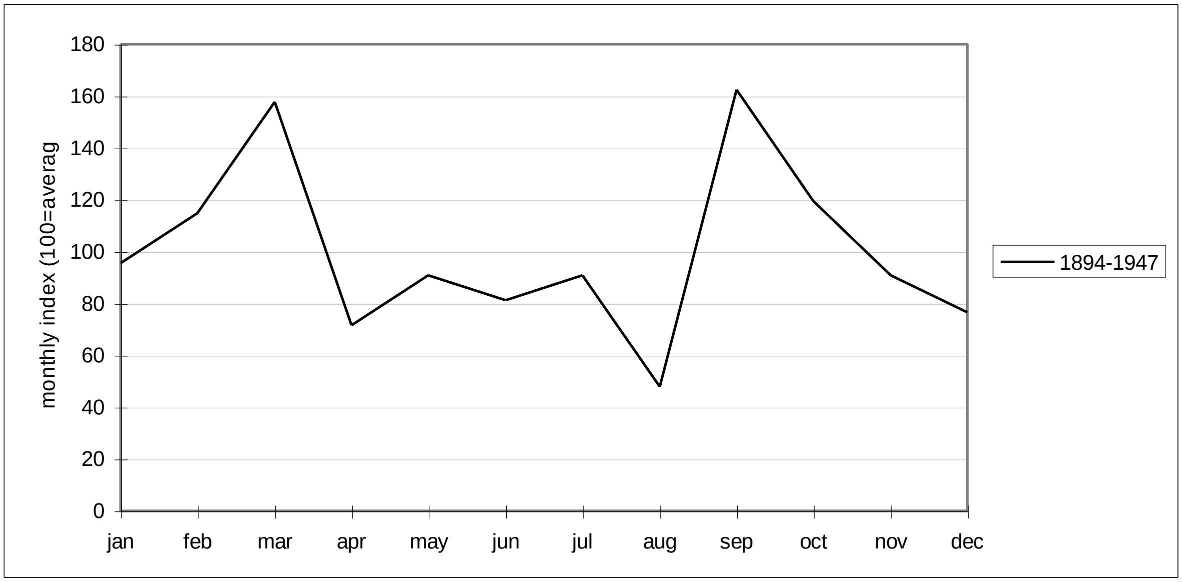
Source: Based on 363 death and 3497 birth records.

A general problem with monthly variations in infant deaths is that they are affected by monthly variations in births, therefore obscuring interpretation. For that reason seasonality of births is also presented in figure 8.1, so as to facilitate comparison of the variability of the two vital events. It is obvious that the seasonality of births is not so acute as that of infant deaths. Therefore, there must be something genuine in the peaks and troughs of infant deaths, especially when these fluctuations deviate more than 40 units from the average (which is 100), since the deviation in birth seasonality never exceeded 38 units. The prolonged peak in June and July reflects deaths from diarrhoeal diseases, which were a major killer of infants and young children (1-4 years old) in pre-war Greece in seasons when the climate was hot and humid, that is from mid-May to mid-September (Soutzoglou-Kottaridi, 1991:372). Especially in the island environment, diarrhoea is mentioned as a cause of death (in the death certificates of our two communities) in every single month of the year, but it was taking endemic form in the summer months of June and July. As death certificates of Naoussa and Kostos reveal, diarrhoeal diseases continued to represent a serious threat for infants until well into the 1950s. Unfortunately, it is not possible to extract trustworthy percentages of those who died from diarrhoeal diseases because in the period before 1932 cause of death is registered very irregularly in the death certificates; in only 25.2% of infant deaths occurring prior to 1932 a cause of death is mentioned.

The sudden fall of mortality in August and September is difficult to explain since diarrhoeal diseases were supposed to be extremely lethal in those months as well. This fall may be associated with a drop in the number of births earlier in the calendar year. The peak in October (and at a lesser extend in November) might have to do with working practices of mothers during the olive harvest. Because this kind of rural work was labour-intensive, all the members of a rural family were employed in the harvest. It might be the case that mothers, who were nursing their children, chose to wean them in that period so as to facilitate their work in the field. The early cessation of breast-feeding would have negative effects on the infants' survival. Although there is not any hard evidence to prove this assumption, the practice of early weaning as a response to demanding agricultural activities, has been found in rural communities in German villages (Knodel, 1988) and particularly for olive-harvesting, in rural Italy (Bell, 1979).

Seasonal mortality of children aged 1 to 14 years (figure 8.2) exhibits a different pattern from that of infants. The peak here is not in summer months, but in March and September. One might expect the higher than average mortality in early spring (in March and at a lesser extend in February) to be associated with ailments of the respiratory system. And indeed bronchitis, pneumonia, and "colds" are all mentioned occasionally as causes of death during February and March in the death certificates. Yet, there are more records of diphtheria, a disease that inflicted death at children and infants not only in those two months but all over the year, up to the mid-1930s. Another infectious disease registered as a cause of death particularly in March for children was malaria. The major peak in September is due to diarrhoeal diseases, which in that month and for the period under consideration (1894-1947 excluding 1942) caused 25% of childhood deaths as opposed to only 11% per average in every other month. It is peculiar, however that although the number of childhood deaths due to diarrhoeal diseases was equally high during summer months (15.4% in June, 15% in July and 25% in August), the total number of childhood deaths, irrespective of cause of death, was higher in September than in the summer months.

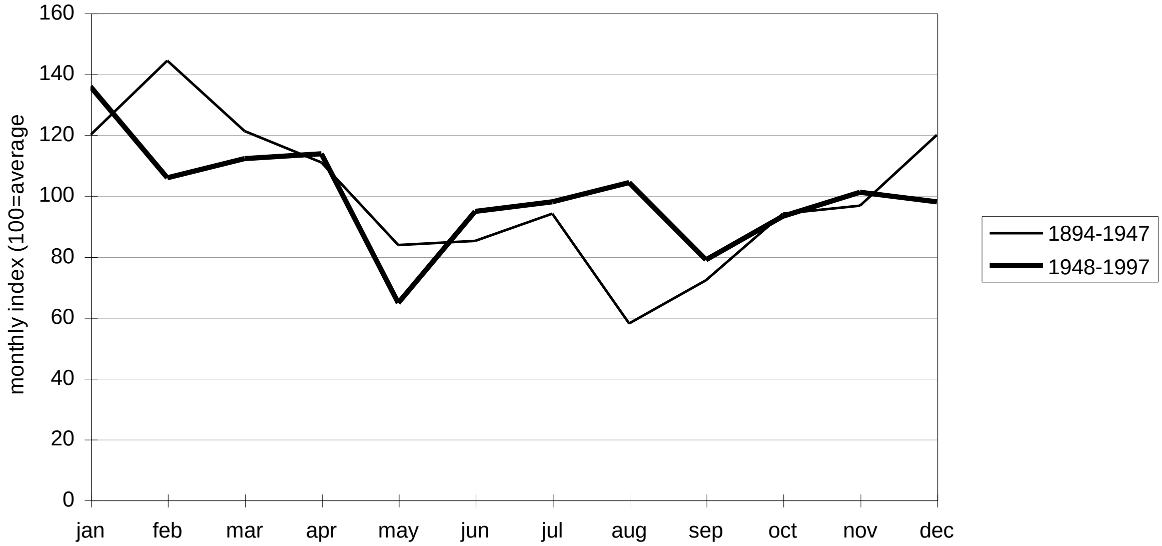
Figure 8.2 Seasonality of childhood deaths (ages 1-14); Naoussa and Kostos 1894-1947 (excluding 1942)



Source: Based on 251 death records.

Seasonal variations in adult mortality (figure 8.3) for the earliest period (1894-1947) conform to a pattern usually found in temperate climates: low in late summer (August) and maximum in late winter (February). The higher than average level in winter and early spring can not be related to any cause of death particularly. Respiratory infections and tuberculosis were common causes of death all over the year for this period. In the latest period (1948-1997) the peak has shifted from February to January, while mortality in summer months (June, July August) is not so low as it was in the first period (1894-1947) and in August is above average. This rise of mortality in summer months probably reflects tourist activity from the 1970s onwards in the island (and in the examined communities as well). Since during summer months there are many more people in the two communities than the rest of the year, the number of deaths increases proportionally.

Figure 8.3: Seasonality of adult deaths (ages 15+); Naoussa and Kostos 1894-1997 (excluding 1942)



Source: elaboration of 1691 death certificates. Note: 1894-1947 N=931; 1948-1997 N=760

Table 8.2 compares the seasonality of different sub-periods using an index that summarises the extent of seasonal variation in each of these periods. This index shows the average deviation of the monthly indexes from their mean (which is 100). In other words we take the sum of the absolute differences between 100 and each monthly index and divide this sum by 12. The greater the index, the greater the seasonality exhibited by the deaths over the calendar year.

Table 8.2: Extent of seasonality of adult mortality; Naoussa and Kostos 1894-1997 (excluding 1942).

Year of death	Index of the extent of seasonality
1894-1947	19.4
1948-1997	12.1

Source: elaboration of 1691 death certificates.

As was the case with other vital events studied in previous chapters, seasonal variation in deaths has declined over time. The fact that deaths are more evenly spread within a calendar year in the period 1948-1997 could reflect the fact that most deaths in recent years are due to degenerative conditions like heart attacks, strokes and cancers, which do not follow a strong seasonal pattern as the one exhibited by some infectious diseases like diarrhoea and infections of the respiratory system.

8.3 The study of mortality through family reconstitution

As mentioned in the previous chapter the method of family reconstitution was primarily devised for the study of fertility. It is more difficult to study mortality using family reconstitution results because of one basic reason: presence in observation is almost impossible to establish for single adults and difficult even for married ones. In the case of the former the situation is like this: for those who were born and died in the examined community both their birth and death would be recorded in the community. For those who were born in the study community but subsequently left it and died elsewhere only their birth would be recorded and thus there is no way of establishing how long they stayed in the community before leaving. For those who came from elsewhere and died in the community, only their death would be recorded, and again there is no way of establishing how long they had stayed in the community before dying. The period of residence in the community of someone who was there for only a fraction of his/her life, however, should be included in the stock of the population at risk of dying. In other words the recorded deaths should be related to the person-years at risk of dying experienced both by "stayers" and by "leavers" and "comers". If only "stayers" were taken into account in the calculation of mortality rates, mortality would be overestimated. Therefore, since the population at risk of dying cannot be measured with accuracy, mortality cannot be estimated for adults who remained unmarried.

The situation is not any better when dealing with the married population. There are those who were married and died in the examined community and one could treat them as entering observation on marriage and exiting on death, but there are also people who married in the community and subsequently left so that presence in observation cannot be established strait-forwardly. The fact, though, that the presence of a married couple can be traced from the birth of a child born to them[35] induced historical demographers to devise rules that make it easier to define presence in observation for married people.

These rules try to define the maximum and minimum period of exposure for individuals for whom a date of marriage is available but a date of death is unknown, based on

[35] If the registration system records information about the person who reports the vital event, as is the case in our data, then even a death of a child could testify that one of the parents was still alive and present at the time the death occurred, if for example the declaring person is the father or the mother.

plausible assumptions. Louis Henry for example proposed as the minimum period of exposure the time between the date of marriage and the date of the last recorded event relating to the individual. This event could be a birth of a child or a second marriage or, in absence of anything else, the first marriage itself. Thus, by assuming that the person in question had died immediately after the last known event relating to him/her, Henry derived a maximum estimate of the level of mortality. Subsequently, he calculated a minimum mortality level by defining the maximum period of exposure for individuals whose death date was unknown. As maximum period of exposure he proposed the time from marriage to a terminal date before which the person in question should have died. If no such date was known the person in question was supposed to have lived to 80 years. In this way a minimum level of mortality was estimated and the actual mortality should have been somewhere between the minimum and maximum estimates. However, Henry's method of minimum and maximum estimates of the mortality level can only yield reliable results if applied to communities where migration was relatively rare. In places where migration was usual the method cannot be used in a satisfactory manner (Wrigley et al.,1997: 211-212).

A more advanced method of estimating adult mortality was devised by Blum (cited in Wrigley et al., 1997:212). The advantage of his method is that it tries to include in the period spent at risk of dying in a community both those who died there and those who left the community at some point after their marriage and died elsewhere. The method is based on the assumption that if a leaver had not migrated his/her family history would have been similar to those who remained in the community until their death. Consequently, the period of exposure for a migrant is not defined by the last recorded event relating to him/her but by the date at which a next event would have occurred had the migrant not moved. The main disadvantage of this method is its complicated and time-consuming nature, which makes it difficult to apply. Moreover, the results may not be free of errors, since the method could produce biased results depending on the level of migration (ibid:213).

Bearing in mind the weaknesses of the methods devised to measure adult mortality from reconstitution data, it was decided to study infant and childhood mortality only, since it is relatively easier and simpler to measure mortality at young ages from family reconstitution.

In determining the persons to be included in the calculation of infant and childhood mortality we followed the rules proposed by Knodel (1988:535-541) with some minor modifications. More specifically, only children born to couples whose end of union is known[36] are included. However, when calculating infant mortality this rule is relaxed by including children born either to couples whose end of union is known or to couples to whom a subsequent child has been born. The existence of a subsequent birth attests that the index child for whom a death date is not given is present in observation at least throughout infancy. When studying childhood mortality, that is when calculating mortality rates for ages past infancy, the end of the marital union of children's parents must necessarily be known and the assumption is made that children for whom a death date in not given survived to at least age 15. This is a plausible assumption since the family was in the community until the union was broken by the death of one of the spouses and it is unlikely that children under age 15 would leave the community independently of their parents. There are cases however, where the marital union terminates before all children reached age 15 and consequently some children could go away and die elsewhere before age 15. Therefore, mortality rates might be biased downwards. However, in Greek culture orphans are usually fostered by their grandparents or by close relatives in the community, so that the assumption of presence in observation up to age 15 (if a death date is not given) for these children very probably holds true. It is also worth mentioning that Knodel in his study of 14 German villages found that results derived under this assumption did not differ substantially from results based on stricter rules for determining presence in observation (Knodel, 1988: 536).

8.4 Issues of data quality

The accuracy of mortality estimates, however, depends not only on the method used to derive these estimates but also on the completeness of the registration system. As assessed in chapter two, the coverage of birth registration was fairly good except for some years at the beginning of the examined period. On the other hand death registration appears problematic in the period 1915-1931 for the community of Kostos (see chapter two, section 2.2.1). To deal with this problem Kostos is excluded from the mortality analysis in the period 1915-1931. Thus, mortality rates for the period 1915-1931 refer to Naoussa alone.

Another issue of data quality is the accuracy of the reported age at death. A common drawback of Greek death certificates, at least in the past, was age misstatement for infants, the

[36] It is worth remembering that the end of marital union is considered known when the death records of both spouses are available or, where only the death record of one spouse exists, information is available indicating that the deceased spouse was the first of the spouses to die. Such information can be either a remarriage of the surviving spouse or an indication in the death certificate of the deceased that he or she was married (i.e. not widowed) when death occurred.

age of whom was usually misreported as being one year (Hionidou, 1993:125). Family reconstitution permits us to assess the level of age misreporting by comparing the *real age at death*, which is the age at death calculated from the linked death and birth certificates (date of death-date of birth), with the *reported age at death*, which is the age of the deceased as was reported in the death certificate. Although in all calculations involved in the derivation of infant and childhood mortality real ages at death have been used, it is interesting to see how close to the real age is the reported one. In our data 26% (74 out of 286) of infants for whom both real and reported ages at death are available were reported as being one year or older. This rounding of age to one year could have important implications for published death statistics based on civil registration. However, 95% of deaths upon which the above observation is based occurred before 1950 and probably the accuracy of the reported age at death has improved since then.

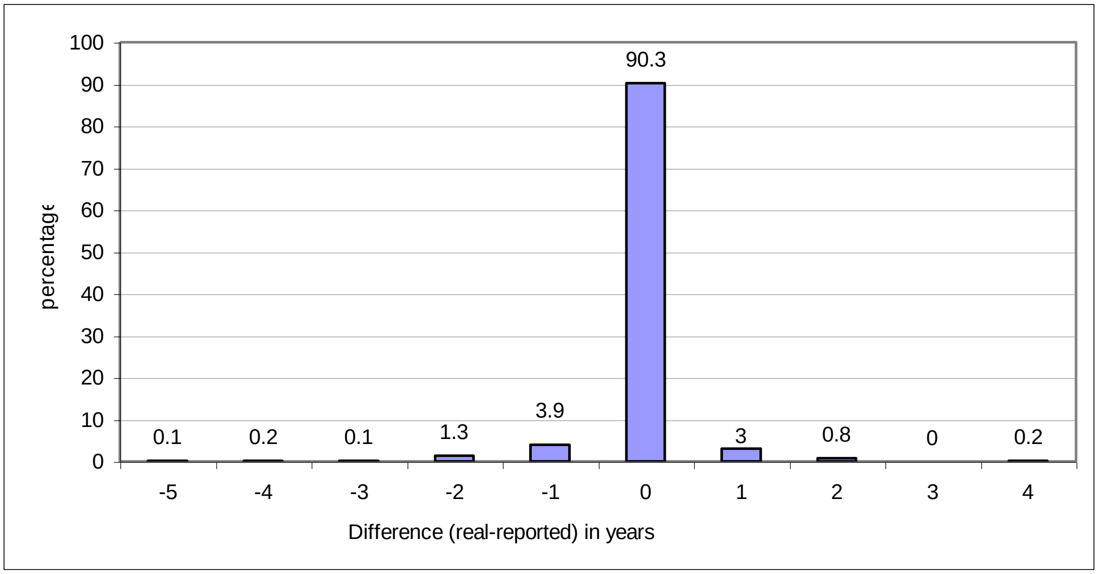
Figure 8.4 shows how biased infant mortality rates can be when relying on the reported age at death. Three rates of infant mortality have been calculated. The one termed "IMR1" is based on deaths with a reported age at death of around one year or below. These deaths include all cases with reported age of the deceased "one year" or "12 months" along with cases with reported age below one year. However, they do not include cases where the age of the deceased was clearly one year, such as cases where the age of the deceased is reported as "one and a half years" or with even greater accuracy such as "15 months", "17 months" etc. The measure termed "IMR0" in figure 8.4 is based on deaths with a reported age less than a year and that termed "IMR" is the rate of infant mortality as derived from family reconstitution using the rules and procedures described above. Under the assumption that "IMR" is the most reliable measure of infant mortality, it is interesting to observe that "IMR1" is at times closer to "IMR" than "IMR0" is. This fact alone shows the extent of age misreporting for infant deaths, which results in infant mortality rates which are biased downwards.

Figure 8.4: Deccenial infant mortality rates based on family reconstitution (IMR), on reported age less than a year at death (IMR 0) and on reported age at death of around one year or below (IMR 1). Naoussa and Kostos 1894-1953 (Kostos is not included in the period 1915-1931).

Source: Elaboration of birth and death records from Naoussa and Kostos; Naoussa & Kostos family reconstitution.

Turning to the misstatement of age at death for all ages, not for infants only, figure 8.5 presents the deviation of the reported age at death from the real one in years. It is based on 868 death records for which both real and reported ages are available. The difference (real minus reported age at death) is shown in completed years, meaning that the difference between the two ages must exceed 11.9 months to appear in figure 8.5. It seems that age reporting for the deceased, although was performed by a third person, was fairly accurate in the two communities under consideration. In 90.3% of the cases the reported age at death was the same as the real one, within a year margin. In 5.6% of the cases the reported age was greater than the real one and in only 4% of the cases the reported was lower than the real age at death. Consequently, it is only the age reporting of infants that was not reliable because the difference of some months in age reporting can distort the size of this age group. In the age groups of adults, however, age at death appears to be well reported. A slight tendency to overstate age is clear here also although not to so great an extent as was the cases with age reporting at marriage (see chapter 6).

Figure 8.5: Percent distribution of the deviation of the reported age at death from the real one in completed years (all ages); Naoussa and Kostos 1894-1998.



Source: Naoussa and Kostos family reconstitution.

8.5 Infant mortality and its components

The rate of infant mortality, that is mortality within the first year of life, is probably the single most sensitive index of the prevailing mortality regime. High levels of infant mortality imply low life expectancy and, in contemporary societies, low levels of social development. Infant mortality itself is usually divided into neonatal and post-neonatal mortality, with the former referring to deaths occurring during the first month of life and the latter to deaths occurring during the 11 months following the first month of life. This distinction is important because deaths occurring during the first month of life are usually related to congenital anomalies, obstetrical traumas, premature births and causes associated with the conditions of pregnancy and labour. On the other hand infant deaths occurring after the first month of life are usually attributable to the postnatal environment and have to do with poor hygienic conditions, infectious diseases and child-care practices (Tsaousis, 1986:96-97). Therefore, neonatal mortality is associated mainly with endogenous factors, that is factors "internal" to the foetus and the infant, while post-neonatal mortality is related mainly to exogenous causes of death. In recent years, progress in obstetrics has tended to limit the crucial period for the survival of the infant to the first week after birth and thus neonatal mortality could refer to deaths occurring during the first seven days of life. In this study however, neonatal mortality follows the most widely used definition and comprises deaths that took place zero to 29 days after birth.

Table 8.3 presents results of family reconstitution regarding neonatal, post-neonatal and infant mortality. In general infant mortality appears to have been relatively low throughout the study period. It was below 120 deaths per 1000 live births at the turn of the 20th century but it increased considerably to around 125 in the decade 1904-1913. The lower infant mortality in 1894-1903 may be associated with the inferior quality of the primary data in that decade. It is worth remembering that there are no data on deaths for 1898 due to missing books of civil registration, while only half of the expected births have been traced from other sources for that year (see chapter 2, section 2.2.1). This deficit of deaths relative to births leads to IMRs that are biased downwards.

Infant mortality fell abruptly to surprisingly low levels (66/1000) in 1914-1923. This sudden fall from one decade to another (1904-1913 to 1914-1923) might reflect worsening under-registration of infant deaths and more particularly under-registration of deaths occurring immediately after birth, since it was the neonatal mortality that dropped abruptly from 57.8/1000 to 15.4/1000. Another factor contributing to this fall in infant mortality may be that infant mortality in Kostos is not included in the period 1915-1931. It seems that Kostos exhibited higher infant mortality than Naoussa and when it was removed from the results, IMRs decreased reflecting the infant mortality prevailing in Naoussa alone. Evidence that Kostos was a village with high infant mortality comes also from the event that in the period 1934-1943, when Kostos is included in the calculations again, infant mortality did not decrease as expected, but remained in the same levels as in the previous decade. However, it may well be that the absent of any improvements in mortality during 1934-1943 is because part of this period coincides with the Second World War and a general scarcity of food and goods.

