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SOCIO-HISTORICAL ANALYSIS OF A CROATIAN VILLAGE

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The author investigates the impact of economic conditions and of demographic processes on vital events (births, marriages, and deaths) in a small society of a Roman Catholic parish in civil Croatia from 1755 to 1855. The analysis has undeniably demonstrated the existence of typical associations in the economic and demographic system, as well as in the demographic system itself. Attention has been paid to interpretations of observed patterns from the ethnological perspective.

Introduction

This study focuses on Cernik, a civil Croatian parish, from 1755 to 1855.* It looks at the influence of annual fluctuations in economic conditions and at the influence of the interplay of demographic variables themselves on short term (annual) variations in the demographic system of the parish. The existence of these demographic behaviour patterns cannot be denied. In this study I note these patterns and seek for possibilities for their explanations in ethnographic and historical evidence.

Since I am an anthropologist by profession, the central effort of this demographic study

* The study summarizes a larger study, presented as a Master's Thesis at the University of California, Berkeley, in May 1986.

is understanding complex relationships among different dimensions of human life. To this end, I used, at the time when the study was written, available historical, socio-cultural, economic and ecological data on the region around Cernik.

The study is part of that tradition of demographic enquiries concerned with the short term tendency of past demographic systems towards equilibrium. It uses a Malthusian approach to account for this equilibrium only as a serviceable heuristic tool. This is because of my conviction that the dramatic confrontation between population and a failed food supply does not occur in isolation but is mediated by social, cultural and political forces. I subscribe to the current paradigm in socio-historical and demographic studies which interprets past demographic structures as to a large extent caused by circumstances beyond human control (bad weather, harvest failure, scarcity, high prices, disease and finally death). However, I also belong to that sociological tradition which points to the importance of historical and social context and that anthropological tradition which stresses the importance of human symbolic systems and men's capacity to shape their own history. Of keen interest is the question of where the line can be drawn between the ecological, biological and economic, narrowly defined, and the cultural, social, and political factors. Both of these obviously determine human destinies, and it is interesting to study their relative importance. In other words, while it is important to understand the effects of ecological and economic (narrowly defined) determination on demographic systems it seems even more important, from an anthropological perspective, to detect those cultural traditions and those socio-economic conditions which alter what otherwise would have been a pure and simple bio-ecological demographic regime. This is why I pay special attention to interpretation of mechanisms which underlie observed demographic patterns.

At the same time I express opposition towards biological, ecological and narrowly defined economic determinism spread in demographic studies. These studies neglect the cultural and socio-historical context of demographic processes. In them, culture is only a residual category and is not studied. This may partly be the fault of anthropologists who have not developed a theory of how traditional and cultural elements impact on individual motivations.

The introductory part discusses the relationship between anthropology and historical demography. Then I place the study in Malthusian theoretical framework. After some basic information on the economic situation of the region under investigation I present data. Then, as a way of introduction to statistical analysis of associations between demographic and economic variables, I comment on the graphic material. Finally the results which have been obtained are compared with the results of a similar analysis which uses data for four other parishes (Cernik, Nova Gradiška, Trnjani and Garčin).

Historical Demography and Anthropology

French social historians "discovered" demography (Willigan and Lynch, 1982). The high value that they placed upon historical demography is attested to by one of the most prominent representatives of modern French social history. Not only did LeRoy Ladurie say that historical demography was "the most promising discipline of the new school" (LeRoy Ladurie, 1979:4) but he went so far as to say that "rural civilization should be regarded, first and foremost, from the view point of demography. This matters more than, say, wood

carving or costume, ... popular literature or any other folk tradition that might come to mind when one hears the words 'rural civilization'" (1979:89).

There is, first, only a descriptive aspect to this new field to which the same author attributes mathematical resurrection of the total past (1979:223). Historical demography is estimation and reconstruction of the size and composition of populations in the past. However, it goes beyond the sheer description of past demographic structures to interpretation and explanation of population processes (Willigan and Lynch, 1982:3-4). Hollingsworth's famous definition (1969:11) of what a historical demographer ought to be to successfully perform his job indicates even more the vast scope assigned to their discipline by historical demographers:

"The ideal historical demographer will need to have a keen historical sense and a command of all the knowledge and resources of modern demography, requiring a thorough acquaintance with the methods and findings of every national system of census and vital registration in the world. He will be deeply versed in economics, sociology, religious observance, archaeology, anthropology, climatology, epidemiology, and gynaecology; and he will understand the mathematical techniques of the statistician so well that he can advance improvements on them of his own."

The formative days of demography in the seventeenth century were characterized by an emphasis on the systematic nature of mortality experience, irrespective of the day to day lives of individuals. Demographers were seeking natural laws that governed all human mortality experience. The subsequent developments of the field understood population processes as deeply embedded within socio-historical settings so that today the concern of the field is not population in some abstract sense but characteristics of living, breathing inhabitants of past times (Willigan and Lynch, 1982:15).

Any contemporary historical demographic study based on empirical data is necessarily accompanied by the social and historical information on the community in question. Actually, it is sometimes difficult to say where historical demography ends and social history begins and vice versa. Treatment of demographic data constitutes the basis of social history in all materially oriented studies. On the other hand, for historical demography "curiosity about the concrete conditions of human social existence is central to understanding the results of historical demographic analysis quite simply because there is no theory from the science of demography, narrowly defined, that explains historical demographic behaviour at any time in history" (Willigan and Lynch, 1982:38).

Demographers discover the concrete conditions of human social existence by studying ecological (economy, climate, epidemics), political and cultural constraints imposed on demographic behaviour. Most important for the links I will now try to establish between historical demography and socio-cultural anthropology are certainly the latter, although no study which sets as its goal a thorough understanding of the life of past communities can neglect the first two aspects of their experience.

I will now give some examples to illustrate the relevance of cultural and social history for the understanding of demographic patterns and some of several aspects of culture and society that may be clarified by studying demographic patterns which underlie them. The relationship between socio-cultural and demographic variables is reciprocal. This fact makes it often impossible to reach the ultimate cause behind each but it is important to point out to their close interaction. (Hollingsworth, 1969:327)

Fertility performance in general can be illuminated by knowledge of various aspects

of social organization such as marriage and inheritance patterns, cultural traits such as courtship practices and about cultural values such as honour etc. (see Iszaevich, 1975). The status of women in a patrilineal or matrilineal society, the culturally defined relationship between mother-in-law and daughter-in-law in societies with virilocal residence and culturally defined perceptions about sexuality can also be helpful in interpreting observed fertility patterns (Levine and Scrimshaw, 1981). The knowledge of the value system (e.g. perception of wealth), of female and male social roles, and of the intimacy of their relationship can clarify the timing and the general appearance of fertility limitation. The timing and the reasons for the onset of fertility limitation are burning issues in historical demography today. The most recent findings of the Princeton European fertility project suggest that it cannot be accounted for by purely economic factors. (van de Walle and Knodel, 1984)

Hammel (1975) has examined the influence of the zadruga on the overall demographic regime. This influence is at least threefold. The zadruga system probably encouraged early marriage which led to high fertility, enhanced old age survival and lowered infant mortality. At the same time the existence of the zadruga depended on these demographic factors. It could not subsist unless fertility was high enough to assure large sibling sets which would form fraternal zadrugas or unless mortality was low enough and marriage early so that the cohabitation of fathers and married sons was possible.

Another example of an aspect of culture which may be clarified by studying demographic processses is marriage. Married life studied statistically can provide insight into the length of the period spent in wedlock and into taboos about remarriage. The latter may be different for each sex and may vary with age. Furthermore it sheds light on unexplored areas of conjugal life such as regulation of sexual activity and premarital relations between the sexes. Thus demography can provide us with a quantitative history of social mores (see Laslett, 1977)

The demographic data sometimes enable us even to contrast socio-economic groups within a particular region and across regions. As Le Roy Ladurie said, historical demography "provides us with guidelines that can take us very far along the road of social history" (1979:228).

These examples are meant only to serve as an illustration of where and how historical demographic studies are relevant for ethnographic research and vice versa. They do not at least exhaust possible avenues of interdisciplinary demo - anthropological research. They only show some possible lines of a useful union between historical demography and cultural anthropology.

Theoretical Background

The theoretical framework of this study is based on the work of Malthus, Marx and Boserup. It was primarily developed by Malthus and subsequently implemented by the latter two.

Malthus (1958(1803)) argues that fluctuations in population size closely follow variations in economic conditions (land resources and technology). In other words, in his model material resources and technology are exogenous factors which permit and occasion shifts in population size. He sees the relationship as being strictly unidirectional: exogenous, in the sense that they are not dependent on population density, technological innovation and,

in circumstances of non-fixed land resources, the possibility of extending them, push the population up to the limit of its carrying capacity. This concept designates the highest possible number of people living on a certain surface of land in certain technological and social (organizational) circumstances. In other words, this is a socially determined level of resources which can sustain a certain population size.

Malthus does not envisage any feedback mechanism by which the population could exert influence on the resource base and technology. The response of the population to an increased standard of living is seen as unilateral - it increases until it reaches the equilibrium position defined by the carrying capacity of land. The core discrepancy between the growth of population and that of production lies in Malthus's conviction that the first rises exponentially (geometrically) and the second linearly (arithmetically).

There are two ways to check population growth. One is essentially negative although it is called a "positive" check. It consists of war, starvation and disease. The other, more elaborated in the second edition of his *Essay on Population* (1803), consists in preventing population growth by moral restraint through celibacy, deferral of marriage and deliberate control of fertility.

Marx criticized this simple bio-ecological model for not taking into account the socio-economic context within which all population movement is placed. According to Marx, there is no such thing as a universal law of population, rather, each particular socio-economic formation has its own law of population.

Another negative feature of the model is that the relationship between economic and demographic factors is unilateral. This is emphasized in particular by E. Boserup (1965). She contends that population size is a motor of technological advancement and of increases in agricultural output. Thus her model is diametrically opposite to that of Malthus, but like his it remains one-sided: population is exogenously determined by factors that Boserup does not define, and production is exogenously driven by population size. Simultaneously, technology, which includes not only better tools and methods, but also factors of socio-economic organization such as division of labour and economies of scale (Hammel, 1983) is also a means to alleviate population pressure on the resource base.

Another theoretical critique of Malthus' model is possible. It is not quite clear that the carrying capacity is fixed. People may, if forced by population pressure to do so, change their diet quantitatively (to a certain extent which depends on the previous level) and qualitatively, thus modifying the subsistence level.

Empirically, populations do not show a universal tendency to go unchecked in favourable economic circumstances. The evidence for historical demographic transition suggests that fertility is likely to go down as per capita income goes up.

Using Malthus' basic concepts, the present study makes an effort to capture some of the complexity of social causality. It investigates yearly "surpluses" of population caused by bad harvest yields, weather conditions or diseases. It pays special attention to the relative importance of checks to population growth through increased mortality and of checks that operate through nuptiality and fertility. The study has found a strong preventive check via deliberate short term fertility control, and also a positive check via increased mortality. It has failed to demonstrate the existence of preventive control through nuptiality. This demographic factor seems not to be conditioned by economic reasons. This fact also points out that Malthus' model of economic determinism is too narrow to explain complex socio-cultural phenomena.

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Socio-economic Background

Until 1745 when a Roman Catholic parish was founded in Nova Gradiška, a large area lying to the south of Cernik all the way to the river Sava belonged to the parish of Cernik. After the parish in Nova Gradiška had been founded, villages under the jurisdiction of the parish in Cernik were reduced to the following ones: Baćindol, Baničevac, Bukovica, Cernik, Drežnik, Giletinci, Mala, Opatovac, Podvrško, Sinlije, Šagovina and Šumetlica. They gravitated to Cernik, a market town situated only a couple of kilometers from Nova Gradiška. The parish was part of civil Croatia. In 1760 the parish had around 2700 inhabitants and by 1848 it had grown to around 4400 inhabitants. Most of the villages in the parish belonged to the estate of Cernik owned by the Marković family.

Croatian economy in the eighteenth and nineteenth centuries was based upon a backward feudal system of the exploitation of serfs who were obliged, in return for utilizing a parcel of land, to pay dues in kind and money and supply the landowner with free labour and their own means of production. (Karaman, 1972)

The economy of peasant holdings was natural in the majority of cases. Only a part of the yield from peasant parcels was incorporated into the exchange of goods and reached market. This enabled peasants to secure the money necessary for paying certain dues to the feudal lord, and especially for state and district taxes. (Karaman, 1972:10). Another source of monetary income for peasants were cash payments for any extra labour peasants performed for the landowner (Bøsendorfer,1950), cattle and wine marketing. All these sources were fairly limited. Marketing occurred only if peasants were able to secure a surplus product after they had satisfied their own consumption, paid their dues in kind and left seed for the next year's sowing. Marketing of meat and wine was further limited by urbarial regulations (established in 1756 by Maria Theresa) which reserved both kinds of marketing for landlords as their "little royal rights", so that peasants could exercise them only at certain times of the year. (Bøsendorfer, 1950:37). Also the landlord had the right to buy any of the peasant surplus produce. In practice it probably occurred more than often that the landlord forced peasants to sell him all their surplus at or below market prices.

We are confronted, then, with a natural economy, regularly accompanied by domestic production of clothes and agricultural tools. The majority of population satisfied their most important needs by their own work. Essentially they were producers and not consumers who supplied themselves from markets. They catered to most of their needs and sold whatever surplus they could produce at the market. The involvement of peasants in market exchange was limited. This fact impeded the development of inner market exchange, which was, in any case, rendered difficult because of the underdevelopment of transportation facilities and roads. However, we cannot rule out the possibility that in the market town of Cernik a larger segment of the population were artisans and shopkeepers, dependent at least partly on serf production.