Table 8.3: Infant mortality and its components. Rates per 1000 live births; Naoussa and Kostos 1894-1953 (Kostos is not included in the calculations for the period 1915-1931).

Year of birth	Neonatal mortality	Post-neonatal mortality	Infant mortality	Number of births
1894-1903	34.2	82.3	116.5	644
1904-1913	57.8	67.4	125.2	519
1914-1923	15.4	50.7	66.1	454
1924-1933	12.4	44.1	56.5	566
1934-1943	11.2	45.0	56.2	445
1944-1953	7.9	26.4	34.3	379

Source: Naoussa and Kostos family reconstitution.

Although a comparison of the infant mortality of Paros (as represented by Naoussa and Kostos) with that of Greece in the period under examination is problematic because of the poor quality of published statistics, it seems that the island generally exhibited lower levels of infant mortality than mainland Greece. This emerges from comparing the IMRs of table 8.3 with the infant mortality rates for Greece presented in chapter 3. It is worth remembering that in 1885, the latest year of the 19th century for which published statistics are available, the IMR for Greece was 154.2/1000, though Valaoras considers more plausible an IMR of 187.4/1000, a value which is adjusted for under-registration of any kind and for age-misstatement. For the decade 1894-1903 Valaoras' values average 177.6 and for the following decade (1904-1913) 166 deaths per thousand live births. In the 1920s, when official statistics were published once again, the IMR has fallen to 91/1000, though values given by Valaoras are more pessimistic (around 140/1000). In the 1930s the IMR according to official statistics rises to 116/1000. This rise is probably due to better coverage of the registration system and Valaoras seems to agree with official statistics by giving values of the IMR for that decade that average 115/1000. No relevant data are available for Greece in the 1940s but in 1952, when an estimate by Valaoras is available, infant mortality has receded spectacularly to 53 deaths per thousand live births. Official statistics in 1956 give an even lower value (39/1000) and from thereon the decline in IMRs continues with rapid pace. (Ministry of Internal Affairs, 1889α), (Ministere de l' Economie Nationale, 1924-1939), (SGG, 1931-1940), (NSSG, 1956a-1998a), (NSSG, 1955b-1998b), (Valaoras, 1960).

The fact that infant mortality in the examined communities was substantially lower than that of Greece is not surprising. Studies in West European countries referring mainly to the 19th century have shown that "…urban living conditions were likely to produce higher mortality than country life" (Wrigley et al., 1997:203). This is so because "infectious and contagious diseases spread readily in large and tightly packed populations" (ibid). In our case the relatively isolated island environment did not seem to favour epidemics of childhood diseases. That might be inferred from the fact that post-neonatal mortality, which is determined mainly by infectious diseases and other exogenous causes, was relatively low all over the examined period, whereas neonatal mortality was quite high at least until 1913. Another example of low infant mortality in an island environment is Mykonos for which values of infant mortality were below 100/1000 for most of the second half of the 19th century (Hionidou, 1993:126). A comparison among IMRs of Paros, Mykonos and Greece can be better seen at figure 8.6. The two islands presented lower levels of infant mortality than Greece as a whole in the 19th and early 20th centuries. However the difference lessened from the 1930s onwards and might have been reversed after the 1950s.

Figure 8.6: Deccenial average rates of infant mortality (per 1000 live births) of Greece (values registered by NSSG and values adjusted by Valaoras), Paros and Mykonos.

Source: For Greece and Valaoras as of figure 3.6. For Paros values have been taken from table 8.3 and for Mykonos from Hionidou, 1993:126 (table 6.2).

8.6 Bio-demographic differentials in infant mortality

Age specific mortality rates may suffice for a basic study of mortality but family reconstitution permits us to go further than that and to deal with issues that will give us an in-depth mortality analysis. The information provided by the results of family reconstitution on the demographic characteristics of the deceased makes it possible to examine how mortality differs by sex of the deceased, maternal age, family size and birth interval. Such bio-demographic differentials in mortality are more pronounced during infancy and therefore their study will be restricted to infant mortality.

8.6.1 Sex differentials

A law of nature dictates that slightly more boys than girls are born in a population in any given time, provided that the number of births is big enough to rule out chance variation. On the other hand it seems that nature has endowed females with increased probabilities of surviving and therefore, provided that both sexes receive the same treatment and share the same environment, males are more likely to die at every age than females are (Knodel, 1988:79-84). Consequently, it is important to examine sex differentials in infant mortality because they can reveal preferential treatment of one sex over the other. In societies where woman's position is degraded it is not unusual for boys to receive better treatment as infants such as better nutrition and immediate medical care when an illness occurs. This could result in lower mortality rates for boys than for girls.

Nevertheless, while lower male infant mortality is strong evidence that girls were neglected, the reverse situation, that is lower female infant mortality, does not necessarily imply preferential treatment of daughters. This is so because girls have biologically more chance of surviving and therefore a lower female mortality is expected, especially in infancy. In fact, even in populations where a preferential treatment of sons is known to exist, like in Pakistan, Bangladesh, and in 19th century Ireland, it is often only after infancy that girls exhibit higher mortality than boys do (Knodel, 1988: 79). Consequently, by examining sex differentials in infant mortality, preferential treatment of sons will be detected if either male mortality is lower than female or if the two rates are very similar. Unfortunately, it is difficult to specify how much lower female infant mortality would be expected to be than male, if no preferential treatment of one sex over the other existed. Thus our judgements will be based on rough approximations.

Before examining IMRs by sex, however, it is necessary to inspect whether death registration was equally consistent for male and female infants. It is known from other studies of historical demography that deaths in the first month of life are the most likely to be omitted (Knodel, 1988:493). In our data this is expected to be the case as well for one more reason: unbaptised children were not offered the last blessing by the Church and therefore it was easier for their death to pass unreported. In the beginning of the examined period and up to the first years of the 20^{th} century, as our birth certificates indicate, baptisms were taking place within a few days from birth. As mortality of infants fell, the period between birth and baptism was prolonged but in all times it was common practice to hasten baptism if the death of a baby could be anticipated. Even so, the deaths most likely to go unreported were deaths in the first month of life. To check if there was sex-selective under-registration of early infant deaths table 8.4 compares the proportion of male infant deaths occurring in the first month of life with the respective proportion of female deaths. Again a slightly lower proportion of female deaths is expected and does not necessarily mean under-registration of female deaths. This is because "…the larger average size of males at birth could result in disproportionately higher male stillbirth and neonatal mortality rates, for the risks of death associated with parturition would be increased" (Knodel, 1988: 493).

According to table 8.4 an under-registration of female relative to male early infant deaths is observed to a small extent in the first 20 years of the examined period (1894-1913). In the next 20 years (1914-1933) early infant deaths are equally registered for both sexes, while in the period 1934-1953 a clear dearth of early infant deaths for boys relative to girls is evident. Most probably this discrepancy between male and female early infant deaths in the period 1934-1953 is due to the small number of deaths involved in this period. There are only 25 linked male infant deaths of which only 5 occurred within 30 days from birth, and 23 linked female infant deaths of which 6 were neonatal deaths. The very small number of cases bears an element of randomness and cannot give reliable results concerning under-registration of deaths of one sex relative to the other. Differential registration by sex is more pronounced when comparing not all linked infant deaths, that is cases for which a birth and a death certificate are available, but deaths that fulfil the criteria of family reconstitution for inclusion in the calculations of IMRs. There, the number of cases is even smaller and random fluctuations greater. Nevertheless, this lack of male deaths relative to female ones for the period 1934-1953 will be reflected in the relevant IMRs biasing the male infant mortality downwards.

Table 8.4: Deaths under one month as proportion of infant deaths by sex of child; Naoussa and Kostos 1894-1953 (in the period 1915-1931 Naoussa alone).

Year of birth	**Using all linked deaths.**		**Difference**	**Using only deaths included in the calculations of IMRs.**		**Difference**
	Males	**Females**		**Males**	**Females**	
1894-1913	0.438	0.343	0.095	0.423	0.307	0.117
1914-1933	0.220	0.200	0.020	0.250	0.192	0.058
1934-1953	0.200	0.261	-0.061	0.111	0.300	-0.189

Source: Naoussa and Kostos family reconstitution

Note: Results for linked deaths are based on 3745 births. Results using stricter rules are based on 3009 births.

Conclusively, it seems that sex-selective under-registration of infant deaths, and more particularly of female ones, might have happened, to a small extent, in the first 20 years of the examined period (1894-1913). For the last of the three periods examined in table 8.4 (1934-1953) there are not have enough cases to draw any firm conclusion.

Turning to infant mortality by sex, as set out in table 8.5, it appears that in general there is no evidence of strong preferential treatment of one sex over the other. The higher female mortality in 1934-1953 is due to the small number of cases involved in that period (422 male and 402 female births) and thus the rates of infant mortality are not trustworthy for that period. The only rates that might reflect a neglect of female infants are those for 1894-1913. Female mortality is lower than male in that period, as expected because of the biologically innate advantage of females. Yet, taking into account that during that period (1894-1913) early infant deaths for females were under-reported relative to those of males (see table 8.4), the female mortality should appear even lower if the two sexes received equal treatment.

Table 8.5: Infant mortality by sex and ratio of female to male mortality; Naoussa and Kostos 1894-1953 (Kostos is not included in the calculations for the period 1915-1931).

Year of birth	Males	Females	Ratio
1894-1913	126.6	113.3	0.90
1914-1933	66.7	53.9	0.81
1934-1953	42.7	49.8	1.17
1894-1953	**83.7**	**75.5**	**0.90**

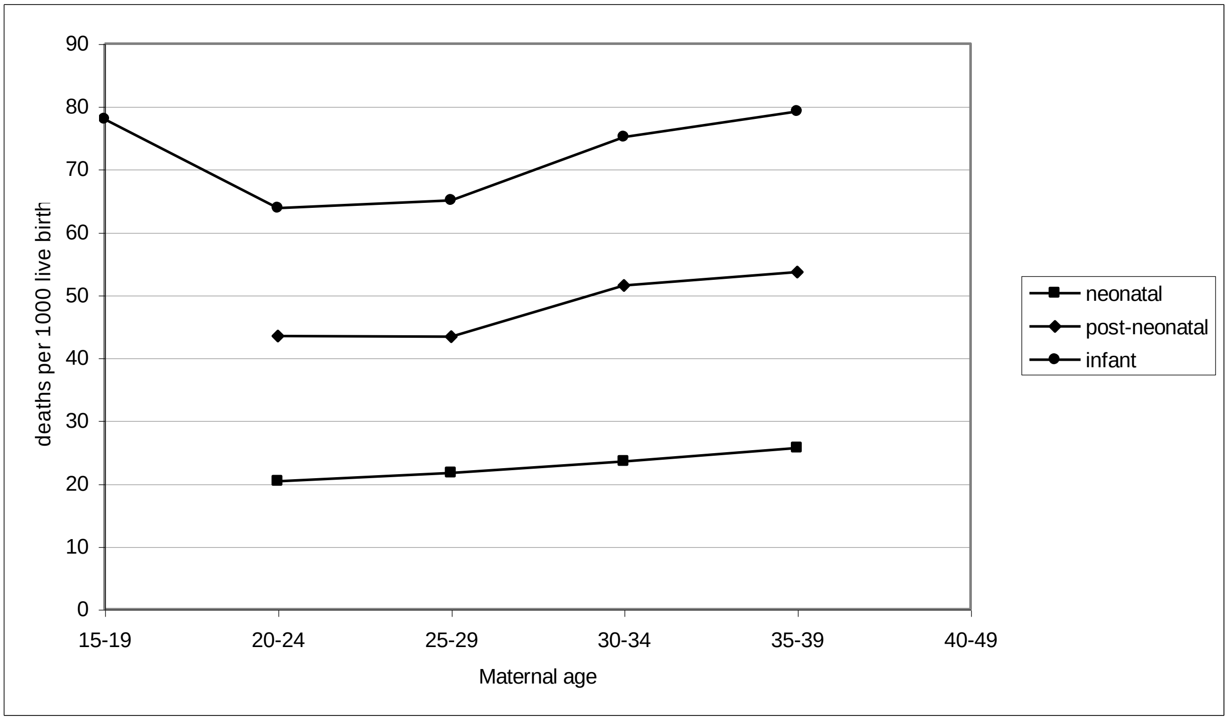
Source: Naoussa and Kostos family reconstitution

Note: Results are based on 3009 births.

8.6.2 Infant mortality by age of mother

Maternal age is an important determinant of mortality during infancy. It is widely thought that childbearing at very young ages is associated with higher mortality risks. The same holds true for childbearing at old ages (Knodel, 1988:85) Figure 8.7 shows the relationship between maternal age on one hand and neonatal, post-neonatal and infant mortality on the other for Naoussa and Kostos. Although the period under examination is the entire study period from 1894 to 1998, the persons who fulfil the criteria for inclusion in the calculations of infant mortality and its components are babies born largely before 1950. This is so because only children born to couples whose end of union is known or to couples to whom a subsequent child has been born are included in the calculations of infant mortality. More specifically 50% of the babies included in the calculations involved in figure 8.7 were born before 1929, 75% of them were born before 1945 and 90% were born before 1963.

Figure 8.7: Neonatal, post-neonatal and infant mortality by age of mother at birth; Naoussa and Kostos 1894-1998 (Kostos is not included in the calculations for the period 1915-1931).



Source: Naoussa and Kostos family reconstitution.
Note: Results are based on 3026 births. Average IMR irrespective of maternal age: 68.74.

A first glimpse at figure 8.7 reveals that according to the experience of women in our sample the best age for a woman to have a baby is in her early 20s. From the maternal age of 25 onwards mortality risks for the baby during infancy increase and in the age group 35-39 they have slightly surpassed risks related to babies born by teenage mothers aged 15-19. Neonatal and post-neonatal mortality also increase with maternal age but there are not enough cases to examine mortality rates when the mother is a teenager. Usually it is neonatal deaths that are inflated when the mother is between 15 and 19 years old (Knodel, 1988:88) but in our case it would not be surprising if post-neonatal mortality was also higher in the age group 15-19 than in the age group 20-24, since it generally follows the trend of overall infant mortality.

8.6.3 Infant mortality and birth intervals

A number of studies have shown the adverse effect of short birth intervals on the survival of newborn children (see for example Hobcraft et al., 1983 or Knodel, 1988). Two or more births in rapid succession can lead to maternal depletion and this in turn can result in physically weak babies with reduced chances of survival. Table 8.6 shows the relationship between infant mortality and length of the previous birth interval for the examined population. Only births of second parity or higher are included in the calculations, since for first births there is no previous birth interval to be measured.

As was expected there is a strong inverse correlation between the risk of a child dying within the first year of life and the length of the previous birth interval. The shorter the interval the greater is the risk of death before age one. However, what is striking is that children born less than a year from the previous birth experience extremely high infant mortality: more than two and a half times higher than that experienced by children born only one to one and a half years since last birth. The excess mortality associated with so short intervals is attributed mainly to maternal depletion and to the fact that a high proportion of births occurring less than a year since a previous birth are premature (Knodel, 1988:90). However, the percent distribution of births by year of occurrence, also presented in table 8.6, show that differences in infant mortality are not exclusively due to differential birth intervals but to some extent reflect the different periods in which infant mortality occurred. Infant mortality associated with intervals longer than four years, for example, is much lower than any other interval-specific mortality not only because of the effect of the long interval but also because births involved in this category took place in more recent years.

Table 8.6: Infant mortality by length of interval since previous birth in complete months. Naoussa and Kostos 1894-1998. (Kostos is not included in the calculations for the period 1915-1931)

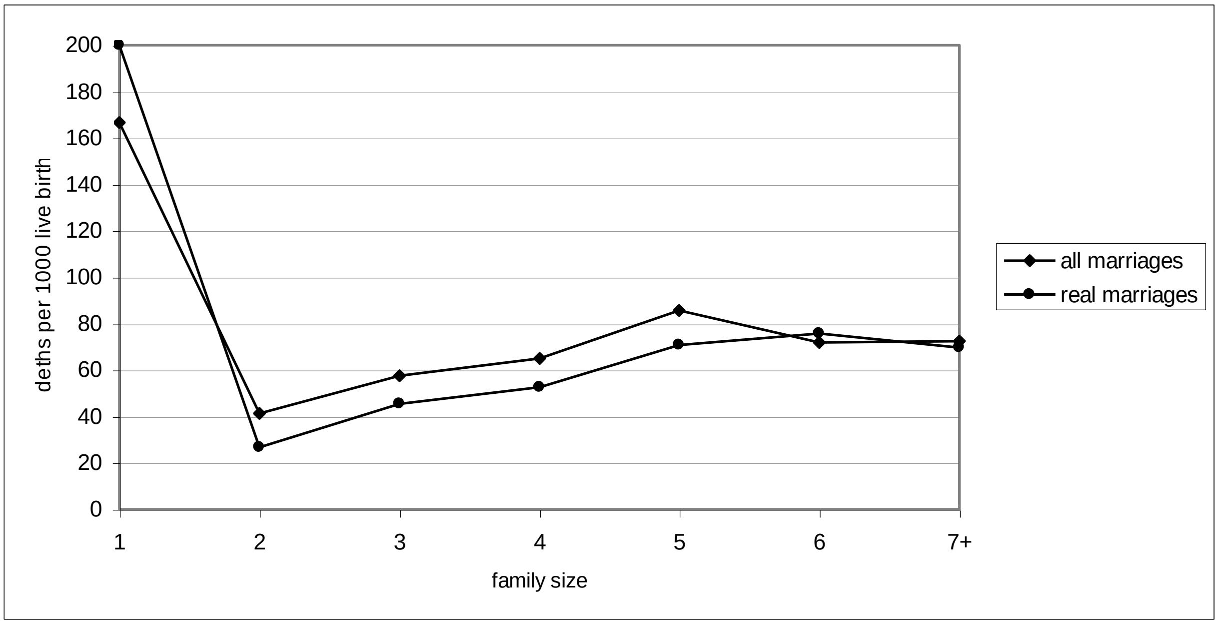
Interval from previous birth to index birth (months)	Infant mortality of index births	Number of births	Year by which specific proportion of births occurred.		
			25%	50%	75%
<12	207.3	82	1903	1927	1944
12-17	82.3	413	1909	1923	1936
18-29	70.5	1135	1906	1921	1935
30-47	61.2	654	1909	1927	1942
48+	37.5	293	1916	1937	1950

Source: Naoussa and Kostos Family reconstitution

8.6.4 Infant mortality and family size

The last of the demographic differentials in infant mortality that will be examined is the one resulting from different family sizes. The term “family size” here means the final number of children born to a woman. Figure 8.8 presents infant mortality by family size based on two different data sets. The first data set comprises all marriages, i.e. both real and dummy marriages. The assumption is made that for dummy marriages the recorded birth of rank one is indeed the first birth to the couple and there are no prior births, which would alter the recorded birth order and family size. The second data set comprises real marriages only. Of course in both data sets only children who fulfil the criteria for inclusion in the calculations of infant mortality, as set out in section 8.3, are included.

Figure 8.8: Infant mortality by family size; Naoussa and Kostos 1894-1998. (In the period 1915-1931 Naoussa alone).



Source: family and Kostos family reconstitution

Note: results for all marriages are based on 3570 births. Results for real marriages are based on 2428 births.

Both data sets give similar results as far as trends are concerned, although infant mortality for all marriages is somewhat higher than it is for real marriages for most family sizes apart from family size one. The considerable difference for family size one may be due to statistical fluctuation since results for single-child families are based on very few cases for both data sets (24 births for all marriages and 15 births for real marriages). Nevertheless, the similarity in trends indicates that the two data sets are not unrepresentative.

The relationship between infant mortality and family size is J-shaped. Infant mortality is extremely high in one-child families, drops sharply in families with two children and then increases more or less monotonically as the number of children rises. The extremely high infant mortality in one-child families must be resulting from two main reasons. The first reason has to do with birth rank: first births usually present more complications than subsequent ones and therefore mortality risks are increased for the first-born (Goldman and Hobcraft, 1982). The second reason might be an association with age of mother at birth. Assuming that couples are willing to have at least a few children and not only one, women who stop childbearing after their first birth may be, in some cases, women who were married late and thus had their only child towards the end of their reproductive life span, presumably at their 40s. Consequently, infant mortality is high in these cases because of the high mortality risks associated with high maternal age. Another factor that may inflate infant mortality in one-child families is maternal mortality. Most probably a new-born who loses its mother at birth confronts higher mortality risks than when the mother is present. In families with more than one child the higher infant mortality risks associated with a maternal death will affect only the last child, while in single-child families a maternal death will affect the one and only child thus increasing disproportionately IMRs in these families.

The increase in infant mortality after family size two results from the interrelation of several factors. It was noticed in chapter 7 that women with a great number of births tend to bear their children with short birth intervals. This childbearing pattern increases infant mortality, since short birth intervals are associated with greater mortality risks, as seen in section 8.6.3. Moreover, when several young children are present in the household at the time of a birth, as is the case with big families, maternal care and attention to the newborn infant will probably be reduced, hence a positive association of infant mortality with family size. Another factor contributing to high levels of infant mortality among families with many children may be the demand for economic resources that the great number of children brings with it. In the years before 1950, when the majority of the births examined here took place, the resources of a peasant family, which were already limited because of the low standards of living prevailing then, were further reduced by the many children in the family. Consequently the amount that could be paid for medical care and proper rearing of every child was restricted, something that may have contributed to high mortality among children in big families.

8.7 Childhood mortality

It would be illuminating if child mortality could be studied with the same detail as infant mortality. Yet, the stricter criteria used to determine the persons eligible to be included in the calculations of child mortality (see section 8.3) and the smaller number of deaths occurring during childhood as opposed to the many deaths in infancy, restrict our data set to few cases. This in turn renders the results susceptible to random fluctuations and, in many cases, unreliable. However, we hope that general trends will be captured and levels will be, if not trustworthy, at least indicative of the mortality regime prevailing in the examined population at childhood ages.

Table 8.7 presents death rates for the age groups 1-4 and 5-14 and the corresponding probabilities of dying between exact ages 1 and 5 (${}_4q_1$) and between exact ages 5 and 15 (${}_{10}q_5$). The derivation of probabilities of dying (or mortality risks) has been based on the assumption that the average number of years lived within the age group x to x+n by those who died within this age group, i.e. ${}_n\alpha_x$ in life table notation, is 1.5 for the age group 1-4 (${}_4\alpha_1$=1.5) and 5 for the age group 5-14 (${}_{10}\alpha_5$=5). Another assumption is that the age-specific death rates of the population are equal to the life table age-specific death rates, i.e. ${}_nM_x={}_nm_x$.