Demographic Data

The basic data for this study are obtained from church registers of baptisms, marriages and deaths in the parish of Cernik. Vital registration of births starts in 1714, that of marriages and deaths in 1717, but this analysis begins only in 1755 for several reasons. At that time the

boundaries of the parish of Cernik were narrowed down and consequently the distance of filial villages to the parish center was reduced, so that the likelihood that most vital events were from that time registered is bigger. The final year of the analysis (1855) is determined by the fact that baptismal registers miss after the year 1863.

In the analysis I have used yearly aggregative data for the number of births (taken to be represented by baptisms on the basis of an ethnographic datum that baptisms were held within three days of a birth). Deaths have been separated into infant deaths (under one year of age) and all other deaths referred to as non-infant or adjusted deaths. This was done because deaths of infants account for a high percentage of all deaths. This has enabled me to calculate the infant mortality rate for which an additional adjustment has been made. The calculation has taken into account the effects of fluctuations in prior births and the distribution of infant deaths. The highest infant mortality occurs in the first months of an infant's life so, it has been estimated that current year infant deaths occur in 30% of births in the previous year and in 70% of births in the current year. (Pressat, 1977:56-58)

In order to facilitate the interpretation of statistical results all demographic variables have been calculated for the harvest year starting on 1 July and ending 30 June. Prices also refer to the harvest year. (Meuvret, 1946)

A difference has been made between first marriages and remarriages defined as marriages in which either partner was already married. Marriages have been treated on a calendar basis for lack of the information on monthly distribution when the study was being done. But since we know from ethnographic descriptions that the majority of marriages occurred in November and a good part in late winter or early spring, I think that the calendar basis on which marriages are counted does not significantly alter the interpretation of other demographic movements based on harvest year.

The unavailability of a continuous series of information on the population size of the parish of Cernik has constrained this analysis to using raw numerical data on births, marriages and deaths instead of rates. This can be misleading since absolute numbers of events are unable to reflect sudden and relatively sharp changes in population size. For example, after a serious mortality crisis, the base population at risk in which deaths, marriages and births occur will drop and consequently "the **absolute numbers** of births, marriages and deaths in the years after the crisis will be lower then normal even though the **vital rates** may have returned to their pre-crisis level. These fluctuations in the numbers of events exaggerate compensatory downswings in the death **rate** after a crisis, while flattening compensatory upswings in the birth and marriage **rates**." (Wrigley and Schofield, 1981:311, emphasis added).

The methodology adopted in this study partly counteracts this problem. The population size and the age structure implicit in the absolute numbers of vital events are removed from each series by application of two procedures. First, in order to smooth variations which tend to obscure the overall trend, I calculate eleven year moving averages. "Such moving averages effectively remove the longer fluctuations of more than 15 - to 20 - year duration, associated with changes in the size or age structure of the population." (Lee, 1981:358). The second procedure consists of dividing each observation by an eleven-year moving average centered on the observation. Thus we have removed the trend from the data, that is we have expressed raw annual variations as proportionate changes from the eleven-year moving average. The property of this so-called detrended series is that its mean is 1. This means that each observation can be interpreted as a percentage increase or decrease in a variable with

respect to the mean 1.

Prices of bread have been used as an economic indicator. They were constructed for the period from 1790 to 1839 using official limitations of retail prices of basic foodstuffs issued by the local government in Požega, a town about twenty kilometers away from Cernik.

Prices were maximized one or more times a year, most frequently in autumn and spring, so that I thought that it was most appropriate to group them on the basis of the harvest year starting on 1 July.

Flour prices are highly correlated with prices of other products. They have been chosen for analysis on the basis of the assumption that grain constituted the staple diet of this region. Since local prices are reconstructed only for the 1790-1839 period and since demographic indicators cover a much longer period, a longer series of data has been made by regressing the shorter period on the Vienna market corn prices which exist for a longer period. The correlation (.9) of local and Austrian prices and the proportion of variation (94.5%) in the dependent variable (local prices) attributed to independent variables (Austrian prices in the same and in the previous year) are high enough to justify this statistical production of a new series of data. Further processing of economic indicators has been similar to that used to adjust the demographic series for population size and age structure.

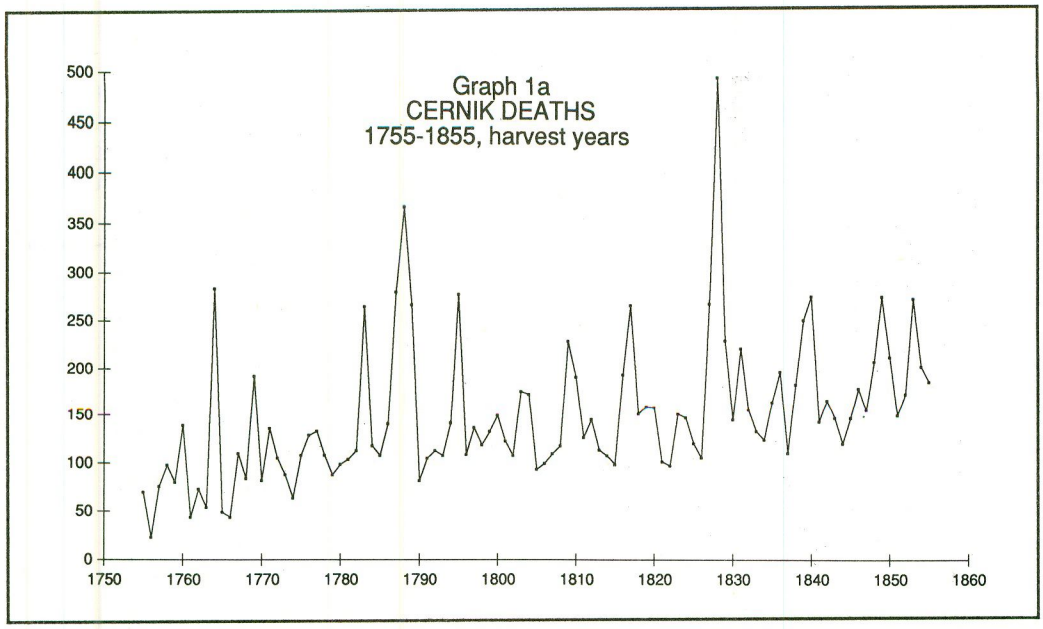
In this study prices stand for agricultural yields and supply of food in general, and in the wide sense for climatic conditions and the standard of living. I am aware that this approximation contains many lacunae because prices, among other things reflect demand for food, storage and import availability, the possibility of being replaced by other food, governmental policy and its capability of organizing help in crises, the foreign market situation, the broader political situation (wars) and long term population growth.

Since the associations between demographic and economic variables are strong in spite of these mediating mechanisms, I have concluded that prices are a suitable indicator of the economic situation.

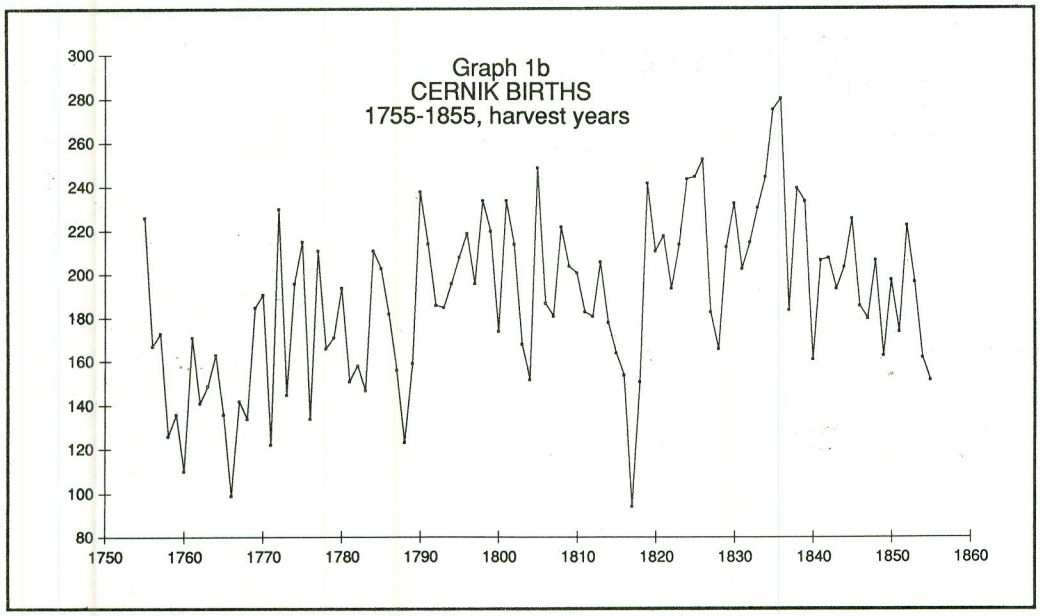
The analysis of demographic and economic variables is based on distributed lag models up to two years following a fluctuation in explanatory variables. This lagged model allows contemporary and previous levels of a variable to affect the level of another variable (Lee, 1981:359). The three year was investigated but in none of the relationships were the effects significant, so in the final presentation it was omitted. The estimated effects of independent variables have been corrected for the serial correlation in each dependent variable.

Graphical Analysis of Data

The three demographic series are plotted for purposes of comparison (see graphs 1a, 1b and 1c). Deaths are the most volatile series. In the second half of the eighteenth century they exhibit mortality crises of short duration, occurring rather regularly every six or seven years. On the contrary, in the first part of the nineteenth century crises last longer. Severe crises of 1802/03, 1808/09, 1816/17, 1838/39, 1849 and 1853/54 are followed by a year or two of less or equally heavy surges in mortality. Moreover, extreme situations occur without any regular pattern. There does not seem to be any stabilization in the volatility of the series with time. It even becomes more volatile towards the end of the period. The coefficient of variation for the whole period is .537.

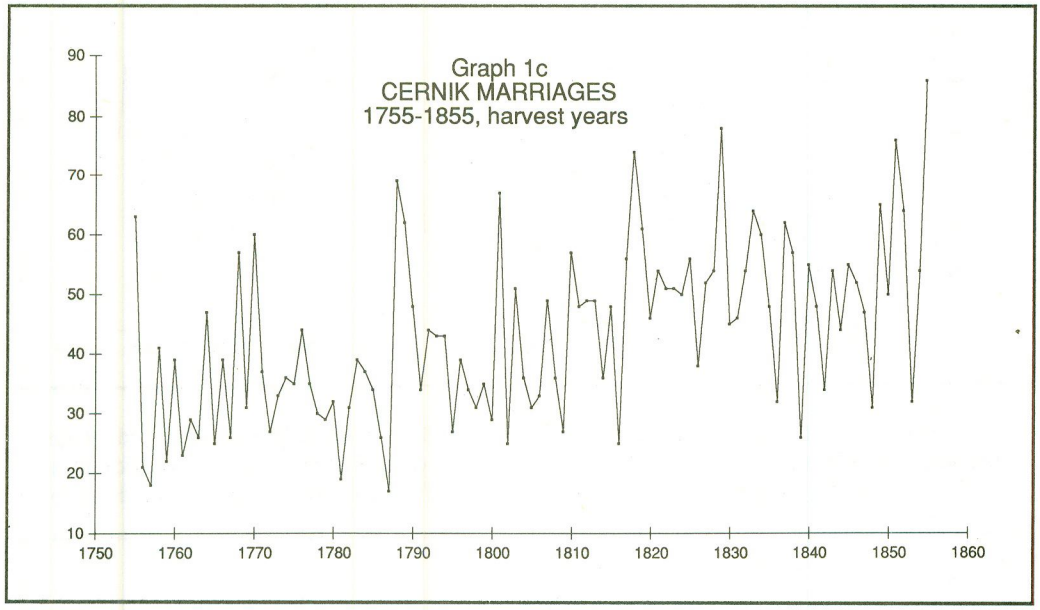


Births, in contrast to deaths follow longer periods of more or less pronounced cycles, are less variable and yet different each year. Their average is 189 and the coefficient of variation .196. It is noteworthy that most violent fluctuations coincide with those of



mortality, only in the opposite direction. This is true of 1787/8, 1802/03/04, 1817/18, 1827/28, 1849 and 1854/55.

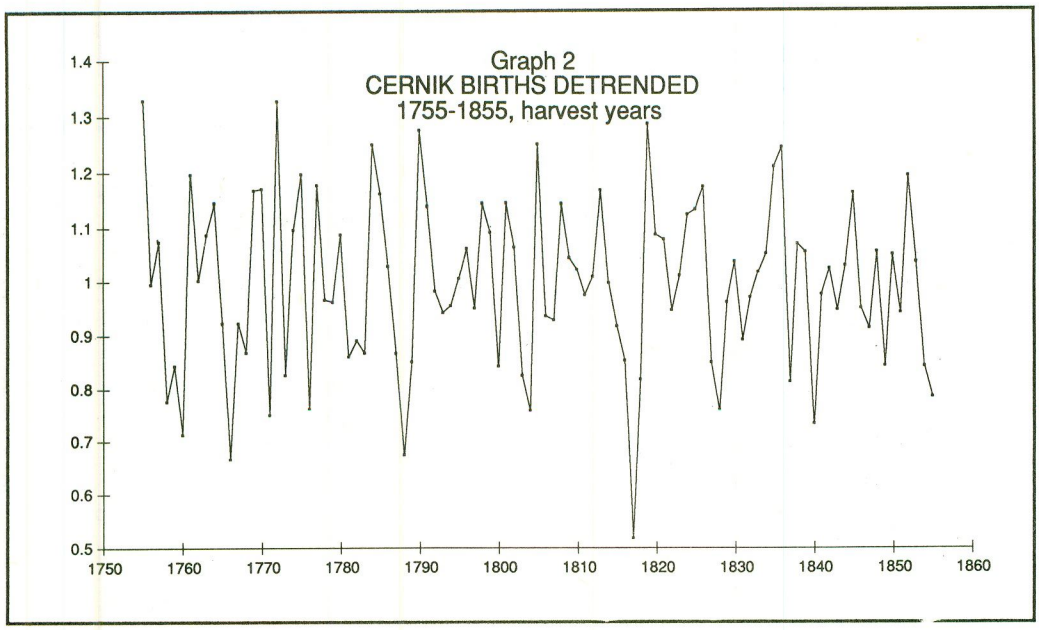
The coefficient of variation for marriages is .341 which indicates greater fluctuations than for births and lesser than for deaths. Fluctuations in all marriages are due mostly to fluctuations in first marriages which, although smaller in magnitude than fluctuations in remarriages are much more frequent. The coefficients of variation for first marriages are .341 and for remarriages .783.