Before observing results in table 8.7 one should bear in mind that the mortality rates (and corresponding mortality risks) presented in the above table may be slightly biased downwards. This is because, according to the rules set out in section 8.3, children who migrated out of the community independently of their parents or guardians are treated as having survived until age 15 if a date of death is not recorded. Although few such cases are though to have existed, a small underestimation of mortality is always possible when using the rules described in section 8.3 to calculate childhood mortality.

Table 8.7: Age-specific death rates per 1000 population ($_nM_x$) and the relevant mortality risks ($_nq_x$) for individuals. Birth cohorts from Naoussa and Kostos. Results based on fewer than 100 person-years per year of exposure are not shown.

Year of birth	Exposure 1-4 /deaths 1-4	$_4M_1$	$_4q_1$	Exposure 5-14 /deaths 5-14	$_{10}M_5$	$_{10}q_5$
1894-1903	1129.0/18	15.94	0.0613	2605.5/5	1.92	0.0190
1904-1913	905.5/15	16.57	0.0636	1955.5/3	1.53	0.0152
1914-1923	887.0/14	15.78	0.0607	2140.5/5	2.34	0.0231
1924-1933	1033.0/12	11.62	0.0452	2541.0/2	0.79	0.0078
1934-1943	753.0/6	7.97	0.0313	1852.5/1	0.54	0.0054
1944-1953	336.0/2	5.95	0.0235			

Source: Naoussa and Kostos family reconstitution.

Note: Kostos is not included in the calculations for the period 1915-1931

Both age groups 1-4 and 5-14 exhibited low levels of mortality throughout the study period. A comparison with table 8.8 shows that in 1928 childhood mortality in the examined communities was lower than the national average. However, by 1950 this situation had changed and the examined communities exhibited somewhat higher early childhood mortality than Greece, while mortality in the age group 5-14 continued to be slightly lower than the national average. Similarly low mortality risks for the age group 1-4 for the first half of the 20th century have been found in Mykonos, where in the period 1909-1938 $_4q_1$ oscillated between 0.065 and 0.044 (Hionidou, 1993:126).

Another point worth noting in table 8.7 is that there is a surge in mortality in the ages 5-14 for the birth cohort 1914-1923, that is, people who died mainly during the 1920s. This mortality increase during the 1920s is in accordance with a more general trend observed in the crude death rates of Greece and the examined island populations as well (see chapter 3). The causes of this temporary mortality increase during the 1920s have been mentioned in chapter 3. They have to do with adverse historical circumstances including a series of wars between 1912 and 1922, mass and heavily age selective emigration and, a factor more relevant to childhood mortality, a widespread food shortage caused by an international blockade in 1918-1919 (Valaoras, 1960:127). It is peculiar, however, that a respective mortality increase is not observed in the ages 1-4, since the above-mentioned predicaments should have affected that age group also.

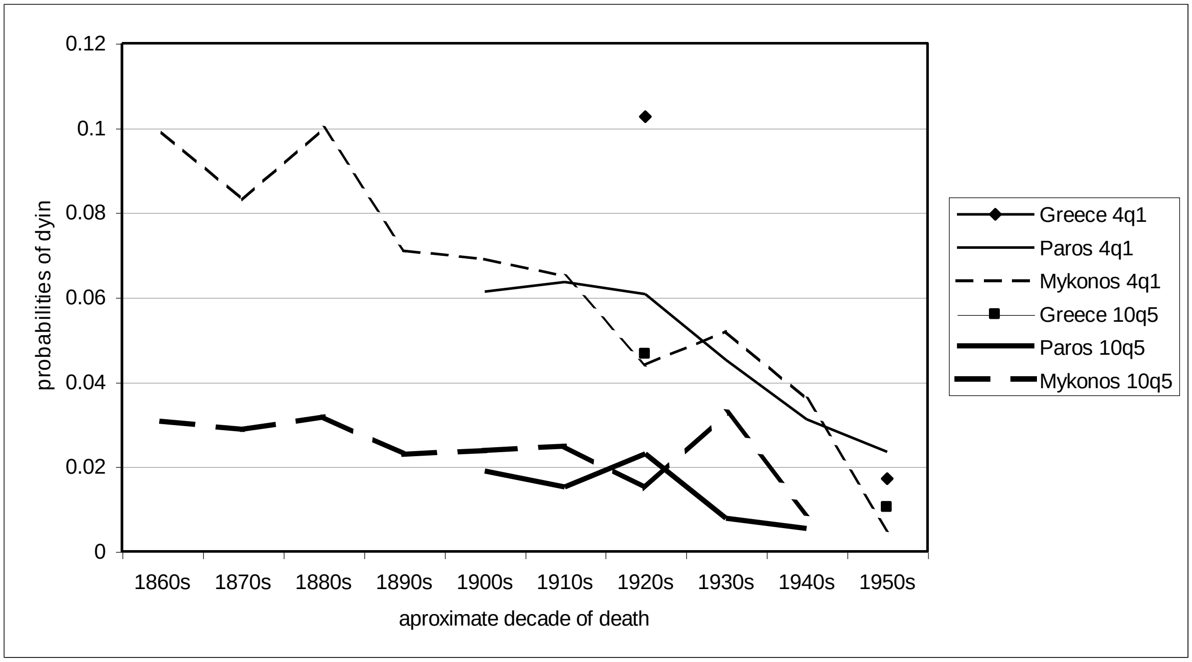
Table 8.8: Life-table age-specific death rates per 1000 population ($_nm_x$) and the corresponding mortality risks ($_nq_x$) for individuals.

	Greece 1928		Greece 1950	
	Males	**Females**	**Males**	**Females**
$_4m_1$	27.70	27.16	4.51	4.21
$_4q_1$	0.1036	0.1017	0.0178	0.0167
$_{10}m_5$	4.97	4.58	1.15	0.94
$_{10}q_5$	0.0485	0.0448	0.0115	0.0094

Source: figures are based on summary life tables (NSSG, 1998a:56)

All the above conclusions regarding childhood mortality can also be observed in a graphic way at figure 8.9. The lines representing childhood mortality in the two islands are not strictly comparable because they refer to slightly different periods. For example where the x-axis has the indication "1930s" it refers to the birth cohort 1929-1938 for Mykonos and to the birth cohort 1924-1933 for Paros. Although childhood mortality for these birth cohorts refers mainly to people who died during the 1930s, results for the age group 5-14 will comprise many people who died during the 1940s, especially in the case of Mykonos, while in the case of Paros results will refer to a somewhat earlier period. In any case the main inference from figure 8.9 is that childhood mortality in the two islands seems to have been lower than the national average at least until the 1920s. However, by the 1950s Greece's early childhood mortality (age group 1-4) had dropped to the same or even to lower levels than that of the islands. Late childhood mortality (age group 5-14) for Greece appears to have followed a similarly spectacular drop, although for the 1950s we cannot compare Greece's late childhood with that of the islands because of lack of data for the latter.

Figure 8.9: Probabilities of dying between exact ages 1 and 5 ($_4q_1$) and between exact ages 5 and 15 ($_{10}q_5$). Greece, Paros and Mykonos.



Source: For Greece figures have been taken from table 8.8, for Paros from table 8.7 and for Mykonos from Hionidou, 1993:126 (table6.2).
Note: values for Mykonos 10q5 have been derived as 10q5=1-(1-5q5)*(1-5q10). For the 1940s no value for 5q10 is provided so the value of the 1920s 5q10 (the lowest that Hionidou records for Mykonos) has been used instead.

8.8 The mortality crisis of 1942

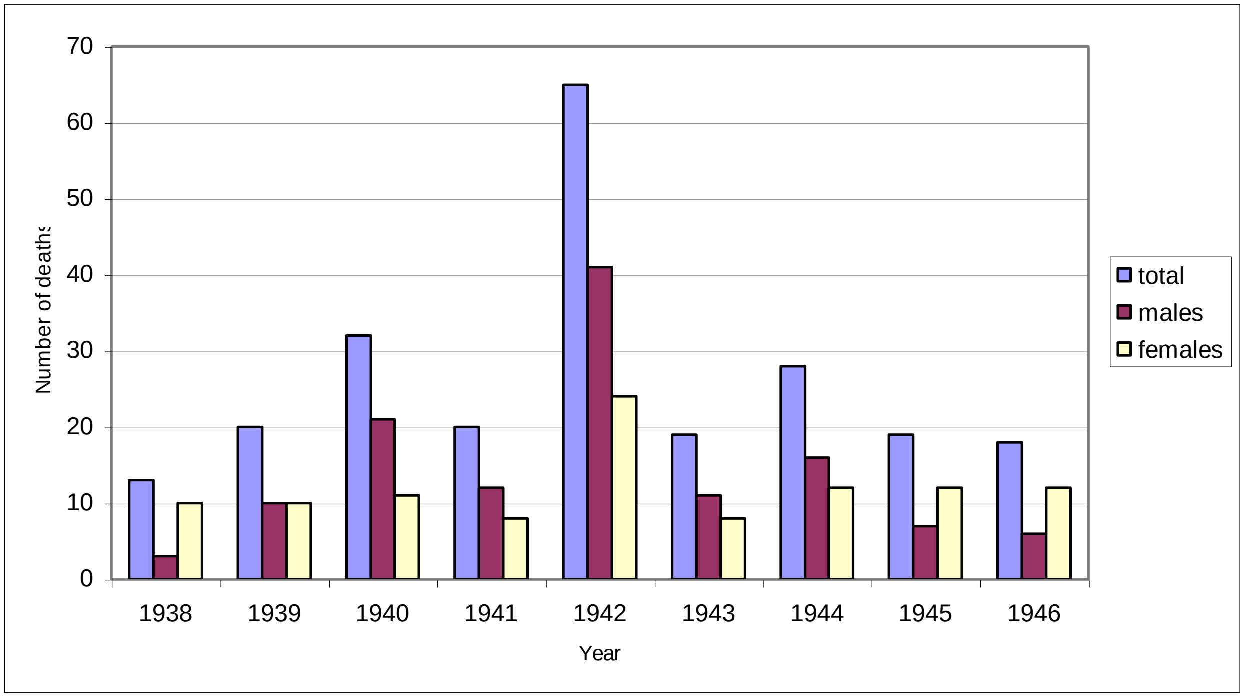
An event worth mentioning, even in brief, is the famine that struck the island in the winter of 1941-42. This famine hit most of Greece and was caused by the tripartite occupation of the country by axis forces (Germans, Italians and Bulgarians). The chronicle of the famine can be found in many historical studies concerning modern Greek history. Here only the general outline of the Greek famine will be set out, whereas our focus will be on the mortality crisis caused by the famine in Naoussa and Kostos.

The main reason for the Greek famine was the requisition of all stocks of food ordered by the German authorities immediately after the occupation of Greece in April 1941. For some time 400,000 troops of the German army were fed by Greek resources and in addition to that, large quantities of food were sent to German units in north Africa. The lack of food was inevitable since a naval blockade had been imposed on Greece by the allies upon the occupation because the country had become enemy territory. In autumn of 1941 all stocks of food had been depleted and without the capacity for replenishment the famine broke out in the winter of 1941-1942. In mainland Greece the famine-struck areas were mainly Athens, Piraeus and the urban centres that were dependent on food imports; the countryside was affected less. Those who died of starvation during the occupation are estimated to be around 260,000. Most of them died in the trimester December 1941-February 1942. As an indirect effect of the famine diseases like malaria and tuberculosis presented an unprecedented rise. In 1942 around 200,000 people showed symptoms of tuberculosis. The famine started receding in March 1942, when the allies lifted the naval blockade and foods were sent from Canada and the USA and distributed by the International Red Cross (Roussos, 1975).

The study of the demographic effects of the famine in Naoussa and Kostos will be based solely on aggregate data and will be focused mainly on mortality. As can be seen in figure 8.10 the lack of food resulted in mortality crisis only in 1942. In that year the number of deaths was more than three times greater than the average number of deaths in the eight adjacent years: 65 deaths in 1942 as opposed to an average of 21 deaths in 1938-1946 excluding 1942. What is more striking however is that 44.6% of deaths in 1942 are directly attributed to "starvation" as the death certificates indicate. Two deaths in 1943 are also attributed to "starvation", the last one happening in June of that year. Most probably the famine caused more deaths than those where the death certificates gave the cause of death as "starvation", because famine victims are vulnerable to disease and usually die of a cause other than starvation itself.

Another observation is that famine afflicted more males than females. In 1942 for every female death there were 1.7 male deaths, while the average sex ratio at death in the eight adjacent years (1938-1941 and 1943-1946) was 1.0. Excess mortality of males during the famine was also found in Athens and Piraeus and in Mykonos as well. According to Valaoras (1946:218) the ratio of male to female deaths in Athens and Piraeus between October 1941 and June 1942 was 1.7, while in Mykonos the excess male mortality was even higher reaching 2.4 male deaths for every female death between December 1941 and May 1942 (Hionidou, 1993:162). This pattern of a strongly masculine sex ratio at death seems to be usual during famines, since it has been observed in other parts of the world also (see for example Dyson, 1991a, 1991b). Many explanations have been proposed for this, but the most relevant in our case is, most probably, the different physiology of the two sexes and especially the higher level of women's body fat.

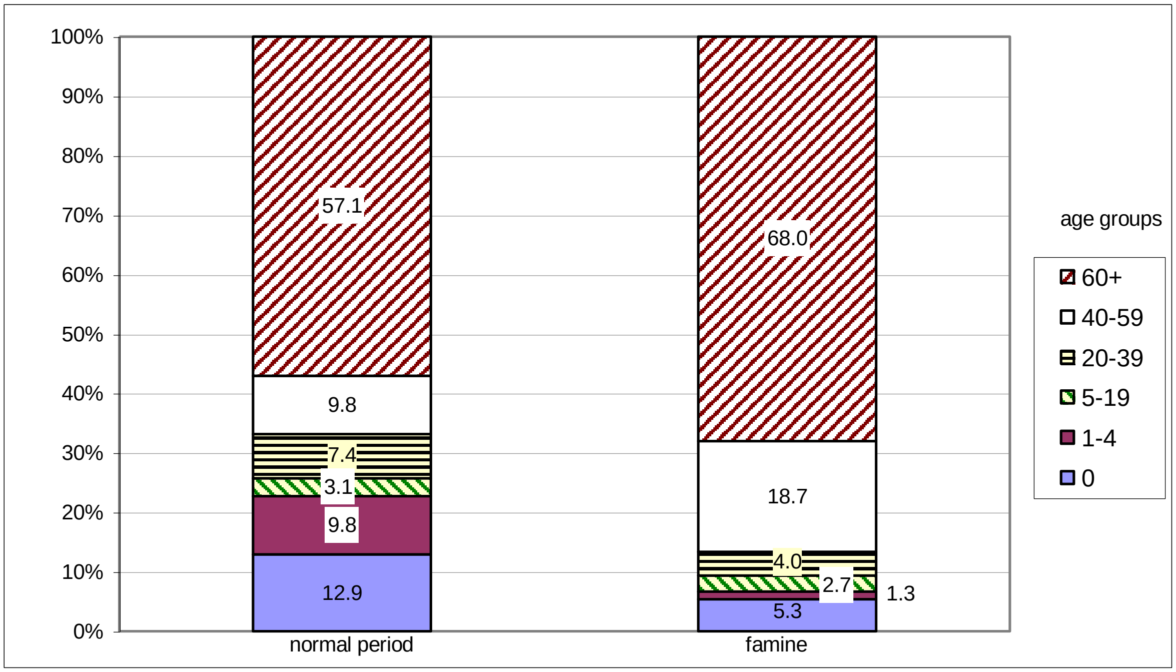
Figure 8.10: Number of deaths by sex; Naoussa and Kostos 1938-1946.



Source: Naoussa and Kostos civil registers.

In order to investigate which age groups were mostly afflicted by the famine figure 8.11 compares the proportion of deaths each age group contributed to the total deaths in a “normal” period (that is during a period that the population was not affected by famine) and during the famine.

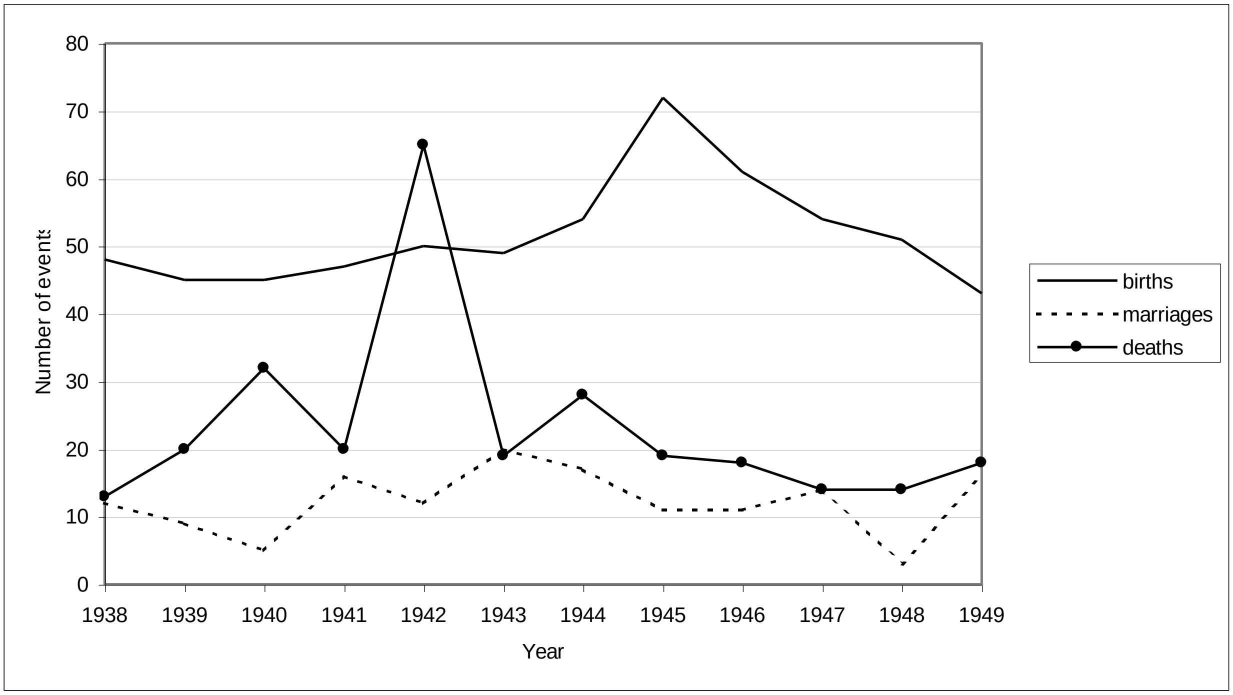
Figure 8.11: Percentages of deaths by age group during famine (1/7/1941-30/6/1943) and during a normal period (1937-40 and 1944-47).



Source: elaboration of 238 death certificates.

According to figure 8.11 the people most afflicted by the famine were those aged 40 years and over and especially the age group 40-59. It is worth noting that the increase in the proportional number of deaths in old ages (60+) was smaller than the respective increase in middle ages (40-59). The proportion of deaths in old ages (60+) increased by 20% during famine while that of the middle aged by 91%. A similar mortality pattern for these age groups, which indicates that the old ages were afflicted less than the middle ones has been found in Mykonos as well (Hionidou, 1993:166-167). It may be the case that the society gives more care to the elderly who have been retired from work than to people who are still able to work and are expected to take care of themselves. The proportions of deaths contributed by age groups below 40 years of age are smaller than in normal periods, indicating that these age-groups were not affected by famine as much as ages over 40. The infants and the one to fours seem to have been affected less than any other age-group by the famine since the decrease in the proportional number of deaths during famine in these age groups was greater than in any other group. This comes in contrast to what happened in Athens and Piraeus, where infants and especially young children were among the age groups mostly affected by the famine (Valaoras, 1946). This is because the famine was not so acute in the island and mothers could still breast-feed their infants and give any available food to young children.

Figure 8.12: Annual number of vital events; Naoussa and Kostos 1938-1949.



Source: Naoussa and Kostos civil registers.

In an attempt to find out whether the famine had an impact on fertility and nuptiality in addition to mortality, figure 8.12 was drawn. It sets out the annual numbers of deaths, marriages and births occurring in Naoussa and Kostos from 1938 to 1949. At first glance there seem to be no major disruptions in the time series of births and marriages. Contrary to expectation the number of births started increasing from 1941 onwards and reached a peak in 1945. After that, when the harshest years for the island were over, births fell back. The explanation for the increase in the number of births must be the return of soldiers to their homes after the occupation of the country in April of 1941. Hence, the famine did not cause any fertility decline in Naoussa and Kostos.

However, the famine probably had some effects, though minor, in nuptiality. With respect to marriages, two major troughs are observed in 1940 and 1948 respectively. These drops in marriages are because both 1940 and 1948 are leap years and people avoid getting married in such years, a characteristic of the Greek marriage pattern that was referred to in chapter 3[37]. Thus, if 1940 and 1948 are disregarded, 1942 is among the years with the fewest

[37] 1944 was also a leap year but it is the year of liberation as well. Thus, the exhilaration caused by the liberation of the country from the axis powers counterbalanced any superstitious traditions concerning the leap years and the number of marriages in 1944 was similar to that of a non-leap year.

marriages. Most probably marriages were postponed that year because of the famine and the general scarcity of goods.

8.9 Conclusions

The main realisation drawn from this chapter is that the mortality regime in the island communities under consideration changed dramatically in the course of the 20th century. At the beginning of the 20th century infectious and contagious diseases caused the majority of deaths, something that implies a high mortality regime with poor hygienic conditions where people were dying prematurely. Yet, as infrastructure concerning public health, such as sewage and a running water system, was developed, the mortality regime started changing. In the period 1932-1965 infectious and contagious diseases constituted already the minority of deaths, though this change must reflect mainly post-war developments. In more recent years (1966-1998) the overwhelming majority of deaths (77.6%) were due to degenerative conditions while parasitic diseases had disappeared, something that classifies the examined communities among societies with high level of social development.

Another finding is that death comes to different age groups in different seasons within the calendar year. In the years up to 1947 the very young (0-11 months old) were at high risk of dying during summer months, something that is attributed to diarrhoeal diseases as the parallel study of the cause of death in the death certificates showed. Older children (1-14) were susceptible to death in early spring as well, while adults died preferentially in late winter. The seasonal pattern of adult mortality was studied for a more recent period also (1948-1997) since the number of cases permitted it. In that period (1948-1997) summer mortality appears to rise reflecting the growth in the number of summer visitors to the island.

Using family reconstitution, rates of neonatal, post-neonatal, infant and child mortality were derived. It was found that infant mortality in the island was substantially lower than that of Greece all over the examined period (1894-1953). IMRs for Naoussa and Kostos oscillated between 125 and 34 deaths per thousand live births, while the relevant values for Greece in the same period (1894-1953) fluctuated between 178 and 50 or thereabout. The lower infant mortality in the examined communities is probably associated with the relatively isolated island environment, which did not seem to favour epidemics of infectious diseases.

Examination of the association of various bio-demographic variables with infant mortality gave us an insight into the patterns of mortality during infancy. The comparison of mortality rates for the two sexes did not reveal any strong preferential treatment of one sex over the other. The only period when some preferential treatment might have been shown to sons is that of 1894-1913 but if that happened, it happened to only a very small extent as IMRs for the two sexes suggest. Age of mother at birth was found to be an important parameter for the survival of the baby during infancy. Rates of infant loss were greater than average for teenage mothers and for mothers aged 30 and above. Although IMRs increase with age of mother from the age of 25 onwards, the age group 25-29 still exhibited rates of infant loss lower than average.

A strong negative association was found between the risk of a child dying within the first year of life and the length of the interval since the birth of its previous sibling. The shorter the interval the greater was the risk for the baby to die before age one. Intervals shorter than a year were associated with extremely high mortality, while the gain in mortality risk was diminishing for intervals longer than two and a half years. Another important determinant of infant mortality was found to be family size. Infant mortality was extremely high in one-child families, dropped sharply in families with two children and then increased fairly monotonically as the number of children rose. This relationship of infant mortality with family size, as explained in the relevant section, is due to both bio-demographic and socio-economic reasons.

Childhood mortality was studied mainly for the period 1894-1943. Early childhood mortality (1-4) followed a parallel course with that of infant mortality. It declined definitely from the second decade of the 20th century onwards, although it is possible that a decline had started back in the 19th century but there are not enough data to support this argument. Its level was relatively low in the period 1894 to 1953 fluctuating between 16.57 and 5.95 deaths per thousand births. Childhood mortality at ages 5-14 was declining from the beginning of that period (1894) but a surge in mortality of this age group was observed in the 1920s. A comparison with childhood mortality rates available for Greece suggested that in the years before 1950 childhood mortality in the island was lower than the national average. However, this is only a suggestion and in no way a conclusion since for the first half of the 20th century (before 1950) data for Greece are restricted to only a life table referring to 1928.

A demographic event in the history of the island that could not pass unnoticed is the famine of 1941-42. It caused mortality crises in 1942 but it did not affect substantially fertility and nuptiality. The reason that the famine did not have any noteworthy impact on fertility and nuptiality is firstly because it was not very acute and secondly because the famine period coincided with the arrival of the soldiers to their homes, something that counterbalanced any adverse effects of the famine on fertility and to a lesser extent on nuptiality. With respect to mortality the famine afflicted mainly males over 40 years of age.

CHAPTER 9: CONCLUSIONS

A motivation for undertaking this study was the lack of a consistent series of official population statistics for Greece in the period before 1950. We used civil and parochial registration from two communities of the island of Paros as a case study and we employed the method of family reconstitution along with aggregative methods to study the demographic processes that took place from the end of the 19th until the middle, and in some cases until the end, of the 20th century. These processes were investigated through the lenses of the theory of demographic transition. This final chapter tries to answer the research questions posed at the beginning of the thesis and through these answers summarises the main findings of the thesis. In the end, a synthesis of the findings will reveal a special demographic regime that characterised the Cycladic islands and probably most islands in the Southern Mediterranean.

We shall start our summing up by attempting to answer the main research question, which was: what was the course of demographic transition in Greece, in the Cyclades and in Paros? This question implies three sub-questions concerning mortality, fertility and nuptiality, which can be dealt with separately. As far as Greece and the Cyclades are concerned some basic answers derive from the aggregate analysis set out in chapter 3. When it comes to Paros, which is represented by the two communities of Naoussa and Kostos, for which family reconstitution was employed, answers to the research questions will be more insightful.

9.1 What was the marriage pattern of the examined populations and the changes that occurred over time?

The marriage patterns of Greece, the Cyclades and Paros from the end of the 19th until the end of the 20th century were reviewed in chapter 3 while a more elaborate analysis of issues concerning nuptiality was made for Paros in chapter 6. A general conclusion that can be drawn from the entire study is that the marriage pattern of the island populations exhibited some characteristics that made it differ moderately from that of Greece as far as age at marriage and proportions married are concerned. In the following paragraphs a review of these two marriage patterns is set out.

In the years from 1879 to the Second World War age at first marriage in Greece was around 24 for women and 28 for men. Marriage was almost universal for females, with proportions of permanent celibacy not exceeding four percent. Yet, the level of permanent celibacy for males was not so low, usually exceeding six and occasionally even eight percent. In post war years the percentage of never married females rose, reaching 7.1 in 1971 and the universality of marriage for females ceased to be one of the characteristics of the Greek marriage pattern. However, by 1991 the percentages of never married females had fallen again to a value of 5.1. At the same time permanent celibacy for males had dropped to the same level as that of females. This is an indication that marriage in Greece has started becoming popular again and if this trend continues even lower levels of permanent celibacy may be seen in the future. With respect to age at marriage, although it underwent some turbulent fluctuations after the 1940s, in the early 1990s it was at the same levels as in pre-war years but with a tendency to increase for both sexes.

On the other hand the marriage pattern of the Cyclades and especially that of Paros, presented some particularities, which are worth noting. First of all age at first marriage, compared to that of Greece, was lower for females. In Paros, based on results from the examined communities, median age at marriage was around 22 for spinsters for the entire study period (1894-1998). For the Cyclades taken altogether age at marriage for spinsters was somewhat higher than in Paros but still lower than in Greece (23.3 years). In any case it seems that the Cycladic islands demonstrated a great age gap between spouses, around five to six years, which later on in the life cycle results in a high proportion of widows.

The second characteristic that made the marriage pattern of the Cycladic islands different from that of Greece is the level of permanent celibacy. Census results referring to the Cyclades disclose that permanent celibacy was quite high in every census from 1907 to 1971. The percentage of never married males during that period was above seven and occasionally exceeded 10, and that of never married females above six, very often exceeding seven.

However, in the last few decades some noteworthy changes have taken place in the female marriage pattern of the Cyclades and Paros, though the male one remained stable. The proportion of never married females started falling from the 1950s onwards and by 1991 it was lower than the national average (4.1% for the Cyclades as opposed to 5.1% for Greece). Yet, permanent celibacy for men was still at moderately high levels in the Cyclades in 1991 since the percentage of male population never married by age 50 was eight. As far as age at first marriage is concerned again changes affected mostly females. For both Paros and the Cyclades an ascending trend in age at first marriage is evident in the 1980s for both sexes, but in the 1990s (and here evidence comes from Paros only since for the Cyclades data stop in

1991) this tendency is more pronounced for females. This rise in the age at which spinsters enter marriage was quite remarkable for Paros, based on results for the two study communities. Mean female age at first marriage rose from around 21.5 in the 1970s to 25.5 in the 1990s and resulted in a female age at marriage higher than ever in the past 100 years.

Trying to typologise marriage patterns the classification proposed by Laslett (1983) has some relevance, although the marriage patterns exhibited by Greece and the Cyclades do not fit the typology of Laslett exactly. The marriage pattern of Greece in pre war years bore resemblance to the eastern European/Balkan pattern but only in terms of the intensiveness of marriage. Age at marriage for both sexes was relatively high by Balkan standards. In the first post war decades the percentages of never married females rose and the intensiveness of marriage weakened, although from the 1980s onwards marriage started becoming popular again.

On the other hand, the Cycladic marriage pattern until very recently (up to the 1980s) demonstrated certain characteristics of the Mediterranean pattern, such as rather low age at marriage for brides and high for grooms. However, it cannot be characterised as typically Mediterranean because of the moderately high levels of permanent celibacy that were exhibited throughout most of the study period. In any case in the last decades of the 20th century there has been a convergence of the two patterns exhibited by Greece and the Cyclades, which is probably associated with changes in modes of production, urbanisation and the more general modernisation of life style.

A more general observation from the above review is that in Greece the marriage pattern did not play a major role in fertility transition at least in the period where data are available, that is from 1879 onwards. This is so because no great changes occurred to it from the last decades of the 19th century until the Second World War. The same holds true for the marriage pattern of the Cyclades and Paros as well. The only nuptiality changes that took place in the pre-war period were some short-term oscillations in age at marriage but these could only have had a temporary effect on fertility. Drastic changes in the Greek marriage pattern, and more specifically a rise in the percentages of never married females, occurred only in the post-war years, but by then fertility had already dropped substantially. That means that fertility transition in Greece was not initiated by a change in the marriage pattern as might have happened in some West-European countries[38] but it came with a decline in marital fertility per se.

Nevertheless, even if age at marriage and proportions married did not differ much at the beginning and at the end of the examined period, this would not necessarily mean that issues related to family formation and dissolution have not changed as well. As was revealed from family reconstitution results for the two communities of Paros there were considerable changes in some respects. Age at widowhood changed dramatically during the study period (1894-1998). In the course of the 20th century age at widowhood almost doubled for men reaching 80 years as opposed to 47 at the beginning, thus extending the married life of males by 33 years. Gains were less for females since they entered permanent widowhood at 72 at the end of the 20th century compared with 48 at the beginning of it, having gained 23 years of married life. Although these figures refer to permanent widowhood the order of change is similar for age at first widowhood as well, which is usually a few years lower than that of the former. The main cause behind this impressive increase in age at widowhood was improvements in adult mortality.

Another feature of Paros'marriage pattern that changed over time is the percentage of female remarriages among all marriages. While in the early years of the 20th century it was rare for females to remarry (only 0.7% of all marriages were female remarriages), this situation gradually altered and in the end of the century in almost 5% of all marriages the bride was not a spinster. It is worth noticing that the initial pattern was in accordance with a feature of the Mediterranean marriage pattern, which wants widows to remain unmarried. As remarriage became more popular among females the marriage pattern diverged from the Mediterranean one in this aspect as it did in other aspects as well.

Together with the increase in levels of remarriage among females, a rise in mean age at remarriage came for both sexes but especially for women. This rise was greater than 10 years for females (from below 30 at the beginning to over 40 at the end of the 20th century) but only around seven years for males (from 37.5 to just over 44).

Other changes are related to social issues that are not directly associated with nuptiality but which question the role of marriage as the only setting within which reproductive activity can take place and can indirectly affect marriage patterns. One of these

[38] Evidence that this was the case with England, Finland and Ireland is presented in Tapinos, 1993:373-375.

issues is bridal pregnancy, which was found to have increased in the course of the 20th century. In the study communities of Paros the percentage of brides that were pregnant at the day of their wedding rose from seven at the beginning of the 20th century to 10 at the end of it. This level of bridal pregnancy is considered low by West-European standards since in 19th century England and Germany bridal pregnancy was between 26 and 41% (Knodel, 1988. Reay, 1996). However, the increase in bridal pregnancy in the study population could have had some effect on the marriage pattern by precipitating marriages. It was observed that this increase was not because of births conceived shortly before marriage, but mainly due to births conceived three to six months before marriage. Since in the latter case the couple was probably aware of the pregnancy before marriage, it might have been the pregnancy that played a crucial role in their decision to marry.

Another noteworthy change during the 20th century concerns non-marital childbearing or illegitimacy, as it was commonly known formerly. In the sample population the percentage of illegitimate births among all births fell from 2% at the beginning of the 20th century to 0.3% at the end of it. Although this decrease does not seem significant expressed as a percentage, in absolute numbers it means a more than six-fold drop in the number of illegitimate births. This drop is unlikely to be due to a decrease in non-marital sexual activity since bridal pregnancy increased at the same time. The decline in illegitimacy most probably reflects the fact that people became familiar with modern birth control techniques.

The above-described changes concerning remarriage, bridal pregnancy, illegitimacy along with the reducing age gap between spouses and the fact that an ever increasing proportion of brides are older than grooms reveal that cultural changes took place in the island society in the last decades of the 20th century. In some cases cultural changes were so strong as to offset structural changes of the population. This is the case, for example, with remarriages. Although increases in age at first widowhood should have tended to decrease remarriages, only a small reduction has been observed in male remarriages and, in contrast, a huge rise in female remarriages. It seems that as the society became more open both culturally and demographically, mainly due to tourist development from the 1970s onwards, traditional social conventions relaxed and remarriage became widely available. To this modernisation of the society we can also attribute the observed increase in bridal pregnancy, which could signify, among other things, a liberalisation of morals. However, it seems that people deal with pre-marital relationships more responsibly than in the past, since premarital conceptions do not end in illegitimate births as implied by the continuously decreasing rate of illegitimacy. Even the greater equality in the ages of spouses observable in the 1990s in the studied communities could signify a change in the traditional roles of husband and wife, which saw the latter as subservient to the former.

9.2 What was the course of the mortality transition in Greece, in the Cyclades and in Paros?

With respect to mortality, as far as crude death rates are concerned, it seems that both Greece and the examined island populations followed a parallel course from the last decades of the 19th century onwards. The absence of erratic fluctuations and the fact that CDRs from 1860 onwards did not exceed 35/1000, indicate that in 1860, when our aggregate data start, the examined populations were already undergoing the first stage of demographic transition. It is worth remembering that the first evidence that something is changing in the mortality regime of pre-transitional populations is the attenuation of mortality crises and the gradual stabilisation of CDRs, as a prelude to mortality decline. This decline for Greece had started by 1860, although historical events, such as wars, mass emigration, the annexation of new territories and the intake of new populations, disrupted the descending trend of CDRs at least three times, in the 1880s in the 1920s and in the 1940s.

In the 1880s the annexation of Thessaly and Arta was responsible for a small surge in mortality, evident in the CDRs given by Valaoras (1960), most probably because the population of the new areas experienced somewhat higher infant mortality than the national average (Siampos, 1973:67). The significant rise in mortality in the late 1910s-early 1920s, which is evident not only in the CDRs for Greece but also in those for the Cyclades and Paros (represented by Naoussa), was due to a combination of wars and mass population movements, which caused a rise in mortality. Another interruption of the decline in mortality rates occurred during the 1940s due to the war and the hardships that foreign occupation brought along. Although there are no published data at the national level for that period some estimates (Siampos,1973: 89) put the population lost due to war-related causes during the 1940s at 687,000, i.e. 9.2% of the mid-population of Greece in that decade.

However, the main feature of crude death rates in the 20th century is their abrupt drop in the immediate post Second World War years. This drop cannot be followed closely in the case of Greece and the Cyclades because there are no published data for the 1940s but the available values at the beginning and at the end of this period imply that a steep fall took place within few years. CDRs for Greece fell from 13/1000 in 1939 to 8/1000 in 1950 and to an even lower 6.9/1000 in 1955. These values, which are given by official publications (NSSG, 1997a) do not differ much from values given by Valaoras (1960) with the latter being a couple of units higher. The same picture, that of a rapid decrease in mortality somewhere between the end of the 1930s and the beginning of the 1950s, is presented by the published CDRs for the Cyclades (see figure 3.5 in chapter 3). In fact looking at CDRs for Naoussa in chapter 3, for which uninterrupted series of CDRs are available for the 1940s, it becomes obvious that, although a swift decline in mortality had started from the mid-1930s, in the first years of the 1940s CDRs reached particularly high levels due to the famine that hit the whole country in 1941-1942. Thus, the very low CDRs observed in 1950 should have been the result of a mortality decline that took place in the late 1940s, after most of the hardships of that decade, which for Greece was a war decade, were over.

This mortality decline in the post-war years resulted mainly from a change in the causes of death. The analysis of Naoussa's death certificates showed that at the turn of the 20th century (1895-1915) the majority of deaths (56%) were caused by infectious and contagious diseases. Especially infectious and parasitic diseases like tuberculosis, diphtheria, malaria and typhoid fever, a sub-category of infectious and contagious diseases, constituted a major threat for human life in that period, being responsible for more than a third of all deaths. In the period 1932-1965 infectious and contagious diseases constituted already the minority of deaths (35.7%), and this change in the mortality regime was achieved exclusively due to the elimination of infectious and parasitic diseases as the analysis of the death certificates revealed. In more recent years (1966-1998) the overwhelming majority of deaths (77.6%) were due to degenerative conditions, while deaths from infectious and parasitic diseases were almost non-existent (0.4%) and deaths from all infectious and contagious diseases did not exceed 8.5% of all deaths.

The reasons behind the change in the causes of death and the concomitant mortality decline should be sought both in the development of infrastructure concerning public health, such as the building of hospitals, the improvement of sewage and running water system, and in medical progress as well. Some of these developments had taken place in the years before 1940 but most of the country's infrastructure was destroyed during the Second World War and the ensuing civil war. The mortality decline in Greece in the late 1940s-early 1950s was mainly the result of external aid. This aid in the first place came from the United Nations Relief and Rehabilitation Administration (UNRRA) in 1945 and 1946, which sent to Greece great amounts of food and medical supplies (Fischer et al., 1974:65). Until the end of 1946 the assistance of UNRRA to Greece reached the amount of 358 million dollars (Ekdotiki Athinon, 2000:128). Yet, the main economic aid to post-war reconstruction in Greece, which permitted improvements in mortality, came from the USA and is associated with the political climate of that era. The political manoeuvres of that period, which initiated an era of American intervention in the Eastern Mediterranean through the "Truman Doctrine" in 1947, are beyond the scope of this study but it suffices to mention that from 1945 to 1950 Greece received from the USA about 2.1 billion dollars in food and medical supplies, technical and material support and economic assistance. This amount of money, relative to the population of Greece, was the greatest received by any European country in that period (Ibid:224).

Hence, CDRs reached their lowest level in Greece in 1955 with a value of 6.9/1000. From thereon a gradual increase in crude death rates is observed, which came as a natural consequence of the ageing of the population. Today (end of the 20th century) Greece is among the countries with the highest longevity worldwide, with life expectancy at birth being 76 and 81 years for males and females respectively (The Economist, 1998).

Regarding infant mortality, it is not clear when its decline started. Rates of infant mortality for Greece given by Valaoras (1960) show a descending trend from as early as 1864 onwards, although these rates do not fall bellow 180/1000 until the turn of the 20th century. On the other hand IMRs calculated from official publications do not show any descending trend in the 19th century, although they are much lower than those of Valaoras, fluctuating between 155 and 120/1000. Family reconstitution of the examined communities of Paros provided IMRs only for the period 1894-1953 and thus it cannot be said whether the decline of infant morality had started before 1894, although an irreversible decline in infant mortality in Naoussa and Kostos is evident only after 1914. What is more important though is that the two island communities (Naoussa and Kostos) exhibited significantly lower infant mortality than the national average at least in the period 1894-1953. More specifically IMRs for Naoussa and Kostos oscillated between 125 and 34 deaths per thousand live births, while the relevant values for Greece in the same period (1894-1953) fluctuated between 178 and 50 or thereabout (Valaoras, 1960). Childhood mortality in the same period was also lower in the island, although there are signs that around 1950 the difference in childhood mortality between the island and the Greece as a whole diminished, or even reversed. Lower levels of infant and childhood mortality than the national average have been also found in the island of Mykonos for the second half of the 19th century (Hionidou, 1993).

Lower mortality in island populations in the period before 1950 should not surprise us, since it is probably associated with the relatively isolated island environment, which did not favour epidemics of contagious diseases. In fact, there are some indications suggesting that overall mortality in the Cyclades was usually lower than that of Greece. The first indication comes from the life tables we constructed in appendix C for Greece and the Cyclades referring to 1870 and 1879 and based on official publications. In all eight life tables (four for Greece and four for the Cyclades) life expectancy at birth was approximately three years higher in the Cyclades, when comparing homologous populations (same sex and same date populations). Life expectancy at birth in 1870 Greece was around 40 years while in 1879 it rose to 44-45 years. For the Cyclades relevant values were three years higher than those of Greece.

Further evidence implying that the Cycladic islands were characterised by lower mortality than Greece, at least in the second half of the 19th century, is the life tables constructed by Hionidou for the island of Mykonos referring to the years 1861, 1870 and 1879. In all cases life expectancy at birth for the population of Mykonos was higher than the national average, swinging between 42 and 53 years for the period 1861 to 1879 (Hionidou, 1993: 242). Moreover, another indication reinforcing the argument that island populations in the past experienced lower mortality than mainland ones, comes from the study of the Ionian island of Lefkada by Tomara-Sideri (1991). According to the findings of her study life expectancy at birth in mid-19th century Lefkada was 49.4 years, a value at least 12 years higher than that prevailing in mid-19th century Greece (Tomara-Sideri, 1991:82-83).

9.3 What was the course of the fertility transition in Greece, in the Cyclades and in Paros?

Time series of crude birth rates for the above populations showed that these rates fluctuated at about 40-50/1000 in the last decades of the 19th century and declined rather rapidly from the last years of the 19th century onwards to reach a level of around 30 births per thousand population in the early 1920s. However, the decline was not monotonic for any of the examined populations. CBRs increased in the 1920s to fall again from the mid-1930s onwards. At least some of the fertility decline between 1890 and the early 1920s was probably caused by a lack of males during that period. Two kinds of historical events corroborate this argument. The first was mass emigration to overseas countries, which invoked 12.3% of the Greek population in the period 1890-1912. The host of emigrants consisted of 94% males, of whom 93% were aged 15 to 44 years (NSSG, 1980c:97). The second event responsible for the lack of males in the 1910s was a series of wars that took place between 1912 and 1922 and which were, as emigration, highly sex selective claiming a great toll among the male population. Therefore, we believe that a deliberate choice of the population to limit its family size cannot have been responsible for the entire fertility decline from 1890 to 1922. The population drain among males during that period must have been partly responsible for the low CBRs observed before the 1920s.

The temporary increase in CBRs that took place in the 1920s is associated with large population movements that changed the structure of the population. In 1922-23 an exchange of populations between Greece and Turkey brought to the former 1.2 (1.4 according to other estimates) million refugees from Asia Minor. And although some 380,000 Muslims left the country in the framework of this exchange, the net influx was still huge (around 900,000) (Clogg: 1992:101). Most likely the reproductive behaviour of the refugees was more prolific than that of the native inhabitants. However, a secondary intrinsic decline in fertility started from 1935 onwards when both the refugee population and inborn inhabitants had adapted their reproductive behaviour as a result of free choice to limit their family size.