In order to better assess annual fluctuations in each demographic series we can look at statistically processed data which give the so called detrended series. In them each observation is expressed with respect to an eleven year moving average centered on that observation. As the property of the detrended series is that its mean is 1, each observation can then be interpreted as a proportional increase or decrease in a variable with respect to the mean.

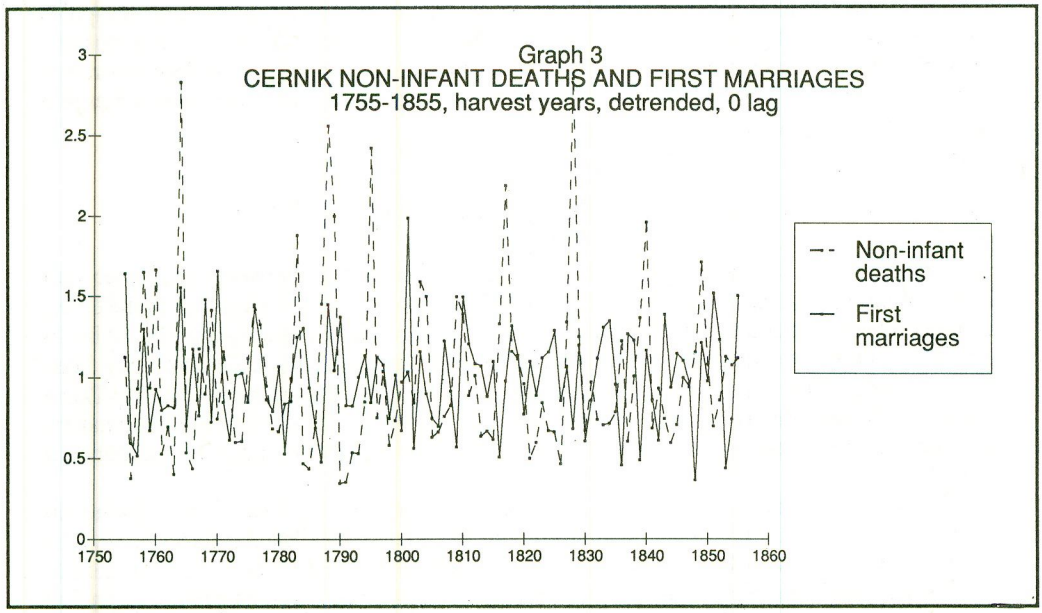
For example, examine the detrended series of births (graph 2). The first thing that strikes one is a rather low amplitude in the volatility of births. Except for the extreme troughs in 1787, 1803, 1817 and 1827 in which births were respectively 36, 51, 59 and 35% below average, they rarely fall or increase by more than 20%. The inspection of the detrended data suggests that fluctuations were yearly, namely that there is no period in which the number of births would be stable for a couple of years. A trough is usually followed by a rise in the following year. Over the whole period, births fluctuate with equal frequency and amplitude except perhaps in the last decade.

We can also plot two variables expected to covary against time. This will enable us to get a preliminary impression as to the **general** relationship between variables in each pair and identify **particular** years in which either variable deviated from its mean in a direction unexpected from their general relationship. Also, by following their association over time

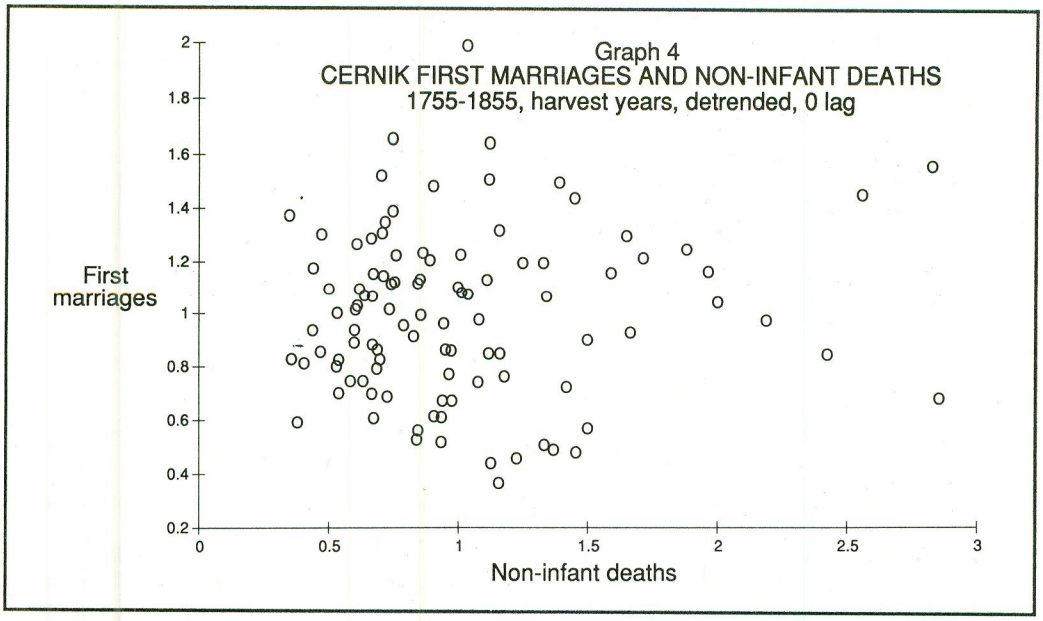


we will be able to discern any changes that may have occurred in it during a century.

Let us look at the covariation of non-infant deaths and first marriages. They are expected to be associated inversely and the graph (# 3) confirms our expectations except for



a couple of years - from 1768 to 1770 and from 1803 to 1806. Furthermore, the graph suggests that the relationship was not extended into the following year but was limited to the current year. Over the century this relationship does not seem to change.



The same relation can be studied without respect to time on a scattergram. (graph 4) The concentration of points around the point of average is rather strong but many outliers deteriorate the overall strength of association so that the coefficient of correlation is rather small - negative .222. However, when outliers are taken away there seems to emerge a downward sloping line.