It should be said, however, that the Cyclades were not affected so much by the host of refugees that flooded into Greece in 1922-1923. According to the 1928 census the refugees made up almost 22% of the population of Greece but only 3.7% of the population of the Cyclades (SGG, 1933 **(I)**). This is evident from the CBRs of Greece and the Cyclades during the 1920s (see figure 3.1). Rates for Greece exhibit a much higher surge than that for the Cyclades and most probably the small increase in the CBRs of the Cyclades was caused by the fact that civil registration improved considerably after 1924 (NSSG, 1956a:XV) and not because of the higher fertility of refugees. The examined communities of Paros used as a case study, namely Naoussa and Kostos, exhibited a moderate rise in their CBRs during the 1920s (from 35/1000 in the early 1920s to about 40/1000 in the early 1930s), presumably because their refugee population, although not so big as that of Greece, was big enough (6% according to the 1928 census) to affect CBRs. Yet, in general the advent of the refugees should not have affected much the demographic processes in the Cyclades; or at least not to the degree it affected fertility and mortality at national level.

From the mid-1930s onwards CBRs for Greece fell rather rapidly from around 30 to 25/1000 in 1940 and again to 20/1000 in 1950 (the figures are similar for the examined island populations as well). For the 1940s there are no published data for Greece so it is not known if any erratic fluctuations took place. Presumably, the famine of 1941-42 would have affected fertility in a negative way, while the return of soldiers to their home after April 1941 would not have had an upward effect on CBRs in urban centres, which were the parts of Greece mostly affected by the famine. In any case CBRs continued their descending course in an almost monotonic way from 1950 onwards and reached the value of 9.7/1000 in 1995.

Nevertheless, crude birth rates alone are very vague measures of fertility. They depend heavily on population structure and therefore their information about levels and trends of overall fertility can be misleading. Some better measurements of fertility have been calculated in chapter 3, namely Coale's indices of fertility. The index of overall fertility (I_f) revealed that overall fertility was generally higher at all periods up to 1971 for the Cyclades and Paros than for Greece as a whole. This index (I_f) for Greece exhibited only a small reduction in the last four decades of the 19th century, falling from 0.40 in 1860 to 0.37 in 1885. A significant decline in overall fertility had taken place by 1921, bringing I_f down to 0.30 but there are no official data on I_f for the years between 1885 and 1921. Moreover, in a population where the marriage pattern remains relatively stable, as was the case of Greece from 1879 (when the first data on age at marriage and proportion married are available) until the Second World War, it would be more interesting to monitor the evolution of marital fertility because it is mainly this that defines changes in overall fertility.

Unfortunately marital fertility in Greece cannot be studied in detail in years before 1950 because published population statistics do not provide births broken down by age of mother. Some indirect measurements of marital fertility, like Coale's indices of marital fertility (I_g), can be calculated from 1921 onwards and for certain years only, when both population age structure and number of births are available. This has been done in chapter 3 and Coale's indices of marital fertility have been estimated for both Greece and the Cyclades for the years 1921, 1928, 1951, 1961, 1971, 1981 and 1991. The only firm conclusion from this series is that in pre-war years the Cyclades exhibited higher marital fertility than the national average. A second observation is that while Greece presented a rise in marital fertility between 1921 and 1928 (see table 3.3), which most probably reflects the effect of the more prolific reproductive behaviour of the refugees, in the Cyclades marital fertility declined between 1921 and 1928 because refugees in the Cyclades were too few to have any serious impact on fertility.

However, the above-mentioned series of I_g suffer from two serious limitations. First, they do not go back beyond 1921, and second, the index of I_g alone cannot detect when a population alters its reproductive behaviour from natural to controlled. Yet, this passage from natural to control fertility in populations with a relatively stable marriage pattern, as was the case with pre-war Greece, is very important because it signifies the onset of fertility transition.

A detailed study of marital fertility has been accomplished in chapter 7 for the island of Paros based on family reconstitution data from Naoussa and Kostos. Our data permitted us to probe the reproductive behaviour of those who married in the two communities between 1894 and 1953. Although this period is not very long, findings suggest that we captured a 60-year period at the beginning of which fertility was still natural but subsequently became controlled. The measures used to explore marital fertility were age-specific marital fertility rates, age of mother at last birth, length of birth intervals and three out of the four proximate determinants of natural fertility (permanent sterility, fecundability and the postpartum non-susceptible period). All these measures and comparison with schedules of natural fertility, suggest that fertility was still "natural" in the island at the beginning of the 20^{th} century, while a substantial fertility decline made itself visible only in the late 1920s and early 1930s.

It is worth reviewing here the main points of fertility transition in Paros, since family reconstitution made it possible to detect and measure the presence and extent of family limitation for marriage cohorts between 1894 and 1943. Marital fertility at the beginning of the 20^{th} century was rather moderate, even for a natural fertility population, with a total marital fertility rate of 8.47 while the completed family size averaged six children per woman. These figures are neither at the top nor the bottom of the scale for natural fertility populations. The figure for total marital fertility (8.47) is only marginally higher than the average TMFR 20-49 (8.45) of the 13 populations proposed by Henry (1961) as "natural fertility" ones. The main reason for the moderate level of fertility was a relatively long period of breast-feeding, which was found to be almost one year in the marriage cohorts 1894-1923 and which must have had a reducing effect on marital fertility at the beginning of the 20th century.

Reproductive behaviour in the examined communities continued to be natural for those who married up to 1913. For the next marriage cohort, that of 1914-1923, the several measures employed showed a differentiation in the reproductive behaviour from previous marriage cohorts, although this differentiation towards family limitation was neither spectacular nor decisive. Yet, though the 1914-1923 marriage cohort could lie somewhere between natural and controlled fertility, the steep drop in mean completed family size from around 6 children per family in the previous 20 years (1894-1913) to 5.4 in the 1914-1923 marriage cohort, made us accept that this was the marriage cohort that initiated family limitation. However, a spectacular move of all indices towards family limitation came for those who married only after 1923.

Consequently, the onset of fertility transition in Paros should be put somewhere in the late 1920s-early 1930s. This is because people belonging to the 1914-1923 marriage cohort, which was the first cohort to deviate, even slightly, from natural fertility, tried to stop childbearing at the older reproductive ages. This became evident from the comparison of the age pattern of their fertility schedule with the standard schedule of natural fertility proposed by Henry. Therefore it seems that people in that marriage cohort (1914-1923) applied some kind of stopping behaviour only after having reached a number of children they did not want to exceed, and that could have only happened 10 to 15 years after their marriage. Thus the turning point from natural to controlled fertility for the examined communities and inferentially for the entire island of Paros could not have occurred before the end of the third decade of the 20th century. Not surprisingly, the late 1920s are proposed by Hionidou (1993: 233) as the date that fertility decline started in the adjacent island of Mykonos as well.

However, at that date Greece as a whole was in a more advanced stage of fertility decline than Paros and the Cyclades. This was inferred by comparing indexes of marital fertility (Ig and Ig') for Greece, the Cyclades and the examined communities in chapter 7. Marital fertility in the Cyclades was closer to that of the study communities, although somewhat lower, but both the Cyclades and the examined communities of Paros exhibited higher indexes of marital fertility than the national average. More specifically this index (Ig or its modified version Ig') in the Cycladic islands was between 0.65-0.72 in the early 1920s, while that of Greece was 0.56. In the late 1920s the difference was lower but still visible with the Cyclades fluctuating at 0.63-0.68 and Greece at 0.59.

To answer how the population switched from natural to controlled fertility a birth interval analysis was employed. This suggested that any attempts to reduce family size among those who married up to 1923 were confined to stopping childbearing only after having reached a number of children they did not want to exceed. Birth intervals of almost all orders started to lengthen only after 1923 and this is an indication that birth spacing started to be used in conjunction with birth stopping by those who married from 1924 onwards. The use of birth spacing seems to have been limited until the 1930s but it became increasingly more important in subsequent marriage cohorts.

9.4 What was the relationship between mortality and fertility?

In the original formulation of demographic transition theory fertility decline follows that of mortality with a time lag, which depends on the economic development of the society (Notestein, 1945). As research on demographic transition went on this causal relationship between mortality and fertility was put in question since new findings could not support it. It was found that in some cases the decrease of the two variables was simultaneous or even that, like in the cases of France and Germany, the decline in fertility in many districts preceded that of mortality (Tapinos, 1993: 377).

In the case of Paros infant mortality dropped steeply from the mid-1910s onwards, while childhood mortality was already low at that time. On the other hand fertility started declining in a manner implying family limitation in the late 1920s-early 1930s. Therefore, one's first reaction would be to infer that reductions in infant mortality brought about concomitant reductions in fertility. However, this relationship may not have been a causal one, although its timing would suggest so. It may well have been that fertility decline started as a fashion following other places in Greece, which at that time were more advanced in family limitation. This may be suggested by the following table (9.1), which gives a very crude picture of the socio-demographic situation that prevailed in Greece and Paros at the time their marital fertility had shown signs of irreversible decline.

The year 1900 or thereabouts, as the time when marital fertility in Greece reaches the threshold of 10% below its “plateau” level, is the year proposed by Siampos and Valaoras (1969:606). The socio-demographic indices for Greece shown in table 9.1 are also estimates produced by them. Demographic indices for Paros are based on findings for Naoussa and Kostos shown in detail in previous chapters. The urban population here is defined as those living in cities with more than 10,000 inhabitants and hence there is no urban population in Paros. The percentage of literate women in Paros in the age group 20-29 is based on census returns (SGG, 1933).

Table 9.1: Socio-demographic indexes at the time fertility starts declining.

	Date of decline in marital fertility by 10%	Marital fertility before decline (I_g)	IMR	% Urban Population	% Literate women (20-29)
Greece	Ca. 1900	0.75	173	14	16
Paros	Ca. 1930	0.78	57	0	42

Source: see text.

Note: IMR for Greece is an estimate by Valaoras (1960:132). Official publications give a value of 154 for 1885 and 75 for 1921.

According to table 9.1 Greece and Paros had attained very different levels of infant mortality when their fertility started declining. In the case of Greece infant mortality had declined only marginally from the levels attained in the last decades of the 19th century (Valaoras, 1960:132). It seems that urbanisation played a more important role than infant mortality. The role of urbanisation but also that of culture is pinpointed by Siampos and Valaoras (1969) when they claim that fertility decline started from Athens, Salonika and the Ionian islands. Athens and Salonika are exclusively urban areas while the Ionian Islands were more open to influences from western Europe, because of their past links with certain European countries (Italy and England).

On the other hand Paros, although it had achieved low levels of infant mortality, did not see its fertility declining until around 1930. The fact that it was a rural society might be the reason behind its delayed fertility decline. This suggestion is supported by the finding, showed in chapter 7, that farmers and agricultural labourers, which in pre-war years made up the majority of the population in the two study communities, were the occupational groups with the greatest family sizes.

Nevertheless, in the examined populations we cannot dismiss the role of mortality in declining fertility. Although a strong relationship between infant mortality decline and fertility decline does not seem to exist in the case of Greece, one cannot exclude the possibility that there was a correlation between reductions in childhood mortality and those in fertility. Evidence that there were reductions in childhood mortality comes from estimates of life expectancy made by Valaoras (1960), according to which life expectancy at birth increased by five years between 1860 and 1900. The increase in life expectancy in a high mortality population implies mortality improvements mainly in the youngest age groups.

9.5 How was demographic balance achieved in pre-transitional, transitional and post-transitional Paros?

Aggregate analysis for the island populations in chapter 3 revealed a great gap between CBRs and CDRs from the 1860s until the 1960s suggesting a huge natural increase, which should have led the Cyclades and Paros to experience high rates of population growth. On the other hand the census figures (seen at tables A.1 to A.3) show declining populations for most of the 20th century up to 1971. The only responsible for this discrepancy was migration, considered in some detail in chapter 4. Consequently, it seems that the demographic regime of Paros and possibly of all the Cyclades can be sketched as follows. Traditionally the population exhibited moderately high levels of fertility resulting from a marriage pattern that favours low age at marriage for females and from a non-controlled marital fertility until the late 1920s. High fertility in conjunction with relatively low mortality led to high population pressure, which was counterbalanced by high rates of out-migration. This demographic model was initially proposed by Hionidou (1993) for the island of Mykonos and it might hold true for every Cycladic island.

To test whether this model was indeed in action at macro and micro-level, that is in the group of islands called Cyclades and in individual island communities within this group of islands, tables 9.2 and 9.3 have been constructed. These tables have been based on tables 4.1 and 4.3. For intercensal periods where no data on the natural movement of the population exist the population growth rates have been calculated directly from the difference in the population size between two successive censuses.

Table 9.2: Annual rates of natural increase, net migration and real increase for the population of the Cyclades; 1861-1991.

Intercensal period	Rate of natural increase (%)	Growth rate of net migration (%)	Population growth rate (%)

1861-1870	0.90	-0.32	0.58
1870-1879	0.97	-0.21	0.76
1879-1889	0.88	-0.92	-0.04
1889-1920			-0.22
1920-1928	1.26	-0.53	0.73
1928-1940	1.23	-1.28	-0.04
1940-1951			-0.22
1951-1961	0.82	-3.12	-2.30
1961-1971	0.58	-2.05	-1.46
1971-1981	0.25	-0.01	0.24
1981-1991	0.00	0.60	0.61

Source: table 4.1

Table 9.2 is characteristic of how demographic equilibrium was achieved in the Cyclades. The rate of natural increase, although never extremely high, would have led in a fast population growth in pre-war years, had the population been a closed one. A rough estimation showed that with the prevailing rates of natural increase in pre-war years, if no migratory movement had taken place, the population of the Cyclades would have exceeded 200,000 in the early 1930s, a population size that these islands could not sustain with their rural economy. Therefore, net out-migration, which was always substantial until the 1960s, acted as a release valve. However, it seems that the volume of net emigration, which at times exceeded 3% per anuum, was much higher than that needed to keep a demographic equilibrium. As a result population growth rates were usually negative from the end of the 19th century until the 1960s and the islands experienced a rapid depopulation; the population dropped from 132,020 in 1879 to 86,340 in 1971. What is amazing however, is that depopulation, which would have become more intense from the 1970s onwards because of the very low rates of natural increase, was averted by migration again, this time in the form of in-migration.

Conclusively, migration is the key factor in understanding the demographic regime of these islands. Either negative or positive (emigration or immigration), population mobility has always been and still is the factor that regulates natural increase and determines the real increase of the population. Whenever rates of natural increase were too high, emigration acted as a counterbalancing factor by taking population away from the islands, while when rates of natural increase reached very low levels from the 1980s onwards due to low fertility, immigration came as a substitute and prevented the depopulation and the economic stagnation of the Cyclades.

Table 9.3: Annual rates of natural increase, net migration and real increase for the population of Naoussa; 1861-1991.

Intercensal period	Rate of natural increase (%)	Growth rate of net migration (%)	Population growth rate (%)
1861-1870	2.00	-1.56	0.45
1870-1879	2.27	-2.19	0.08
1879-1889	2.11	-1.09	1.01
1889-1896			0.54
1896-1907	2.25	-3.06	-0.82
1907-1920	1.54	-2.84	-1.30
1920-1928	1.96	0.04	2.00
1928-1940	2.00	-3.27	-1.27
1940-1951	1.60	-0.47	1.13
1951-1961	1.10	-1.93	-0.83
1961-1971	0.66	-1.80	-1.13
1971-1981	0.93	1.72	2.65
1981-1991	0.84	1.27	2.11

Source: table 4.3

Table 9.3 confirms the demographic regime of the Cyclades at the micro-level. Migration determined the demographic equilibrium in Naoussa as well. The only difference compared to the Cyclades as a whole is that Naoussa exhibited higher rates of natural increase and usually higher rates of real increase. Yet, the component in the demographic equation that determined a demographic balance between population and resources was not natural increase, but population mobility.

9.6 Was the demographic regime of Paros similar to other islands within and outside Greece?

It was already shown in the previous section that the group of islands in the middle of the Aegean Sea, called the Cyclades, shared the same demographic regime with Paros, a Cycladic island itself. This inference is reinforced by the case study of Hionidou for Mykonos, another Cycladic island in which for a century high population growth was counterbalanced by high emigration which kept the island population almost constant (Hionidou, 1993). It is surprising to realise, however, that on a number of other islands outside Greece demographic equilibrium was achieved in the same way, that is through population mobility. As an indicative example, we mention here the cases of the Caribbean islands and Malta.

Both Malta and the Caribbean islands experienced two main emigration waves, one during the late 19th and early 20th centuries (until the economic depression of the 1930s) and another one during the 1950s and 1960s. In the case of the Caribbean another emigration wave had followed the emancipation from slavery in 1834. But in any case the islands, because of their limited-base economy, served as a labour reserve whenever the economies of the industrial centre (mainly the USA but also Britain in the post-war period) were thriving. When the two main emigration waves were at their peak, that is in the first decades of the 20th century and in the 1950s and 1960s, both Malta and the Caribbean witnessed negative population growth. This was especially felt in some of the smallest of the Caribbean islands where emigration to such a great extend caused fears of almost complete depopulation of these islands. Even Malta with a population of over 300,000 experienced a negative population growth in the early 1960s because of intense emigration. However, by the 1980s most of these islands had been converted from sending to receiving places. The reasons: the recession of the economies of the centre in combination with the relatively economic prosperity of the islands brought about by tourism and by the remittances sent by emigrants (Busuttul, 1994, Byron, 1999, Connell & King 1999).

Conclusively, the viability of island communities depends mostly on migratory strategies. It is more likely that, whereas in larger and less mobile populations the checks to a relatively surplus population may come through other demographic variables, such as high mortality or reduced nuptiality, islands use migration to achieve a demographic balance.

9.7 What was the social history of Naoussa and Kostos in the last hundred years?

Another thing that is worth remembering is that demographic changes come through interaction with socio-economic changes. The passage from illiteracy to total literacy transformed a rural society to one dominated by the third-sector economy. The strictly delineated tripartite class stratification of the early 20th century gave way, slowly but steadily, to a quasi-urban class structure, where borders are vague and imperceptible.

At the beginning of the 20th century the majority of the population in the examined communities lived on land. This majority was usually divided into proprietors (the big landowners), small landlords or tenant farmers, and labourers, whose hands were their only source of income. Overseas or internal emigration and subsequently return-migration changed this established class stratification and made people turn to activities commonly found in an urban environment such as crafts, sales and trade. These changes brought about economic development and, equally important, geographic and consequently cultural openness of the island society. This modernisation facilitated demographic changes as well. As the roles of the spouses changed, remarriage became widely available to women, the age gap between spouses showed signs of reduction and family planning became more efficient most probably because of improved communication between spouses.

9.8 Discussion

This is the second time family reconstitution has been applied to Greek data. The first application of the method to Greek data was by Hionidou (1993) in the early 1990s again in one of the Cycladic islands, that of Mykonos. Inevitably, the geographic proximity of Mykonos and Paros bestows common demographic features on the two islands. A common finding was that demographic equilibrium was defined in the same way in the two islands. Population was kept at an "optimum" size neither by the "preventive" check of late marriage (and abstinence before it) nor by the “positive” check of high mortality from disease, war or famine, as the Malthusian model would suggest, but by migration. Therefore, the demographic model proposed by Hionidou for island populations is confirmed in the case of Paros and the probabilities that this model held in every island of the Aegean archipelago increase.

Another significant common characteristic of the two islands is that the turning point from natural to controlled fertility was somewhere between the late 1920s and early 1930s. This was substantiated in the case of Paros by making use of a plenitude of measures such as age-specific marital fertility rates, age of mother at last birth, mean completed family size and by a birth interval analysis. In the case of Mykonos the probing of fertility for those who married after 1918 relied mostly on birth intervals but nevertheless the conclusion was the same, that is, that a reproductive behaviour suggesting family limitation became evident only in the late 1920s. The fact that this is a rather late date for fertility decline compared to Greece as a whole has been stressed in this study and the actuality of the rural and insular society was proposed as a reason behind this delayed fertility decline.

However, there are some small differences in the demography of the two islands, which are worth mentioning. First of all it seems that Mykonos experienced a somewhat lower marital fertility, most probably due to different infant-feeding practices. The average non-susceptible period after a woman's confinement, for natural fertility marriage cohorts, was three months longer in Mykonos than in Paros, something that suggests longer periods of breast-feeding and consequently longer intervals between births.

Another noteworthy difference between the two islands concerns trends and levels of infant mortality. While on Paros infant mortality was continuously reducing from the beginning of the 20th century, in Mykonos it started reducing only from the 1930s onwards, showing ascending movements until then and thus exhibiting diverging trends from childhood mortality. Infant mortality levels in Mykonos were lower than in Paros in the years around 1900, but this situation changed as infant mortality of Mykonos was increasing until the 1920s, while that of Paros was decreasing.

Nevertheless, these differences between the two islands constitute expected regional variations of the same demographic regime. What is more interesting in the two studies however, is the study period. Hionidou collected data from the period 1859-1959 and captured the early phases of demographic transition even in areas such as childhood mortality. Our data cover the period 1894-1998. Fertility transition was captured and it was revealed that it was rather quick by European standards, since in the course of 40 years (1894-1933) we passed from a regime of natural fertility to one of well-established family limitation. Our data set, on the other hand, provides less evidence about whether or not we have captured mortality transition. Infant and early childhood mortality show an irreversible decline from the 1910s onwards but it is not clear if prior reductions had taken place in the 19th century.

However, our closer to the present data gave us the chance to observe how demographic processes evolved in a more recent period. In some cases, such as in nuptiality and socio-economic background, results reach up to 1998, thus permitting us to examine aspects of contemporary life. Researchers on the demography of modern Greece should take advantage of the technique of family reconstitution bearing in mind that application of family reconstitution to contemporary data would not be possible in some West-European countries because of restrictive legislation on the use of civil registers. More demographic studies in the micro level in several localities of Greece will contribute to a better understanding of demographic behaviour in years before 1950, where population statistics are meagre. Even in periods with adequate published statistics, however, such studies are useful because microanalysis can reveal behaviours and attitudes that large-scale aggregate analysis often finds it difficult to trace.

APPENDIX A
Population estimates for intercensal periods.

Several methods can be applied to produce population estimates for intercensal periods. The most common is the one that calculates population estimates based on natural increase. To apply that method the population enumerated at a census is used as base population, say that of 1861. However, Greek censuses did not take place at the same date of the year (the dates are given in chapter 2); moreover most of the 19th century censuses lasted several weeks and the first conducted in one day was that of 1889. Thus, the assumption will be made that all censuses have taken place on December 31 of the relevant year and consequently, population estimates refer to the end of the year in question. This is a compromise, which is not expected to bias population estimates seriously since the population size does not change substantially within a calendar year unless extraordinary events happen.

In order to estimate the population of the next year, that is, 1862, one adds the natural increase of 1862 to the base population. The product is the estimated population at end-1862, which becomes in its turn the base population for the estimation of the 1863 population. The same calculation is repeated for each year of the intercensal period. This procedure can be expressed with the following formula: $P_t=P_{t-1}+(B_t-D_t)$ where P represents population at end-year, t denotes the year, B the births and D the deaths. This procedure will be called here "the forward method" for population estimates. The disadvantage of this method is that it does not allow for net migration. Yet, as will be shown in what follows, a great volume of net out-migration characterized the examined populations until 25-30 years ago, thus making population estimates based only on natural increase an overstatement of the real population.

To take into account net migration a modified method has been employed for the estimation of the population. This method consists of three stages: a) One computes the population of, say, 1870 based only on the natural increase that took place throughout the intercensal period 1861-1870, using as base population that at the 1861 census. At the same time one produces annual population estimates by the "forward method" as described in the previous paragraph. b) One takes the differences between the estimated population of 1870 and the actual population of 1870 to obtain the net migration that occurred in the nine-year period 1861-1870. c) The assumption is then made that net migration (which turns out to be net out-migration) has been evenly spread throughout the intercensal period and the annual population found with the "forward method" is corrected to reflect this. The results of this procedure, together with a more schematic explanation of the method, are presented in tables A.1, A.2 and A.3. For the purposes of this study this computational procedure can be called "the method of evenly spread migration".

This method has been used for the estimation of the population in all intercensal periods, wherever data are available. Actual population figures (as enumerated by censuses) are presented in bold characters and are used as base populations for the calculation of the intercensal figures. For years that vital events are missing, that is, for the years 1861-1863, 1884 and 1886-1889 for all three populations and the years 1951-1955 for Paros, births and deaths have been estimated by making assumptions as detailed in notes attached to tables A.1, A.2 and A.3.

Before looking at the following tables one should bear in mind the following points. The method of "evenly spread migration" attributes every difference between the expected population and the enumerated one to migration. This would have been the case, had the registration of vital events and the enumeration of censuses been a hundred percent complete. However, even overlooking the deficiencies of the censuses, one of the main problems with Greek data for the period prior to the mid-1950s is the under-registration of births and deaths (Valaoras, 1960). Nevertheless, as emerged in a cursory assessment in chapter 3, there is evidence that registration of vital events was more complete in the examined island populations than in Greece as a whole. What is more important for our purposes, though, is that the under-registration of births, (which was almost always greater than that of deaths) did not exceed the under-registration of deaths for more than 5-10% (ibid., 1960:135). Consequently, the population estimates here, which are based heavily on the excess of births over deaths, will not be dramatically affected by under-registration of any kind although they will be an under-state of the actual population.

Nevertheless, even if under-registration of the two kinds of vital events (births and deaths) counter-balanced the net effect of under-registration on the estimates of natural increase, one still would have to bear in mind the deficiencies of the censuses. Greek censuses prior to 1928 have been found to under-state the actual population (especially so far as infants and females are concerned). Moreover, the degree of under-enumeration differs from one census to another (Valaoras, 1960:116-118).

In general, the deficiencies of the population statistics, as assessed in the previous paragraphs, are expected to produce population estimates that are biased downwards. In turn, estimates of net migration will be biased downwards in the case of net emigration (i.e. they will show less people leaving) and upwards in the case of net in-migration i.e. (they will show more people coming). In any case the estimated populations presented in the following tables are a gross approximation of the actual ones because their purpose is not to be taken as population estimates per se, but as material from which one can calculate series of crude birth and death rates. Estimates of annual net migration are also an approximation to the issue, a necessary compromise in lack of good quality population statistics. Imperfect as this set of population estimates may be, it nevertheless provides some insight into the dynamics and the mobility of the examined populations.

Table A.1: Population estimates at end-year for the Cyclades using the method of evenly spread migration; 1860-1889, 1920-1940, 1951-1991.

Year t	Births B	Deaths D	Forward method $P_t=P_{t-1}+(B_t-D_t)$	Annual net migration $\mathcal{M}_t$	Estimated population $P_t=P_{t-1}+(B_t-D_t)+\mathcal{M}_t$
1860	3737	3378			116198[39]
1861	3731[40]	2883[41]	**117046**		**117046**
1862	3731[40]	2883[41]	117894	-387	117507
1863	3731[40]	2883[41]	118742	-387	117969
1864	3724	2387	120079	-387	118919
1865	3543	2651	120971	-387	119424
1866	3709	2451	122229	-387	120296
1867	4105	2537	123797	-387	121477
1868	3764	2995	124566	-387	121859
1869	3837	2967	125436	-387	122343
1870	3868	2525	**(123299)** 126779	-387	**123299**
1871	3978	2568	124709	-274	124435
1872	3943	2764	125888	-274	125340
1873	3614	2422	127080	-274	126258
1874	3621	2184	128517	-274	127421
1875	3715	2722	129510	-274	128139
1876	4032	2642	130900	-274	129255
1877	3929	2725	132104	-274	130185
1878	3773	2652	133225	-274	131032
1879	3694	2432	**(132020)** 134487	-274	**132020**
1880	3779	2946	132853	-1211	131396
1881	3584	2695	133742	-1211	130828
1882	3758	2942	134558	-1211	130186
1883	3812	2564	135806	-1211	129977
1884	4026	2749	137083	-1211	129797
1885	4239	2933	138389	-1211	129646

39 Figure has been calculated as $P_t=P_{t+1}+(D_{t+1}-B_{t+1})$
40 Equals the average of the 1860 and 1864 births
41 Equals the average of the 1860 and 1864 deaths

1886	4239[42]	2933[43]		139695	-1211	129495
1887	4239[42]	2933[43]		141001	-1211	129343
1888	4239[42]	2933[43]		142307	-1211	129192
1889	4239[42]	2933[43]	**(131508)**	143613	-1211	**131508**
1920				**122347**		**122347**
1921	3773	2229		123891	-670	123221
1922	3567	2478		124980	-670	123639
1923	3479	2428		126031	-670	124020
1924	3725	2452		127304	-670	124623
1925	3995	2125		129174	-670	125822
1926	4178	2012		131340	-670	127318
1927	4155	2344		133151	-670	128458
1928	4173	2259	**(129702)**	135065	-670	**129702**
1929	3956	2111		131547	-1651	129896
1930	4039	1768		133818	-1651	130516
1931	3836	2074		135580	-1651	130627
1932	3705	2108		137177	-1651	130573
1933	3507	1937		138747	-1651	130492
1934	3656	1849		140554	-1651	130648
1935	3319	1821		142052	-1651	130495
1936	3268	1807		143513	-1651	130305
1937	3106	1843		144776	-1651	129917
1938	2956	1606		146126	-1651	129616
1939	2956	1606		147476	-1651	129315
1940	2956	1606	**(129015)**	148826	-1651	**129015**
1951	2159	997		**125959**		**125959**
1952	2088	1019		127028	-3526	123502
1953	1993	1000		128021	-3526	120969
1954	1941	969		128993	-3526	118416
1955	1942	959		129975	-3526	115873
1956	2016	1040		130951	-3526	113323
1957	1898	982		131867	-3526	110714
1958	1890	938		132819	-3526	108140
1959	1942	949		133812	-3526	105608
1960	1662	923		134551	-3526	102821
1961	1644	980	**(99959)**	135215	-3526	**99959**
1962	1607	901		100665	-1907	98758
1963	1651	985		101331	-1907	97518
1964	1560	1054		101837	-1907	96117
1965	1451	962		102326	-1907	94699
1966	1493	937		102882	-1907	93349
1967	1463	960		103385	-1907	91945
1968	1572	976		103981	-1907	90634
1969	1491	848		104624	-1907	89370
1970	1369	963		105030	-1907	87870
1971	1279	902	**(86340)**	105407	-1907	**86340**
1972	1262	961		86641	-10.1	86631
1973	1143	871		86913	-10.1	86893
1974	1237	896		87254	-10.1	87224
1975	1181	913		87522	-10.1	87482
1976	1180	840		87862	-10.1	87812
1977	1078	952		87988	-10.1	87927
1978	1040	822		88206	-10.1	88135
1979	982	849		88339	-10.1	88258
1980	993	919		88413	-10.1	88322
1981	1066	920	**(88458)**	88559	-10.1	**88458**
1982	1056	948		88566	551.7	89118

[42] births of 1885
[43] deaths of 1885

1983	1106	1024	88648	551.7	89751
1984	1015	933	88730	551.7	90385
1985	1047	941	88836	551.7	91043
1986	972	931	88877	551.7	91636
1987	932	1014	88795	551.7	92105
1988	991	1012	88774	551.7	92636
1989	872	974	88672	551.7	93086
1990	905	1050	88527	551.7	93492
1991	956	995	**(94005)** 88488	551.7	**94005**

Source: Births and deaths have been taken from annual official publications: (Ministry of internal affairs, 1862-1889), (Ministere de l' Economie Nationale, 1924-1939), Statistique Generale de la Grece, 1931-40) (NSSG, 1954, 1955a-1997a). Population figures in bold characters have been taken from census returns.

Table A.2 Population estimates at end-year for Paros using the method of evenly spread migration; 1860-1889, 1951-1991

Years T	Births B	Deaths D	Forward method $P_t=P_{t-1}+(B_t-D_t)$	Annual net migration $\mathcal{M}_t$	Estimated population $P_t=P_{t-1}+(B_t-D_t)+\mathcal{M}_t$
1860	254	127			6415[44]
1861	269[45]	119[46]	**6565**		**6565**
1862	269[45]	119[46]	6715	-71	6644
1863	269[45]	119[46]	6864	-71	6722
1864	283	111	7036	-71	6823
1865	285	185	7136	-71	6852
1866	272	125	7283	-71	6928
1867	318	164	7437	-71	7011
1868	334	224	7547	-71	7050
1869	262	352	7457	-71	6889
1870	305	167	**(6956)** 7595	-71	**6956**
1871	350	112	7194	-120	7074
1872	324	232	7286	-120	7046
1873	272	178	7380	-120	7020
1874	305	104	7581	-120	7101
1875	315	147	7749	-120	7149
1876	325	159	7915	-120	7195
1877	330	131	8114	-120	7274
1878	274	108	8280	-120	7320
1879	327	129	**(7398)** 8478	-120	**7398**
1880	366	193	7571	-65	7506
1881	324	218	7677	-65	7547
1882	313	204	7786	-65	7591
1883	332	126	7992	-65	7732
1884	350	203	8139	-65	7814
1885	368	280	8227	-65	7836
1886	368[47]	280[48]	8315	-65	7859
1887	368	280	8403	-65	7882
1888	368	280	8491	-65	7905
1889	368	280	**(7928)** 8579	-65	**7928**
1951	186[49]	84[50]	**9702**		**9702**

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44 Figure has been calculated as $P_t=P_{t+1}+(D_{t+1}-B_{t+1})$

45 Equals the average of the 1860 and 1864 births

46 Equals the average of the 1860 and 1864 deaths

47 From 1886 to 1889 births of 1885 have been applied

48 From 1886 to 1889 deaths of 1885 have been applied

49 From1951 to 1955 births of 1956 have been applied

50 From 1951 to 1955 deaths of 1956 have been applied

1952	186	84	9804	-212	9592
1953	186	84	9906	-212	9483
1954	186	84	10008	-212	9373
1955	186	84	10110	-212	9264
1956	186	84	10212	-212	9154
1957	175	67	10320	-212	9050
1958	151	73	10398	-212	8917
1959	170	84	10484	-212	8791
1960	118	65	10537	-212	8633
1961	110	70	**(8461)** 10577	-212	**8461**
1962	132	85	8508	-160	8348
1963	127	70	8565	-160	8246
1964	134	84	8615	-160	8136
1965	129	90	8654	-160	8015
1966	116	91	8679	-160	7880
1967	103	72	8710	-160	7752
1968	136	77	8769	-160	7651
1969	134	68	8835	-160	7557
1970	119	74	8880	-160	7443
1971	113	82	**(7314)** 8911	-160	**7314**
1972	107	64	7357	96	7453
1973	100	73	7384	96	7575
1974	93	74	7403	96	7690
1975	114	69	7448	96	7830
1976	84	72	7460	96	7938
1977	93	73	7480	96	8054
1978	101	88	7493	96	8162
1979	80	66	7507	96	8272
1980	107	75	7539	96	8399
1981	100	79	**(8516)** 7560	96	**8516**
1982	114	75	8555	164	8719
1983	119	76	8598	164	8926
1984	127	101	8624	164	9116
1985	120	100	8644	164	9300
1986	106	76	8674	164	9494
1987	106	97	8683	164	9666
1988	107	94	8696	164	9843
1989	105	98	8703	164	10014
1990	131	97	8737	164	10212
1991	131	97	**(10410)** 8771	164	10410

Source: Births and deaths have been taken from annual official publications: (Ministry of internal affairs, 1862-1889), (NSSG, 1954, 1955a-1997a). Population figures in bold characters have been taken from census returns.

Table A.3 : Population estimates at end-year for Naoussa using the method of evenly spread migration; 1860-1885, 1894-1996.

Years T	Births B	Deaths D	Forward method $P_t=P_{t-1}(B_t-D_t)$	Annual net migration $\mathcal{M}_t$	Estimated population $P_t=P_{t-1}+(B_t-D_t)+\mathcal{M}_t$
1860	65	27			1478[51]
1861	61[52]	22[53]	**1517**		**1517**
1862	61[52]	22[53]	1556	-24	1531
1863	61[52]	22[53]	1594	-24	1546
1864	56	17	1633	-24	1561
1865	58	54	1637	-24	1541
1866	77	26	1688	-24	1567

51 Figure has been calculated as $P_t=P_{t+1}+(D_{t+1}-B_{t+1})$

52 Equals the average of the 1860 and 1864 births

53 Equals the average of the 1860 and 1864 deaths

1867	67	35	1720	-24	1575
1868	63	47	1736	-24	1567
1869	62	56	1742	-24	1549
1870	67	13	**(1579)** 1796	-24	**1579**
1871	99	48	1630	-35	1595
1872	74	47	1657	-35	1587
1873	47	18	1686	-35	1582
1874	62	24	1724	-35	1585
1875	69	25	1768	-35	1594
1876	70	42	1796	-35	1587
1877	72	34	1834	-35	1591
1878	63	28	1869	-35	1591
1879	58	24	**(1590)** 1903	-35	**1590**
1880	75	50	1615	-18.3	1597
1881	65	30	1650	-18.3	1613
1882	69	35	1684	-18.3	1629
1883	60	19	1725	-18.3	1652
1884	71	34	1762	-18.3	1671
1885	81	48	1795	-18.3	1685
1886	71	34	1832	-18.3	1704
1887	71	34	1869	-18.3	1723
1888	71	34	1906	-18.3	1741
1889	71	34	**(1760)** 1943	-18.3	**1760**

1894	93	38			1760[54]
1895	89	69			1780[54]
1896	86	39	**1827**		**1827**
1897	99	34	1892	-54	1838
1898	90[55]	38[56]	1944	-54	1837
1899	80	41	1983	-54	1822
1900	80	29	2034	-54	1820
1901	86	29	2091	-54	1823
1902	81	38	2134	-54	1813
1903	68	61	2141	-54	1766
1904	65	57	2149	-54	1721
1905	65	39	2175	-54	1693
1906	61	34	2202	-54	1667
1907	77	20	**(1670)** 2259	-54	**1670**
1908	56	26	1700	-44	1656
1909	67	54	1713	-44	1625
1910	67	29	1751	-44	1620
1911	55	33	1773	-44	1598
1912	56	31	1798	-44	1579
1913	57	27	1828	-44	1565
1914	44	15	1857	-44	1551
1915	48	23	1882	-44	1532
1916	47	31	1898	-44	1504
1917	65	38	1925	-44	1487
1918	59	39	1945	-44	1464
1919	42	24	1963	-44	1438
1920	51	35	**(1410)** 1979	-44	**1410**
1921	47	30	1427	0.7	1428
1922	55	22	1460	0.7	1461
1923	52	32	1480	0.7	1482
1924	48	33	1495	0.7	1498
1925	58	24	1529	0.7	1533
1926	59	21	1567	0.7	1571
1927	56	19	1604	0.7	1609

54 Figure has been calculated as $P_t=P_{t+1}+(D_{t+1}-B_{t+1})$

55 Equals the average of the 1897 and 1899 births.

56 Equals the average of the 1897 and 1899 deaths.

1928	66	20	**(1655)**	1650	0.7	**1655**
1929	77	30		1702	-50	1652
1930	60	18		1744	-50	1643
1931	73	23		1794	-50	1643
1932	49	26		1817	-50	1616
1933	67	34		1850	-50	1598
1934	50	25		1875	-50	1573
1935	47	17		1905	-50	1553
1936	48	28		1925	-50	1522
1937	52	16		1961	-50	1508
1938	40	10		1991	-50	1488
1939	36	16		2011	-50	1457
1940	36	22	**(1421)**	2025	-50	**1421**
1941	34	10		1445	-7	1438
1942	41	59		1427	-7	1413
1943	39	13		1453	-7	1432
1944	43	24		1472	-7	1444
1945	53	14		1511	-7	1476
1946	52	15		1548	-7	1505
1947	39	12		1575	-7	1525
1948	47	10		1612	-7	1555
1949	31	13		1630	-7	1566
1950	30	14		1646	-7	1575
1951	51	9	**(1610)**	1688	-7	**1610**
1952	33	7		1636	-29.9	1606
1953	41	9		1668	-29.9	1608
1954	31	12		1687	-29.9	1597
1955	25	13		1699	-29.9	1579
1956	27	13		1713	-29.9	1564
1957	36	18		1731	-29.9	1552
1958	34	10		1755	-29.9	1546
1959	26	13		1768	-29.9	1529
1960	15	8		1775	-29.9	1506
1961	11	6	**(1481)**	1780	-29.9	**1481**
1962	21	9		1493	-25.2	1468
1963	15	8		1500	-25.2	1450
1964	28	16		1512	-25.2	1436
1965	22	13		1521	-25.2	1420
1966	21	17		1525	-25.2	1399
1967	17	9		1533	-25.2	1382
1968	18	10		1541	-25.2	1365
1969	21	8		1554	-25.2	1352
1970	24	21		1557	-25.2	1330
1971	26	9	**(1322)**	1574	-25.2	**1322**
1972	23	9		1336	26.2	1362
1973	21	14		1343	26.2	1395
1974	25	10		1358	26.2	1437
1975	21	6		1373	26.2	1478
1976	24	10		1387	26.2	1518
1977	25	9		1403	26.2	1560
1978	33	16		1420	26.2	1603
1979	16	5		1431	26.2	1641
1980	27	11		1447	26.2	1683
1981	28	12	**(1725)**	1463	26.2	**1725**
1982	26	12		1739	24.4	1763
1983	37	17		1759	24.4	1808
1984	27	16		1770	24.4	1843
1985	30	12		1788	24.4	1886
1986	36	16		1808	24.4	1930
1987	24	17		1815	24.4	1961
1988	26	16		1825	24.4	1996
1989	28	20		1833	24.4	2028
1990	32	19		1846	24.4	2066

1991	36	16	**(2110)** 1866	24.4	**2110**
1992	28	15	2123		2123
1993	20	19	2124		2124
1994	38	11	2151		2151
1995	29	16	2164		2164
1996	32	16	2180		2180

Note: Births and deaths for years up to 1889 have been taken from annual official publications: (Ministry of internal affairs, 1862-1889). Births and deaths for the period 1896-1991 have been taken from community archives. Population figures in bold characters have been taken from census returns.

APPENDIX B

Coale's indices of fertility for the examined populations.

Coale's indices of fertility express the fertility level of the examined population as a fraction of the fertility the population would have had under a maximum fertility schedule. Usually the fertility of married Hutterite women in the 1920s is used as a maximum standard. The formula for the I_f (index of overall fertility) is $I_f = B/\Sigma w_i F_i$,where B stands for the observed births in the specified population, w_i represents the number of women in each of the reproductive age groups (15-49), and F_i the age-specific fertility rates of married Hutterites in the 1920s, which, at the time the index was developed, was the highest marital fertility on reliable records (Knodel,1988:249). The formula for the Ig (index of marital fertility) is $Ig=B_L/\Sigma m_i F_i$,where B_L stands for the observed births from married women in the specified population and m_i represents the number of married women in each of the reproductive age groups (15-49). The index of proportion married (I_m), which shows the extent to which marriage is less than universal, can be computed as $I_m= \Sigma m_i F_i/\Sigma w_i F_i$.

In practical terms, for the computation of Coale's indices one needs to have at hand the following, at least, data: number of women of reproductive age (15-49) broken down by five year age-groups and marital status; total number of live births and legitimate births. In the case of Greece the first census that provided the age-sex distribution of the population by marital status, was that of 1907. However, since there are no series of vital events (and more particularly births) published for 1907, indexes of marital fertility (I_g) and of proportion married (I_m) have been derived only from 1921 onwards, excluding 1940 for which the marital status of the population is not provided in the relevant census. Nevertheless, indexes of overall fertility (I_f) have been derived from 1860 onwards. For the derivation of these indices for Greece, data for age-sex population structure have been taken: for the years 1860, 1865, 1875, 1885 and for 1940 from Valaoras, (1960:138); for the remaining years from census returns unadjusted.

With respect to the Cyclades data on the age-sex population structure have been taken from the relevant censuses. So far as Paros and Naoussa are concerned, the 1870 population broken down by age and sex was obtained form the 1870 census, while the population structure for 1879 had to be derived indirectly because the 1879 census did not provide this information. As mentioned in chapter 2 the 1879 census provided populations broken down by age and sex down to the level of prefecture (eparchia). For smaller administrative units i.e.

for municipalities, only the male population was given by age groups. To obtain the female age-structure in the reproductive ages 16-50, the sex ratios (females per 100 males) of these age groups (16-20 to 46-50) in the 1879 population of the Cyclades were applied to the relevant male age groups of Paros and Naoussa. These sex ratios were as follows:

age-group	Sex ratio (f/m)*100
16-20	145.03
21-25	140.45
26-30	111.97
31-35	101.98
36-40	101.33
41-45	74.56
46-50	94.00

Another point that needs to be mentioned is that for the years 1870 and 1879, the Hutterite marital fertility schedule was modified so as to be consistent with the age grouping used in those two Greek censuses. The modified schedule is the following:

Age group	ASMFR
16-20	0.355
21-25	0.534
26-30	0.491
31-35	0.464
36-40	0.375
41-45	0.177
46-50	0.049

These values were calculated by Hionidou (1993:58) with the use of table 13 in Eaton and Mayer (1954:25).