Specification of the Model

Based on the literature concerning the interrelationships between economic and demographic variables, as well as the interplay among demographic variables themselves, it has been hypothesized that the best predictors of short term changes in the number of births are prices, mortality adjusted for infant deaths and first marriages. Deaths have been expected to covary with prices and marriages with prices and adjusted deaths. These relationships have been analysed first by studying the impact of each of the explanatory variables on the dependent variable and then by adding the second and third independent variables.

Also other possible independent variables have been used to check if their inclusion contributes to some additional explanation of the dependent variables. Remarriages and the infant mortality rate have been used to account for short term changes in births, but generally their impact has been found to be low. An attempt has been made to measure the impact of

political events, with the aid of information on wars, but the expected results did not show up. A Budapest temperature series for the period 1789 to 1855 has been included as an independent variable to check the hypothesis whether mortality and fertility are responsive to climatic conditions. The results obtained were of little importance (see also Hammel, 1985) and it was decided to omit this variable from the final model.

The dependent variables are, then, births, non-infant deaths, infant mortality rate, first marriages and remarriages. The independent variables are prices (as a proxy for harvest yields and possibly climatic conditions), non-infant deaths and first marriages. Births are studied as a function of prices, non-infant deaths and first marriages. Deaths are examined as a function of prices. Marriages are examined as dependent on prices and non-infant deaths.

Two separate analyses have been done. One covers the period 1755-1855 using the predicted local price series. The other uses only the short, 1797-1834, period of available local prices as a check for results on the previous analysis. Only the longer analysis is presented here. Each set of regressions incorporates the effect of contemporary and two previous levels of a variable on the dependent variable and the correction for serial correlation in the dependent variable.

The statistical analysis gives a way to look for patterns in observed data. It is also a way of testing the likelihood that the observed associations are due to chance alone. By means of tests of significance of regression coefficients we can unequivocally reject chance as an explanation of relationships between variables. The analyses revealed consistency in signs and magnitudes of coefficients even if they were sometimes not statistically significant within 5% or 1%. The failure to reach statistically significant levels is due to the fact that sometimes the coefficients are not big enough. Still, the consistency of observed patterns makes the results look reasonable. This observation is confirmed by the analysis of aggregate data for four parishes and by the general similarity of associations obtained in similar studies of other regions. However, there is a domain left unexplained by statistical analysis, that of actual causal mechanisms which underlie relationships for which statistical analysis rejected an explanation in terms of accidental variability. This is why while presenting the statistical results I have used findings of human biology, epidemiology, social history and ethnology in an effort to sketch possible interpretations of observed demographic patterns.

Regression Analysis of the Period 1755-1855

Fertility

Births were studied as a function of prices, non-infant deaths, and first marriages. Births respond simultaneously to a rise in prices with the explained variance being 19%. (see table 1) Non-infant deaths and economic circumstances together explain 41% of the variance in the number of births. Births react to economic shocks only simultaneously and then they drop by 18.6%. When lagged, the effect of prices diminishes. Increases in deaths affect births in the same and two previous years. The strongest effects occur simultaneously and with a one year lag . However two years after an initial increase in mortality there is a rebound in births so that the overall impact of mortality is lower than the impact of economic circumstances although mortality is relevant in all three years approximately equally. With the addition of a third variable - first marriages - we explain around 50% of the variance in

the number of births. A year after a marriage took place there is the most pronounced reaction in births: they increase by 20% following a 100% increase in first marriages in the previous year.

There are several explanations - biological, psychological, and socio-cultural (or behavioural) used to account for observed decreases in births following economic difficul-

Table 1

Distributed lag analysis of demographic events in Cernik

independent variables	dependent variables				
	births	non-infant deaths	infant mortality rate	first marriages	remarriages
prices					
lag 0	-0,191a	0,35	0,254	-0,105	0,14
lag -1	0,51	0,124	-0,109	-0,078	-0,108
lag -2	-0,003	-0,126	-0,04	0,04	0,482b
non-infant deaths					
lag 0	-0,067b			-0,164b	-0,024
lag -1	-0,055b			0,204a	0,477a
lag -2	0,03			-0,05	0,048
first marriages					
lag 0	0,047				
lag -1	0,199a				
lag -2	-0,079				
constant	1,06a	0,66b	0,90a	1.15a	0,0
coefficient of correlation	0,5	0,07	-0,01	0,20	0,24

The "t statistic" significance levels are indicated by a=1% and b=5%.

ties, mortality crises and marriage troughs. The biological explanation connects a decrease in fertility in economic crises to amenorrhea, to increased incidence of intrauterine mortality (spontaneous abortion) and to a change in the quantity and quality of sperm (LeRoy Ladurie, 1969, Menken, Trussell, Watkins, 1981, Bongaarts and Cain, 1981). The psychological factor most frequently invoked is stress caused by the fear of death and generally by the crisis situation, which may cause amenorrhea and loss of libido. Socio-cultural factors are conscious, voluntary control of fertility, either by abstention, induced abortion or some kind of contraception, and separation of spouses created by increased mobility in search for work or possibly for food. It is almost impossible to dissociate these three factors.

More rigorous statistical analyses using distributed lag models cannot give a definite answer to the dilemma of whether the decrease in births after an economic crisis is due to behavioural or biological mechanisms, but they can at least argue with more strength in favour of one or the other.

In the light of explanations mentioned in the literature I will comment on the statistical results of the Cernik analysis. I reject a purely biological (physiological or nutritional) explanation . My position is based on several points. First, the fact is that the number of births alters **simultaneously** with changes in economic circumstances, and not one year after, as to be expected if purely biological factors were in question (anovulatory cycles and amenorrhea). In the literature and empirical research there is no actual evidence for a significant increase in intrauterine mortality because of higher morbidity in crisis years. Finally, too little is known about biological conditioning of the fertilizing ability of man to base my explanation on this factor.

On the other hand, the fact that the number of births responds quickly to economic circumstances has a convincing interpretation in conscious, voluntary and planned short term control of conception. It is likely that the population, immersed in the rhythm of nature (climatic and agricultural) could easily predict the outcome of the harvest and adapt its reproductive behaviour to it.

My rejection of the purely nutritional mechanisms is partly based on the assumed timing of subsistence crises. Usually, if a harvest has been bad, one may expect that the worst shortage will occur in the spring of the next year, even more so if the harvest of a later crop (e.g. maize) has failed, too. This is actually what happened in the harvest years 1800/01, 1802/03, 1815/16 and 1816/17. (Kempf,1925 and Gavrilović,1977). Under the above assumption about the timing of crises and with the use of harvest year data as the unit of analysis, one would expect a fall in births to occur in the following harvest year if purely nutritional effects were the major factor in the decline.