For all four populations, the number of live births on which fertility indexes are based have been acquired from official publications and have been adjusted to take into account under-registration as described in section 3.2.1. It should be mentioned also that for the year 1921, the age structure provided by the 1920 census and the births of 1921 have been used. Indices of marital fertility (Ig) were derived with due respect to the fact that 1.2% of all live births up to the 1960s were illegitimate both in Greece and in the Cyclades (Siampos & Valaoras, 1969:602). The assumption has been made that the percentage of illegitimacy has not changed since the 1960s.

APPENDIX C

Life tables for Greece and the Cyclades based on census returns and statistics on the natural movement of the populations for 1870 and 1879.

Note: Life tables for 1879 are adjusted to take into account the extreme under-enumeration of infants in the 1879 census (see chapter 3, section 3.5).

1) GREECE 1870:MALES

AGE	m(X,N)	q(X,N)	I(X)	D(X,N)	L(X,N)	S(X,N)	T(X)	e(X)	A(X,N)
0	.11908	.11028	100000.	11028.	92611.	.84168 /A/	3988362.	39.884	.330
1	.03182	.11739	88972.	10444.	328231.	.90550 /B/	3895751.	43.786	1.352
5	.01214	.05891	78528.	4626.	381072.	.95106	3567520.	45.430	2.500
10	.00782	.03835	73901.	2834.	362421.	.95751	3186448.	43.118	2.500
15	.00975	.04761	71067.	3383.	347021.	.94990	2824027.	39.737	2.542
20	.01057	.05148	67684.	3484.	329634.	.95077	2477006.	36.597	2.479
25	.00978	.04774	64200.	3065.	313406.	.94504	2147372.	33.448	2.523
30	.01304	.06318	61134.	3862.	296182.	.93565	1833965.	29.999	2.543
35	.01368	.06619	57272.	3791.	277121.	.91942	1537784.	26.850	2.563
40	.02021	.09628	53481.	5149.	254792.	.90133	1260662.	23.572	2.550
45	.02132	.10130	48332.	4896.	229650.	.87725	1005871.	20.812	2.547
50	.03138	.14555	43436.	6322.	201462.	.85483	776220.	17.871	2.514
55	.03119	.14473	37114.	5371.	172216.	.82805	574759.	15.486	2.514
60	.04585	.20598	31742.	6538.	142603.	.77214	402543.	12.682	2.536
65	.05869	.25640	25204.	6462.	110109.	.67861	259940.	10.313	2.538
70	.09887	.39418	18742.	7388.	74721.	.58747	149831.	7.994	2.430
75	.11263	.43544	11354.	4944.	43897.	.48441	75110.	6.615	2.396
80	.18520	.61436	6410.	3938.	21264.	.35339	31213.	4.869	2.261
85	.22799	.69308	2472.	1713.	7515.	.24472 /C/	9949.	4.025	2.172
90	.31161	.....	759.	759.	2435.	.....	2435.	3.209	3.209

/A/ VALUE GIVEN IS FOR SURVIVORSHIP OF 5 COHORTS OF BIRTH TO AGE GROUP 0-4 = L(0,5)/500000
/B/ VALUE GIVEN IS FOR S(0,5)=L(5,5)/L(0,5)
/C/ VALUE GIVEN IS S(85+,5)=T(90)/T(85)

2) GREECE 1870:FEMALES

AGE	m(X,N)	q(X,N)	I(X)	D(X,N)	L(X,N)	S(X,N)	T(X)	e(X)	A(X,N)
0	.11967	.11103	100000.	11103.	92783.	.84445 /A/	4133660.	41.337	.350
1	.03007	.11144	88897.	9906.	329444.	.90939 /B/	4040877.	45.456	1.361
5	.01144	.05561	78990.	4393.	383970.	.95252	3711433.	46.986	2.500
10	.00793	.03888	74598.	2900.	365738.	.96089	3327463.	44.605	2.500
15	.00807	.03956	71697.	2836.	351432.	.95790	2961726.	41.309	2.513
20	.00913	.04463	68861.	3073.	336636.	.95598	2610293.	37.907	2.504
25	.00903	.04417	65788.	2906.	321816.	.94759	2273657.	34.560	2.549
30	.01264	.06130	62882.	3855.	304951.	.93838	1951840.	31.040	2.546
35	.01279	.06200	59027.	3660.	286160.	.92585	1646890.	27.900	2.547
40	.01803	.08628	55367.	4777.	264940.	.91834	1360730.	24.576	2.510
45	.01604	.07714	50590.	3903.	243306.	.90561	1095790.	21.660	2.528
50	.02424	.11440	46688.	5341.	220341.	.88379	852484.	18.259	2.548
55	.02569	.12099	41347.	5003.	194735.	.82947	632143.	15.289	2.602
60	.05102	.22675	36344.	8241.	161527.	.76779	437409.	12.035	2.550
65	.05431	.23967	28103.	6735.	124019.	.66996	275882.	9.817	2.551
70	.11213	.43602	21367.	9317.	83087.	.53977	151864.	7.107	2.451
75	.13162	.48983	12051.	5903.	44848.	.40175	68776.	5.707	2.390
80	.24662	.72276	6148.	4444.	18018.	.26416	23928.	3.892	2.137
85	.27127	.75748	1704.	1291.	4759.	.19476 /C/	5911.	3.468	2.086
90	.35909	.....	413.	413.	1151.	.....	1151.	2.785	2.785

/A/ VALUE GIVEN IS FOR SURVIVORSHIP OF 5 COHORTS OF BIRTH TO AGE GROUP 0-4 = L(0,5)/500000
/B/ VALUE GIVEN IS FOR S(0,5)=L(5,5)/L(0,5)
/C/ VALUE GIVEN IS S(85+,5)=T(90)/T(85)

3) CYCLADES 1870: MALES

AGE	m(X,N)	q(X,N)	I(X)	D(X,N)	L(X,N)	S(X,N)	T(X)	e(X)	A(X,N)
0	.13330	.12237	100000.	12237.	91801.	.81755 /A/	4308601.	43.086	.330
1	.04060	.14664	87763.	12869.	316974.	.90276 /B/	4216800.	48.048	1.352
5	.00590	.02907	74894.	2177.	369026.	.97381	3899826.	52.071	2.500
10	.00470	.02323	72717.	1689.	359360.	.96729	3530800.	48.556	2.500
15	.00900	.04405	71028.	3128.	347604.	.95748	3171440.	44.651	2.592
20	.00800	.03921	67899.	2663.	332824.	.95810	2823835.	41.589	2.495
25	.00950	.04644	65236.	3029.	318879.	.94235	2491011.	38.184	2.589
30	.01350	.06521	62207.	4057.	300497.	.95137	2172132.	34.918	2.402
35	.00680	.03343	58150.	1944.	285885.	.95057	1871634.	32.186	2.496
40	.01420	.06866	56206.	3859.	271754.	.93474	1585749.	28.213	2.596
45	.01240	.06017	52347.	3150.	254019.	.92232	1313996.	25.101	2.550
50	.02040	.09715	49198.	4779.	234287.	.90480	1059977.	21.545	2.552
55	.01950	.09306	44418.	4134.	211982.	.88036	825689.	18.589	2.554
60	.03220	.14917	40285.	6009.	186621.	.85262	613707.	15.234	2.537
65	.03210	.14902	34275.	5108.	159116.	.77995	427087.	12.460	2.600
70	.07160	.30465	29168.	8886.	124103.	.67485	267970.	9.187	2.554
75	.08510	.35141	20282.	7127.	83752.	.52602	143867.	7.093	2.522
80	.18680	.62559	13155.	8229.	44055.	.31017	60115.	4.570	2.361
85	.28260	.78403	4925.	3862.	13664.	.14919 /C/	16060.	3.261	2.161
90	.44393	.....	1064.	1064.	2396.	.....	2396.	2.253	2.253

/A/ VALUE GIVEN IS FOR SURVIVORSHIP OF 5 COHORTS OF BIRTH TO AGE GROUP 0-4 = L(0,5)/500000
/B/ VALUE GIVEN IS FOR S(0,5)=L(5,5)/L(0,5)
/C/ VALUE GIVEN IS S(85+,5)=T(90)/T(85)

4) CYCLADES 1870, FEMALES

AGE	m(X,N)	q(X,N)	I(X)	D(X,N)	L(X,N)	S(X,N)	T(X)	e(X)	A(X,N)
0	.11450	.10657	100000.	10657.	93073.	.83967 /A/	4457591.	44.576	.350
1	.03550	.12984	89343.	11600.	326760.	.90308 /B/	4364518.	48.851	1.361
5	.01010	.04926	77743.	3829.	379142.	.96367	4037758.	51.937	2.500
10	.00460	.02274	73914.	1681.	365367.	.97427	3658615.	49.498	2.500
15	.00610	.03006	72233.	2171.	355965.	.96471	3293248.	45.592	2.605
20	.00810	.03970	70062.	2782.	343404.	.96267	2937282.	41.924	2.518
25	.00720	.03538	67280.	2380.	330584.	.95438	2593879.	38.553	2.556
30	.01140	.05542	64900.	3597.	315502.	.95241	2263295.	34.874	2.498
35	.00800	.03921	61303.	2404.	300488.	.95274	1947793.	31.773	2.492
40	.01190	.05784	58899.	3407.	286287.	.93766	1647305.	27.968	2.590
45	.01390	.06724	55493.	3731.	268441.	.91697	1361018.	24.526	2.582
50	.02030	.09654	51761.	4997.	246153.	.91708	1092577.	21.108	2.468
55	.01460	.07048	46764.	3296.	225743.	.89990	846423.	18.100	2.549
60	.02970	.13880	43468.	6033.	203146.	.84280	620680.	14.279	2.647
65	.03980	.18203	37435.	6814.	171212.	.72408	417535.	11.154	2.657
70	.09410	.38097	30621.	11666.	123971.	.60482	246323.	8.044	2.503
75	.10330	.40862	18955.	7745.	74980.	.48488	122352.	6.455	2.444
80	.20230	.65612	11210.	7355.	36356.	.26730	47372.	4.226	2.323
85	.33330	.84025	3855.	3239.	9718.	.11782 /C/	11016.	2.858	2.050
90	.47449	.....	616.	616.	1298.	.....	1298.	2.108	2.108

/A/ VALUE GIVEN IS FOR SURVIVORSHIP OF 5 COHORTS OF BIRTH TO AGE GROUP 0-4 = L(0,5)/500000
/B/ VALUE GIVEN IS FOR S(0,5)=L(5,5)/L(0,5)
/C/ VALUE GIVEN IS S(85+,5)=T(90)/T(85)

5) GREECE 1879, MALES

AGE	M(X,N)	Q(X,N)	I(X)	D(X,N)	L(X,N)	S(X,N)	T(X)	E(X)	A(X,N)
0	.11900	.11021	100000.	11021.	92616.	.85821 /A/	4487461.	44.875	.330
1	.02180	.08244	88979.	7335.	336491.	.93061 /B/	4394845.	49.392	1.352
5	.00890	.04353	81643.	3554.	399331.	.96473	4058354.	49.708	2.500
10	.00540	.02664	78089.	2080.	385245.	.97200	3659023.	46.857	2.500
15	.00620	.03054	76009.	2322.	374457.	.96242	3273778.	43.071	2.594
20	.00900	.04402	73687.	3243.	360386.	.95959	2899321.	39.346	2.518
25	.00740	.03633	70444.	2559.	345822.	.95855	2538935.	36.042	2.500
30	.00970	.04737	67885.	3215.	331487.	.95307	2193113.	32.306	2.532
35	.00950	.04641	64669.	3001.	315932.	.94786	1861626.	28.787	2.530
40	.01230	.05973	61668.	3683.	299460.	.93182	1545694.	25.065	2.589
45	.01650	.07940	57985.	4604.	279043.	.89523	1246234.	21.493	2.637
50	.02800	.13103	53380.	6995.	249809.	.86775	967191.	18.119	2.556
55	.02860	.13366	46386.	6200.	216772.	.82799	717382.	15.466	2.555
60	.04860	.21707	40186.	8723.	179486.	.76877	500610.	12.457	2.542
65	.05680	.24910	31463.	7837.	137983.	.67917	321124.	10.206	2.533
70	.10070	.39944	23626.	9437.	93714.	.60164	183141.	7.752	2.413
75	.10240	.40691	14189.	5774.	56382.	.43253	89427.	6.303	2.478
80	.25230	.73117	8415.	6153.	24387.	.29188	33045.	3.927	2.125
85	.21120	.66454	2262.	1503.	7118.	.17786 /C/	8658.	3.827	2.211
90	.49282	.....	759.	759.	1540.	.....	1540.	2.029	2.029

/A/ VALUE GIVEN IS FOR SURVIVORSHIP OF 5 COHORTS OF BIRTH TO AGE GROUP 0-4 = L(0,5)/500000
/B/ VALUE GIVEN IS FOR S(0,5)=L(5,5)/L(0,5)
/C/ VALUE GIVEN IS S(85+,5)=T(90)/T(85)

6) GREECE 1879, FEMALES

AGE	M(X,N)	Q(X,N)	I(X)	D(X,N)	L(X,N)	S(X,N)	T(X)	E(X)	A(X,N)
0	.11967	.11103	100000.	11103.	92783.	.85940 /A/	4626080.	46.261	.350
1	.02100	.07959	88897.	7075.	336915.	.93181 /B/	4533297.	50.995	1.361
5	.00870	.04257	81821.	3483.	400399.	.96451	4196382.	51.287	2.500
10	.00570	.02810	78338.	2201.	386187.	.97311	3795984.	48.456	2.500
15	.00530	.02616	76137.	1992.	375802.	.96836	3409797.	44.785	2.549
20	.00760	.03730	74145.	2766.	363910.	.96428	3033995.	40.920	2.536
25	.00680	.03343	71379.	2386.	350910.	.96453	2670085.	37.407	2.491
30	.00780	.03827	68993.	2640.	338464.	.95987	2319175.	33.615	2.537
35	.00880	.04309	66353.	2859.	324883.	.94633	1980711.	29.851	2.593
40	.01330	.06440	63494.	4089.	307447.	.93740	1655827.	26.078	2.549
45	.01270	.06161	59405.	3660.	288202.	.91533	1348380.	22.698	2.589
50	.02320	.10979	55745.	6120.	263799.	.89456	1060178.	19.018	2.561
55	.02150	.10224	49625.	5074.	235985.	.84495	796379.	16.048	2.608
60	.04820	.21573	44551.	9611.	199396.	.78317	560394.	12.579	2.569
65	.04860	.21721	34940.	7589.	156161.	.69452	360998.	10.332	2.557
70	.10310	.40884	27351.	11182.	108458.	.57315	204837.	7.489	2.469
75	.11770	.45251	16169.	7316.	62162.	.40538	96379.	5.961	2.447
80	.25890	.73699	8852.	6524.	25199.	.29199	34217.	3.865	2.078
85	.20690	.65387	2328.	1522.	7358.	.18410 /C/	9018.	3.873	2.186
90	.48538	.....	806.	806.	1660.	.....	1660.	2.060	2.060

/A/ VALUE GIVEN IS FOR SURVIVORSHIP OF 5 COHORTS OF BIRTH TO AGE GROUP 0-4 = L(0,5)/500000
/B/ VALUE GIVEN IS FOR S(0,5)=L(5,5)/L(0,5)
/C/ VALUE GIVEN IS S(85+,5)=T(90)/T(85)

7) CYCLADES 1879, MALES

AGE	M(X,N)	Q(X,N)	I(X)	D(X,N)	L(X,N)	S(X,N)	T(X)	E(X)	A(X,N)
0	.13336	.12242	100000.	12242.	91798.	.84768 /A/	4701734.	47.017	.330
1	.02160	.08173	87758.	7172.	332040.	.93708 /B/	4609936.	52.530	1.352
5	.00580	.02859	80586.	2304.	397170.	.97719	4277896.	53.085	2.500
10	.00340	.01686	78282.	1320.	388112.	.97936	3880726.	49.574	2.500
15	.00540	.02667	76963.	2053.	380103.	.96281	3492614.	45.381	2.705
20	.00960	.04690	74910.	3513.	365966.	.95628	3112511.	41.550	2.557
25	.00780	.03823	71397.	2730.	349967.	.96342	2746545.	38.469	2.430
30	.00740	.03634	68667.	2495.	337167.	.95875	2396578.	34.901	2.528
35	.00960	.04690	66172.	3103.	323260.	.95172	2059411.	31.122	2.551
40	.01040	.05073	63069.	3200.	307652.	.93504	1736151.	27.528	2.596
45	.01690	.08120	59869.	4862.	287668.	.91095	1428499.	23.860	2.598
50	.01970	.09385	55008.	5162.	262051.	.90887	1140831.	20.740	2.484
55	.01910	.09126	49845.	4549.	238170.	.87942	878780.	17.630	2.570
60	.03330	.15398	45296.	6975.	209452.	.84511	640610.	14.143	2.559
65	.03530	.16306	38321.	6248.	177011.	.71488	431158.	11.251	2.664
70	.10420	.41111	32073.	13186.	126541.	.63218	254147.	7.924	2.435
75	.07320	.31004	18887.	5856.	79997.	.48108	127606.	6.756	2.534
80	.25520	.75365	13031.	9821.	38484.	.21286	47609.	3.653	2.284
85	.33330	.85050	3210.	2730.	8192.	.10223 /C/	9125.	2.842	2.121
90	.51446	.....	480.	480.	933.	.....	933.	1.944	1.944

/A/ VALUE GIVEN IS FOR SURVIVORSHIP OF 5 COHORTS OF BIRTH TO AGE GROUP 0-4 = L(0,5)/500000
/B/ VALUE GIVEN IS FOR S(0,5)=L(5,5)/L(0,5)
/C/ VALUE GIVEN IS S(85+,5)=T(90)/T(85)

8) CYCALDES 1879, FEMALES

AGE	M(X,N)	Q(X,N)	I(X)	D(X,N)	L(X,N)	S(X,N)	T(X)	E(X)	A(X,N)
0	.11450	.10657	100000.	10657.	93073.	.86319 /A/	4919370.	49.194	.350
1	.02110	.07995	89343.	7143.	338523.	.93775 /B/	4826297.	54.020	1.361
5	.00620	.03053	82200.	2509.	404728.	.97620	4487774.	54.596	2.500
10	.00340	.01686	79691.	1343.	395097.	.97979	4083046.	51.236	2.500
15	.00510	.02520	78348.	1974.	387113.	.96844	3687949.	47.072	2.657
20	.00760	.03731	76373.	2849.	374895.	.96324	3300837.	43.220	2.553
25	.00710	.03487	73524.	2564.	361114.	.96640	2925942.	39.796	2.462
30	.00680	.03344	70960.	2373.	348979.	.95994	2564828.	36.145	2.546
35	.00950	.04640	68587.	3182.	334999.	.95772	2215849.	32.307	2.506
40	.00770	.03777	65405.	2470.	320834.	.95730	1880849.	28.757	2.495
45	.01000	.04880	62934.	3071.	307134.	.95011	1560015.	24.788	2.546
50	.01060	.05167	59863.	3093.	291812.	.93912	1252881.	20.929	2.575
55	.01590	.07675	56770.	4357.	274048.	.87008	961069.	16.929	2.751
60	.04140	.18834	52412.	9872.	238444.	.81338	687021.	13.108	2.608
65	.04030	.18373	42541.	7816.	193947.	.71821	448577.	10.545	2.600
70	.10020	.40194	34725.	13957.	139295.	.55686	254630.	7.333	2.540
75	.13330	.49789	20767.	10340.	77568.	.34257	115335.	5.554	2.459
80	.31280	.79711	10428.	8312.	26572.	.25819	37767.	3.622	1.924
85	.19190	.62228	2116.	1317.	6861.	.38714 /C/	11194.	5.291	2.176
90	.18439	.....	799.	799.	4334.	.....	4334.	5.423	5.423

/A/ VALUE GIVEN IS FOR SURVIVORSHIP OF 5 COHORTS OF BIRTH TO AGE GROUP 0-4 = L(0,5)/500000
/B/ VALUE GIVEN IS FOR S(0,5)=L(5,5)/L(0,5)
/C/ VALUE GIVEN IS S(85+,5)=T(90)/T(85)

APPENDIX D

Age at marriage and family size.

Age at marriage, and especially the age at which females enter marriage, in natural fertility populations has a direct effect on the final number of children a couple would have. Even in populations acting under controlled fertility age at marriage plays an important role in the final family size. The younger the age at marriage, the longer the woman's period of exposure to the risk of childbearing, and the larger the number of children she would eventually have. Table D.1 shows clearly this inverse association between age at marriage and family size.

Table D.1: Family size by age at marriage; Marriages from Naoussa and Kostos 1894-1950.

Wife's age at marriage	Children ever born	Number of couples
<20	8.1	15
20-24	5.9	85
25-29	4.4	30
30-34	2.7	9
35-39	1.0	1
40-50	0.2	6
All ages	5.4	146

Source: Naoussa and Kostos family reconstitution.

Note: Only completed marriages where the wife reached at least age 45 before end of marriage are included in the data-set.

A more elaborate way to measure the impact of female age at marriage on final family size is by using simple linear regression, taking the number of children ever born as the dependent and the wife's age at marriage as the independent variable. The regression model is expressed by the formula $Y_i=a+bXi+e_i$ where "Y_i" stands for children ever born, "Xi" for wife's age at marriage, "b" is the slope (or regression coefficient), "a" the constant and e_i the residual of the regression. By using the same data-set as in table D.1 to solve the regression it was found that a=12.69 and b=-0.3036. The correlation coefficient "r" is -0.54 and the coefficient of determination r^2 is 0.29. All factors (a, b, r and r^2) are statistically significant at the 0.001 level of significance.

The regression coefficient (b=-0.3036) implies that for every year added in the female age at marriage there is a reduction of slightly less than a third of a child in the number of children ever born. This coefficient has been used to adjust values of mean completed family size in tables 7.6 and 7.7 so as to take into account the different age at which women of different husband's occupational groups entered marriage. The mean completed family size shown in tables 7.6 and 7.7 is that expected if every occupational group had a female age at marriage equal to that of the entire population of the studied communities (termed "all including unknown" in table D.2). As an example, table D.2, shows this procedure for the whole period 1894-1950 only.

Table D.2: Mean Completed Family Size (MCFS) unadjusted and adjusted to allow for differential female age at marriage by husband's occupational group. Naoussa and Kostos; marriage cohort of 1894-1950. In italics results based on fewer than 25 cases.

	Labourers	**Farmers**	**Seafarers**	**Crafts/sales**	**Services**	**All (including unknown)**
Mean female age at marriage **(I)**	22.9	22.8	23.2	23.3	*20.5*	**23.0**
MCFS unadjusted **(II)**	6.3	6.0	5.0	4.5	*3.5*	5.4
MCFS adjusted **(III)=(23-(I))* (-0.3036)+(II)**	6.3	5.9	5.0	4.6	*2.8*	5.4

Note: The value –0.3036 is the regression estimate of the effect of wife's age at marriage on the number of children ever born. See text for details.

Source: Naoussa and Kostos family reconstitution.

APPENDIX E

Age-standardised index of marital fertility (I_g') and the selection of a population as standard.

The formula of Ig (index of marital fertility) as defined by Coale is $Ig=B_L/\Sigma m_i F_i$ where B_L stands for the observed legitimate births in the specified population, m_i represents the number of married women in each of the reproductive age groups (15-49), and F_i the age-specific fertility rates of married Hutterites in the 1920s, which, at the time the index was developed, was the highest marital fertility on reliable records (Knodel,1988:249). The formula of the modified version as devised by Knodel (1988:249) is: $Ig'=\Sigma f_i Mi/\Sigma M_i F_i$ "where F_i is the same as above, f_i is the observed fertility rates of married women in each five-year age interval in the specified population, and Mi is the number of married women in each five-year age interval in the reproductive span in the standard population…" (ibid).

In our case values for f_i have been taken from table 7.1. The choice of a standard population of married women in the reproductive span (M_i) for the period under consideration (1894-1933) turned out more problematic than initially seems. This is so because in that exact period, which is one of the most turbulent in the history of modern Greece, continuous wars and massive population movements changed constantly the age structure of the population. All three censuses that took place during that period, that is in 1907, 1920 and 1928, captured a completely different age structure of the population of Greece. In 1907 married women aged 15-49 consisted mostly of young females with the age groups 15-29 making up 41.1% of them. By 1920, when overseas emigration and continuous wars had depleted the male population, the age structure of married women 15-49 had changed dramatically and the younger age groups 15-29 made up only 29.1% of the total group 15-49. In 1928, when the population had been rejuvenated by the influx of 1.2 million refugees, the population of married women 15-49 had a more balanced structure consisting of younger age groups (15-29) in a percentage reaching 33.2. This changing population structure is reflected in the values of $I_{g'}$ in table E.1. The age structure of 1907 gives undue weight to the younger age groups 15-29, where fertility rates are high, thus inflating $I_{g'}$. On the other hand the age structure of 1920 produces much lower values of $I_{g'}$ because most of the married women in the reproductive span (70.9% of them) belong to the age groups 30-49, where fertility is low. The age structure of married women of Greece in 1928 represents an intermediate situation and therefore we regard it as more appropriate to be used as standard population for the derivation of $I_{g'}$ for Naoussa and Kostos' marriage cohorts of 1894-1933.

Table E.1: Age-standardised index of marital fertility (Ig′) for four marriage cohorts of Naoussa and Kostos.

Year of marriage	**Knodel's index of marital fertility (Ig′)**		
	Using Greece 1907 as standard	**Using Greece 1920 as standard**	**Using Greece 1928 as standard**
1894-1903	0.82	0.76	**0.78**
1904-1913	0.75	0.70	**0.72**
1914-1923	0.70	0.66	**0.68**
1924-1933	0.68	0.59	**0.63**

Source: see text.

BIBLIOGRAPHY

Aliprantis, T. & Aliprantis, N. (1968) *Paros-Antiparos* [*Paros-Antiparos*]., Athens : Pariani vivliothiki.

Angelopoulos, A.T. (1967) "The anatomy of migration in Greece", In: Angelopoulos, A.T. (ed.), *Essays on Greek migration.* Athens : Social Sciences Centre. 1-10.

Bell, R. (1979) *Fate and honor, family and village: demographic and cultural change in rural Italy since 1800.* Chicago: University of Chicago Press.

Bongaarts, J. (1975) "A method for the estimation of fecundability", *Demography* **12** (4), 645-660.

Bongaarts, J. (1993) "The relative contribution of biological and behavioral factors in determining natural fertility: A demographer's perspective", In: Gray, R., Leridon, H. & Spira, A. (eds.), *Biomedical and demographic determinants of reproduction.* Oxford: Clarendon Press.

Busuttil, S. (1994) "Economic development and population in Malta", In: Carli, M. R. (ed.), *Economic and population trends in the Mediterranean islands.* Naples: Edizioni Scientifiche Italiane.

Byron, M. (1999) "Migration as a way of life: Nevis and the post-war labour movement to Britain", In: King, R. & Connell, J. (eds.), *Small worlds, global lives: islands and migration*. Trowbridge: The Cromwell Press.

Caldwell, J.C. (1982) *Theory of fertility decline*. London: Academic Press.

Caldwell, J.C., Douglas, M.R., Jones, W.G. & D'Souza, M.R, (eds.) (1997) *The continuing demographic transition.* Oxford: Clarendon press.

Camarano, A. A. (1996) *Fertility transition in Brazil in the 20th century: a comparative study of three areas.* Ph.D. Thesis. London School of Economics and Political Science.

Carson, J. & Clark, J.(1978) *Paros.* Athens: Lycabettus Press.

Caselli G. (1994) "Long-term trends in European mortality" In: Office of population censuses and surveys (ed.), *Studies on medical and population subjects,* Vol. 56. London: Office of population censuses and surveys

Cassia, S. P. & Bada, C. (1992) *Marriage and exchange in Nineteenth-Century Athens.* Cambridge: Cambridge University Press.

Chambers, R., Longhurst, R. & Pacey, A. (eds.)(1981) *Seasonal dimensions to rural poverty*. London: Frances Printer Ltd.

Cleland, J. & Wilson, C. (1987) "Demand Theories of the Fertility Transition: an Iconoclastic View", *Population Studies,* **41** (1), 5-30.

Clogg, R. (1992) *A short history of modern Greece.* Cambridge: Cambridge University Press.

Coale A.J. & Watkins, S.C. (1986) *The decline of fertility in Europe.* Princeton: Princeton University Press.

Coale, A. J. & Hoover, E. (1958) *Population growth and economic development in low-income countries.* Princeton: Princeton University Press.

Coale, A.J. & Treadway, R. (1986) "A summary of the changing distribution of Overall Fertility, Marital Fertility, and the Proportioned Married in the Provinces of Europe", In: Coale, A.J. & Watkins, C.S. (eds.), *The decline of fertility in Europe.* Princeton: Princeton University Press. 31-181.

Coale, A.J. & Trussell, J.T. (1974) "Model fertility schedules: Variations in the age structure of childbearing in human populations", *Population Index,* **40** (2), 185-258.

Coale, A.J. (1973) "The Demographic Transition Reconsidered", Liege: IUSSP Conference,Vol 1, 53-73.

Coleman, D.A. (1980) "Recent trends in marriage and divorce in Britain and Europe", In: Hiorns, R.W. (ed.), *Demographic patterns in developed societies*. London: Taylor & Francis.

Connell, J. & King, R. (1999) "Island migration in changing world", In: King, R. & Connell, J. (eds.), *Small worlds, global lives: islands and migration.* Trowbridge: The Cromwell Press.

Crook, N. & Dyson, T. (1981) "Seasonal Patterns in Births and Deaths", In: Chambers, R., Longhurst, R. & Pacey, A. (eds.), *Seasonal dimensions to rural poverty.* London: Frances Printer Ltd. 135-162.

Dyson, T. (1991a) "On the Demography of South Asian Famines: Part I", *Population Studies*, **45** (1), 5-25.

Dyson, T. (1991b) "On the Demography of South Asian Famines: Part II", *Population Studies*, **45** (2), 279-297.

Eaton, W.J. & Mayer, J.A. (1954) *Man's capacity to reproduce: the Demography of a unique population.* Glencoe: The Free Press.

Ekdotiki Athinon (2000) *Istoria toy Ellinikoy Ethnoys* [*History of the Greek Nation*], Vol. ΙΣΤ. Athens: Ekdotiki Athinon.

Emke-Poulopoulou, I. (1986) *Provlimata metanasteysis- palinnostisis [Problems of emigration and return-migration]*. Athens: IMEO-EDIM.

Encyclopaedia Britannica (1995) *The New Encyclopaedia Britannica.* Chicago: Encyclopaedia Britannica Inc.

Fischer, W., Rondholz, E. & Farantos, G. (1974) *Epanastasi kai antepanastasi stin Ellada (1936-1974)* [*Revolution and counter-revolution in Greece (1936-1974)*]. Athens: Boukoumanis Press.

Goldman, N. & Hobcraft, J. (1982) "Birth Histories", *Comparative Studies, Cross National Summaries,* Vol. 17. London : World Fertility Survey.

Goody, J. (1983) *The development of family and marriage in Europe.* Cambridge: Cambridge University Press.

Hajnal, J. (1953) "Age at marriage and proportion marrying", *Population Studies*, **7**, 111-136.

Hajnal, J. (1965) "European marriage patterns in perspective", In: Glass, D.V. & Eversley, D.E.C. (eds.), *Population in History. Essays in Historical Demography.* London: Edward Arnold. 101-143.

Henry, L. (1953) "Fondements théoriques de mesure de la fécondité naturelle", *Revue Institute International de Statistique*, **21,** (3), 135-151.

Henry, L. (1956) "Anciennes familles genevoises, étude démographique: 16e-20e siècle", In : *Institut National d' Etudes Démographique*, Cahier 26. Paris : Presses Universitaires de France.

Henry, L. (1961) "Some data on natural fertility", *Eugenics Quarterly,* **8,** 81-91.

Hinde, A. (1998) *Demographic Methods.* London: Arnold.

Hionidou, V. (1993) *The demography of a Greek island, Mykonos 1859-1959. A family reconstitution study.* Ph.D. Thesis: University of Liverpool.

Hionidou, V. (1995) "Nuptiality Patterns and household structure on the Greek island of Mykonos, 1859-1959", *Journal of family history,* **20**, (1), 67-102.

Hionidou, V. (1995) "The demography of a Greek famine: Mykonos, 1941-1942" *Continuity and Change,* **10** (2), 279-299.

Hobcraft, J., McDonald, W.J. & Rutstein, S. (1983) “Child-spacing effects on infant and early childhood mortality”, *Population Index*, **49** (4), 585-618.

Kardasis, V.A. (1987) *Syros, Stayrodromi tis Anatolikis Mesogeioy (1832-1857)* [*Syros, Cross-road of the Eastern Mediterranean (1832-1857)*]. Athens: Morphotiko Idryma Ethnikis Trapezis.

Kenna, M. (1976) “The idiom of Family”, In: Peristiany, J.G. (ed.), *Mediterranean Family Structures.* Cambridge: Cambridge University Press. 347-362.

Kertzer, I.D. & Brettell, C. (1987) “Advances in Italian and Iberian family history”, *Journal of Family History*, **12**, 87-120.

Knodel, J.E. (1974) *The decline of fertility in Germany.* Princeton: Princeton University Press.

Knodel, J.E. (1988) *Demographic behaviour in the past: a study of fourteen German village populations in the eighteenth and nineteenth centuries.* Cambridge: Cambridge University Press.

Kolodny, E. (1992) *Chora d’ Amorgos, Un village Cycladien.* Provence : Publications de l’ Université de Provence.

Landers, J. (1993) *Death and the metropolis: studies in the demographic history of London.* Cambridge: Cambridge University Press.

Laslett, P. (1983) “Family and household as work group and kin group: areas of traditional Europe compared”, In: Wall, R. (ed.), *Family forms in historic Europe.* Cambridge: Cambridge University Press. 513-563.

Laslett, P. (1980) “The bastardy prone sub-society”, In: Laslett, P., Oosterveen, K. & Smith, R. (eds.), *Bastardy and its comparative history.* London: Edward Arnold. 217-240.

Leridon, H. (1977) *Human fertility: the basic components.* Chicago: University of Chicago Press.

Livi-Bacci, M. (1971) *A century of Portuguese fertility.* Princeton: Princeton University Press.

Livi-Bacci, M. (1977) *A history of Italian fertility during the last two centuries.* Princeton: Princeton University Press.

Loizos, P. & Papataxiarhis, E. (eds.)(1991) *Contested Identities: Gender and Kinship in Modern Greece.* Princeton: Princeton University Press.

Malthus, T. R. (1970) *An essay on the principle of population; and a summary view of the principle of population.* Harmondsworth: Penguin.

McKeown, T. & Record, G. R. (1962) "Reasons for the Decline of Mortality in England and Wales during the Nineteenth Century", *Population Studies,* **16** (2), 94-122.

McKeown, T. (1976) *The modern rise of population.* London: Edward Arnold.

McNeilley, S. A. (1993) "Breast feeding and fertility", In Gray, R., Leridon, H. & Spira, A. (eds.), *Biomedical and demographic determinants of reproduction.* Oxford: Clarendon Press.

Ministère de l' Economie Nationale- Direction de la Statistique (1924-1939) *Statistique du mouvement de la population pendant l' année (1921-1937).* Athènes : Imprimerie Nationale.

Ministère de l'Intérieur. Service du Recensement. (1909) *Résultats statistiques du recensement général de la population effectue le 27 Octobre 1907.* Athènes : Imprimerie Nationale, 2 vols.

Ministry of Internal Affairs. General Directorate of Administration (1977) *Nomos 344/76 peri liksiarhikon prakseon* [*Law 344/76 concerning civil registration*]. Athens: National Printing Press.

Ministry of Internal Affairs. Statistics of Greece (1862b) *Plithysmos toy etoys 1861* [*Population of the year 1861*]. Athens: National Printing Press.

Ministry of Internal Affairs. Statistics of Greece. (1862a) (1866a-1889a) *Kinisis toy plithysmoy kata to etos (1860), (1864-1883), (1885)* [*Population movement during the year (1860), (1864-1883), (1885)*]. Athens: National Printing Press.

Ministry of Internal Affairs. Statistics of Greece. (1872b) *Plithysmos 1870* [*Population 1870*]. Athens: National Printing Press.

Ministry of Internal Affairs. Statistics of Greece. (1881b) *Plithysmos 1879* [*Population 1879*]. Athens: National Printing Press.

Ministry of Internal Affairs. Statistics of Greece. (1890) *Plithysmos 1889* [*Population 1889*]. Athens: National Printing Press.

Morel, M. (1991) "The care of children: the influence of medical innovation and medical institutions on infant mortality 1750-1914", In: Schofield, R., Reher, D. & Bideau, A. (eds.), *The decline of mortality in Europe.* Oxford: Clarendon Press.

Moustaka, C. (1964) *The internal migrant. A comparative study in urbanisation.* Athens : Social Sciences Centre.

National Statistical Service of Greece (1954) *Statistiki Synopsis tis Ellados* [*Statistical Summary of Greece*]. Athens: NSSG.

National Statistical Service of Greece (1955b-1998b) *Statistiki Epetiris tis Ellados (1954-1997)* [*Statistical Yearbook of Greece (1954-1997)*]. Athens: NSSG.

National Statistical Service of Greece (1956a-1998a) *Statistiki tis fysikis kiniseos toy plithysmou tis Ellados kata to (1954-1993)* [*Natural Movement of the Population of Greece in (1954-1993)*]. Athens: NSSG.

National Statistical Service of Greece (1962-1967) *Apotelesmata tis apografis plithysmoy-katoikion tis 19is Martioy 1961* [*Results of the population and housing census of 19 March 1961*]. Athens: NSSG, 3 vols.

National Statistical Service of Greece (1973) *Apotelesmata tis apografis plithysmoy-katoikion tis 14is Martioy 1971* [*Results of the population and housing census of 14 March 1971*] Athens: NSSG, 3 vols.

National Statistical Service of Greece (1980c) *The population of Greece in the second half of the 20th century.* Athens: NSSG.

National Statistical Service of Greece (1983c-1997c) *Statistiki tis dikaiosynis* [*Statistics of Justice*]. Athens: NSSG.

National Statistical Service of Greece (1984) *Apotelesmata tis apografis plithysmoy-katoikion tis 5is Aprilioy 1981* [*Results of the population and housing census of 5 April 1981*]. Athens: NSSG.

National Statistical Service of Greece (1998c) *Apotelesmata apografis plithismoy-katoikion tis 17is Martioy 1991* [*Results of the population and housing census of 17 March 1991*]. Athens: NSSG, 6 vols.

Newell, C. (1988) *Methods and models in Demography.* London: Belhaven.

Notestein, F. (1945) “Population-The long view”, In: Schultz, T. (ed.), *Food for the World.* Chicago: University of Chicago Press. 36-57.

Oeppen, J. (1993) “Generalised Inverse Projection”, In: Reher, D. & Schofield, R. (eds.), *Old and New Methods in Historical Demography.* Oxford: Clarendon Press. 29-39.

Preston, S. & Van de Walle, E. (1978) “Urban French mortality in the nineteenth century”, *Population Studies,* **32** (2), 275-297.

Razzell, P.E. (1974) “An interpretation of the modern rise of population in Europe: A critique”, *Population Studies*, **28** (1), 5-17.

Reay, B. (1996) *Microhistories: demography, society and culture in rural England, 1800-1930.* Cambridge: Cambridge University Press.

Reher, D.S. & Schofield, R. (1993) *Old and New Methods in Historical Demography.* Oxford: Clarendon Press.

Reher, D.S. (1990) *Town and country in pre-industrial Spain: Cuenca, 1540-1870.* Cambridge: Cambridge University Press.

Roussos, G. (1975) *Neoteri istoria toy Ellinikoy ethnoys* [*Late history of the Greek nation*], Vol. Z. Athens: Elliniki morphotiki estia.

Schofield, R., Reher, D. & Bideau, A. (1991) *The decline of mortality in Europe.* Oxford: Clarendon Press.

Siampos, G.S. & Valaoras V.G. (1969) "Long term fertility trends in Greece", *International Population Conference,* Vol. 1. London: IUSSP. 598-610.

Siampos, G.S. (1973) *Dimografiki ekseliksis tis neoteras Ellados (1821-1985)* [*Demographic evolution of modern Greece 1821-1985*]. Athens: S. Tzanettis Press.

Siampos, G.S. (1980) "The Greek migration in the 20th century", In: Siampos, G. (ed.), *Recent population change calling for policy action.* Athens: NSSG. 234-257.

Siampos, G.S. (1993) *Dimografia* [*Demography*]. Athens: Sbilias Pub.

Sofianou, D. (1989) *Istoria tis Paroy kai Antiparoy* [*History of Paros and Antiparos*]. Athens: Memphis

Soutzoglou-Kottaridi (1991) *Paidi kai ygeia* [*Child and health*]. Athens: Dodoni Press.

Spaneli, S. (1998) *Paros.* Athens: AD&ED.

Statistique Générale de la Grèce (1928) *Recensement de la population de la Grèce au 19 décembre 1920/1 janvier 1921.* Athènes : Imprimerie nationale, 6 vols.

Statistique Générale de la Grèce (1931-40) *Annuaire statistique de la Grèce (1930-1939).* Athènes : Imprimerie nationale.

Statistique Générale de la Grèce (1933) *Résultats statistique du recensement de la population de la Grèce du 15-16 Mai 1928.* Athènes : Imprimerie nationale, 6 vols.

Statistique Générale de la Grèce (1946-1950) *Population de la Grèce d' après le recensement du 16 octobre 1940.* Athènes : Imprimerie nationale, 2 vols.

Statistique Nationale de la Grèce (1955-1961) *Population de la Grèce au recensement du 7 Avril 1951.* Athènes : Imprimerie nationale, 3 vols.

Szreter, S. (1993) “The idea of demographic transition and the study of fertility change: a critical intellectual history”, *Population and Development Review,* **19,** 659-701.

Tapinos, G. (1993) *Stoiheia dimografias* [*Elements of demography*]. Athens: Papazisis Pub.

The Economist (1998) *Pocket World in Figures.* Vicenza: LEGO S.p.a.

Tomara-Sideri, M. (1991) “Oikonomiki dynamiki kai dimografiki metavasi [Economic dynamics and demographic transition]”, *The Greek review of social research,* **80,** 70-85.

Trichopoulos, D. & Papaevangelou, G. (1974) *The population of Greece : a monograph for the World Population Year 1974.* CICRED Series.

Trussel, J. & Casterline, B.J. (1980) “Age at first birth”, *Comparative Studies, Cross National Summaries,* Vol. 15. London: World Fertility Survey.

Tsaousis, D.G (1986) *Koikoniki Dimografia [Social Demography]*. Athens: Gutenberg.

Tsaousis, D.G. (1971) *Morfologia tis Ellinikis Koinonias [Morphology of the Greek society]*. Athens: Gutenberg.

United Nations (1955) *Age and Sex Patterns of Mortality: Model Life Tables for Under Developed Countries.* New York: UN.

United Nations (1957) *Report on the World Social Situation.* New York: UN.

US Bureau of the census (1975) *Statistical abstract of the United States: 1975.* 96th ed. Washington, D.C.: US Bureau of the census.

Valaoras V.G. (1946) “Some effects of the famine on the population of Greece”, *Milbank Memorial Fund Quarterly,* **24,** 215-243.

Valaoras, V.G. (1960) “A reconstruction of the demographic history of modern Greece”, *Milbank Memorial Fund Quarterly,* **38,** 115-139.

Wall R., Jean, R. & Laslett, P. (1983) *Family forms in historic Europe.* Cambridge: Cambridge University Press

Walle, E., & Kantrop, L. (1974) “Historical Demography: a Bibliographical Essay”, *Population Index,* **40** (4), 611-623.

Woods, R. (2000) *The demography of Victorian England and Wales.* Cambridge: Cambridge University Press.

World Health Organisation (1977) *International classification of diseases. Manual of the international classification of diseases, injuries and causes of death. Based on the recommendations of the 9th revision conference, 1975, and adopted by the 29th World Health Assembly.* Geneva: WHO, 2 vols.

Wrigley, E.A. & Schofield, R.S. (1973) "Nominal record linkage by computer and the logic of family reconstitution", In: Wrigley, A.E. (ed.), *Identifying People in the Past.* London: Edward Arnold. 64-101.

Wrigley, E.A. (1966) *An introduction to English Historical Demography*. London: Weidenfeld and Nicolson.

Wrigley, E.A. (1973) *Identifying People in the Past*. London: Edward Arnold.

Wrigley, E.A., Davies S.R., Oeppen, E.J., & Schofield, R.S. (1997) *English population history from family reconstitution 1580-1837*. Cambridge: Cambridge University Press.

Yangakis, K.G. (1978) *Dimografika Kykladon 1821-1971* [*Demographic issues of the Cyclades 1821-1971*]. Athens: Vivliopoleio ton Vivliofilon

Zelinsky, W. (1971) "The hypothesis of the mobility transition", *Geographical Review,* **61,** 219-249.