To ascertain that the severe malnutrition and famine which could significantly affect fecundity and fertility were present, more qualitative information concerning the general standard of living of Croatian peasants in the second half of the eighteenth and the first half of the nineteenth centuries is required. This analysis suggests that **typically** peasants were not at the brink of hunger in times of agricultural crisis, but it does suggest that they were aware of its gravity and that they adjusted their behaviour so as to facilitate it.

Literature mentions migration as another social factor that could account for decreases in fertility in the period of crisis. I believe that this is not the most important cause. First of all, the extent of migrations is difficult to ascertain. We wonder how much peasant - serfs were mobile at all, taking into account that to migrate they needed the approval of the landlord. If temporary leaves in search for food or work were permitted the question is where

the peasants from Cernik could go. To the south was the Military Border and unfavourable geographical conditions must have demotivated them from migrating to the west. The only valve they were left with was the center of the county - Požega, but to what extent it could provide them with a refuge cannot be determined.

As for psychological effects on fertility, they are most dificult to detect: they were certainly present but could not have been decisive in lowering fertility.

To sum up, in the core of my interpretation of the relationship between fertility and economic circumstances in Cernik, lies voluntary, short term birth control by any means available, be it abstention, induced abortion or contraception (by coitus interruptus) in the anticipation of economic difficulties.

The mortality effect on births, net of prices and first marriage effects, is noticeable contemporaneously and with a lag, with 1% and 5% significance respectively. Biological explanation of this pattern, namely the depletion of the pool of women in reproductive ages or of already pregnant women or, perhaps of their partners, cannot be excluded. However, the fact that the decrease in the number of births is partly compensated for in the two year lag, as well as the absence of correlation between mortality and fertility in other Croatian parishes (see the comparison later on), hint that socio-cultural factors also affect behaviour in mortality crises. For this reason the ethnographic verification of the hypothesis that a restraint was imposed on reproduction when a family was mourning a parent or a relative will be necessary.

Theoretically, demographers have questioned the empirically identified impact of the number of marriages on the number of births one year after a marriage was contracted. Since new marriages represent only one fourth of all married couples in a place, high elasticity of births with respect to marriages is spurious (Lee, 1981). The same author contends that there exists a third factor, which has not yet been discovered, initiating changes in both marital fertility and nuptiality.

Perhaps, the high coefficient of the relation obtained in Cernik can be explained as an artefact of the chosen harvest year (1 of July to 30 of June) and of the fact that approximately 80% of all marriages take place in November. Both these instances prolong the first year of observation to 20 months in which many new couples probably could have had a first child. We can also speculate that there existed a strong social expectation on a young couple to demonstrate its fertility as soon as possible.

Mortality

Non-infant deaths typically do not display a dependency on economic conditions although they increase by 35% with a simultaneous 100% increase in prices. In other words we cannot exclude a hypothesis that this correlation is due to chance alone. The results are insufficiently removed from chance to provide reliable evidence of a typical connection between deaths and economic conditions.

This precaution is understandable for we know too little about effects of nutrition on mortality. Scientists agree that only severe malnutrition, that is famine, can cause outright starvation and death and second, that a greater susceptibility of an undernourished organism to different endemic and epidemic diseases is not simply related to low nutritional levels, i. e. it is not the same (Hugo,1984, Menken, Trussel and Watkins, 1981). It depends on the kind of endemic or epidemic disease which may become virulent in times of dearth when the

organism is weakened by the lowered food intake, and on weather conditions. The correlation of mortality and economic circumstances is further blurred by socio-economic factors which either improve or worsen it. They seem to have been very important in Cernik.

Neither is the infant mortality rate typically dependent on economic conditions. We can hypothesize that infants were protected from exogenous influences by breast-feeding which must have been prevalent at least in the first several months of an infant's life.

This analysis of mortality has somewhat surprised us because it has pointed to a relatively high standard of living (if we measure it with increased mortality in an economic crisis) of the Croatian peasant, and because it has indicated that, most probably, unpredictable epidemics were driving both non-infant and infant mortality independently of economic conditions.

Nuptiality

We expect nuptiality to be in correlation with economic conditions and non-infant mortality. First marriages and remarriages have been separately analyzed. In both cases the relationship to economic conditions is not typical, that is a statistically accidental correlation between economic circumstances and nuptiality is not ruled out.

The cumulative effect of prices on first marriages is substantial - negative 14.2%, but statistically these results are unreliable. On the other hand there is reliable evidence that first marriages were highly elastic to mortality fluctuations both in the current and in the following year. The decrease of 16.4% in the current year is followed by a more than compensatory increase of 20.4% in the next year, so that over three years, only a negligible 1% increase is left, net of the price effect. It is safe, then, to infer that the formation of new couples did not closely follow the changing economic conditions but moved together with mortality for whatever causes the latter was fluctuating.

Such results are unexpected. Empirical research in western Europe suggests that nuptiality is highly responsive to the economic situation. This difference is probably related to different marriage patterns and formation of households in the west and east of Europe.

Western Europe is characterized by a rather high age at marriage (23-25 for women, 25-28 for men), a high proportion of celibacy and the nuclear type of family. Eastern Europe is characterized by early age at marriage (18-21 for women, 22-25 for men), a low proportion of celibacy and the prevalence of joint family (Hajnal, 1965). Linked to these differences are fundamentally different ways of reacting to adverse economic difficulties and particularly to difficulties resulting from population growth (Hajnal, 1981:481)). This is actually confirmed in this analysis: a concatenation of early marriage and of patrilocality after the marriage probably account for the nonexistence of a typical delay of marriages in economic crises.

The effect of mortality on marriages counteracts that of economic crisis. In theory, mortality opens new opportunities for marrying, either for the first time, after the death of a parent (especially important in the western European system which insists on the independence of the new couple and on the establishment of a minimal economic basis for the support of family prior to marriage) or for the second time after the death of a spouse. A decrease in nuptiality following deaths of younger people just about the age to get married is rather unusual, because people of that age are most resilient to dearth and diseases.

The patterns observed in Cernik of relationships between first marriages and mortality are explained by a sum of the above mentioned factors. It appears that a mortality crisis

somewhat delays and somewhat precludes marriages. We do not know whether this happens because persons of marriageable age are depleted or because, once postponed, a marriage has less chance to be contracted. In any case, a thesis that marriages are delayed due to the respect traditionally paid to deceased relatives, due to the illness of the betrothed and due to the generally unfavourable situation caused by increased mortality is plausible.

As expected, a year after the crisis, the number of marriages goes up because the mourning tabus are no longer operative, and partly because, after the death of a parent, the family feels the insufficiency of labourers and hastens the marriage of sons. Thus mortality opens new opportunities for first marriages.

The regression of remarriages on prices and non-infant deaths also gives credibility to the above interpretation of the response of first marriages. Prices, net of the effect of deaths, display an atypical association with remarriages. Also an unexplained association appears two years after the crisis. Overall, mortality, net of the price effect, raises by 50.1% the usual number of remarriages over three years following a mortality crisis. Effects of the mortality crisis are the greatest after one year: they are statistically significant within 1%. Again I explain this by the ethnographic datum of a one year mourning period observed after the death of a spouse.

In conclusion, both first marriages and remarriages seemingly move independently of economic conditions.

Comparison

In order to check the representativeness of patterns obtained in Cernik I compare them with data coming from the same broader region, (see Table 2). Directions of associations are frequently the same. Magnitudes and temporal patterns of responses are also almost identical when Cernik is contrasted with analyses of aggregate data for the wider region. So Cernik can be said to be representative of the wider region.

Aggregation and analysis of vital events for four parishes — Cernik, Nova Gradiška, Trnjani and Garčin have confirmed the results from Cernik. Whereas Cernik was in Civil Slavonia, the other three parishes were part of the Austro-Hungarian Military Border. Nova Gradiška is adjacent to Cernik while Trnjani and Garčin are located approximately 60 kilometers to the east.

Each parish was first analysed separately and the striking similarity of patterns within each has permitted me to run the analysis first with the combined data for the Border parishes and second for all four parishes. The period covered by the aggregate regression analysis is from 1759 to 1855. Cernik provides the starting (1750) and the ending year (1860). Events from Nova Gradiška contribute to raw events from 1765 to 1856, Trnjani from 1756 to 1855 and Garčin from 1783 to 1853.

The greatest difference observed is in the explanatory power of non-infant mortality both when births and first marriages are the dependent variable. Amplitudes of coefficients in the combined data are much smaller and none reach statistically significant levels. In the Border parishes a typical, non-accidental correlation between mortality and fertility on the one hand, and between mortality and nuptiality on the other has not been found. This may strengthen my interpretation of mortality - fertility and mortality - nuptiality associations in Cernik in which I have questioned a purely biological explanation.

Table 2

Comparison of Cernik and the aggregate data for Cernik, Nova Gradiška, Trnjani and Garčin

Independent variables	dependent variables			
	Cernik 1755-1855	aggreg. data 1759-1855	Cernik 1755-1855	aggreg.data 1759-1855
		births		
prices				
lag 0	-0,204a	-0,194a		
lag -1	0,79	0,135		
lag -2	-0,012	-0,053		
non-infant deaths				
lag 0	-0,086b	0,009		
lag -1	-0,106a	-0,027		
lag -2	0,058	-0,003		
first marriages				
lag 0	0,059	0,218a		
lag -1	0,206a	0,312a		
lag -2	-0,083b	0,033		
infant mortality rate				
lag 0	0,028	-0,046		
lag -1	0,088b	-0,034		
lag -2	-0,042	0,015		
constant	1,01a	0,63a		
coef. of correl.	0,52	0,42		
	first marriages		remarriages	
prices				
lag 0	-0,105	0,051	0,14	0,249
lag -1	-0,78	-0,221	-0,108	-0,111
lag -2	0,04	0,35	0,482b	0,108
non-infant deaths				
lag 0	-0,164b	0,06	-0,024	-0,095
lag -1	0,204a	0,091	0,477a	0,494a
lag -2	-0,05	0,122	0,048	0,276a
constant	1,15a	0,98a	0,0	0,08
coef. of correl.	0,2	0,02	0,24	0,49
	non-infant deaths			infant mortality rate
prices				
lag 0	0,35	0,386	0,254	0,246
lag -1	0,124	0,076	-0,109	0,013
lag -2	-0,126	-0,169	-0,04	-0,165
constant	0,66b	0,72a	0,90a	0,91a
coef. of correl.	0,07	0,09	-0,01	0,05

The "t statistic" significance levels are indicated by a=1% and b=5%.

I have argued that mortality effects on marriages reflect postponement through morbidity and generally unfavourable times rather than mortality per se. In the case of fertility I have assumed that indeed its response to mortality crises partly reflects the depletion of women at risk of childbearing. However, the aggregate data fail to show the existence of this purely physiological mechanism and suggest that the causality was social, as in the case of marriages, namely, a restraint on childbearing in bad times.

If the underlying mechanism was indeed behavioural, then the interesting question that immediately imposes itself is what accounts for the differences in behaviour in Cernik and other parishes. Perhaps there are some essential cultural differences between Cernik and other parishes. Perhaps this also reflects a frequently invoked thesis in ethnological literature that the military government, exacting ever greater numbers of able-bodied men, stimulated the formation of zadrugas and high fertility.

There are still other dissimilarities between Cernik and the analysis of combined data. They do not significantly disturb the general impression of the similarity of patterns, but are worth noting. One is a highly significant 21% increase in births simultaneously with a 100% increase in first marriages. It is interesting that this zero lag effect is absent in Cernik but present in the aggregate analysis of the three Military Border parishes and when all four parishes are considered together. This can point to a high incidence of premarital conceptions in the Military Border. Or perhaps this is another reflection of the constant pressure of the military regime on families to have high fertility.

Other dissimilarities (remarriages react slower to changes in mortality and first marriages to those in economic conditions) are less important and, moreover, atypical.

In spite of these differences, the overall similarity of directions, magnitudes and temporal patterns of responses to exogenous and endogenous influences on vital events in Cernik and in the four parishes is striking. This fact gives additional validity to results obtained for Cernik alone. Furthermore, differences indicate that there existed differences in social mores between civil and military Croatia.

Conclusion

My first interest has been to study standards of living of the inhabitants of Cernik and more generally of Croatian peasantry as presumably reflected in demographic responses to exogenous fluctuations. I have operationalized this interest by analyzing demographic fluctuations with respect to economic changes and with respect to changes in the structure of demographic variables.

The analysis has decisively confirmed the existence of the resource pressure and the population's (in)voluntary response to it by increasing mortality and decreasing fertility. Thus this study has obtained responses similar to those found by other scholars for other areas of Europe. The demographic response to economic forces and to the interplay of demographic factors themselves which is set in motion endogenously has been found to be two-fold. On the one hand the population reacts to exogenous and endogenous disturbances with purely mechanical, biological mechanisms as, for example, in the case of mortality. Fertility and nuptiality fluctuations can also be interpreted as mechanical responses to different exogenous shocks. Yet the main trust of this study has been to show that this is not the entire picture. Many a mechanism of demographic change, so it appears, is socio - culturally determined.

The following picture of basic life processes in Cernik seems to emerge out of this analysis. The fundamental demographic processes of births, deaths and marriages seem to be more or less indifferent (except for births) to exogenous factors. Mortality fluctuations in Cernik appear to be random and drive nuptiality and the formation of households independently of economic conditions. Nuptiality is then driving fertility which is the only process directly sensitive to exogenous influences. Thus the initial phases of demographic processes are largely endogenously determined: newly married couples, probably after due respect has been paid to deceased parents and relatives, occupy empty niches and initiate a new cycle of household formation and life processes. They soon bear children, but later on, as if once the legitimacy of the marriage has been proved and social expectation fulfilled by the birth of the first child, they start responding to outside fluctuations and rationalize the timing of future offspring.

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