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THE RECONSTITUTION OF THE POPULATION OF NORTHERN ITALY WITH A COMPARISON BETWEEN THE DEMOGRAPHIC EVOLUTION OF PIEDMONT, EMILIA AND ENGLAND (XVII – XIX CENTURIES)

First Research Question: was the Northern Italian demographic profile a low pressure demographic regime?

The object of this work is to examine the specific demographic profile of Northern Italy during the Modern Age. Was the demographic profile of Northern Italy a high or a low pressure demographic regime? What kind of specific internal mechanism caused the growth of the Northern Italian population? What were the background conditions that led to the demographic transition? Was the demographic development pattern of Northern Italy similar to the evolution of Northern European population?

A long term point of view will be adopted as it was by the authors of previous studies (M. Breschi, 1990; M. Breschi, L. Pozzi and R. Rettaroli, 1994). For this reason, this work is based on a rich sample of serial data which covers two large and significant zones of Northern Italy (Piedmont and Emilia). These data largely comprise census information and parish series of baptisms and burials and are used to estimate the population's size and the main fertility and survival trends in some Northern Italian regions. The analysis covers a crucial and critical period from the seventeenth century plagues to the beginning of the Italian demographic transition in the late nineteenth century. Lastly, these results are compared with the serial indicators taken from the reconstitution of the population of England (E.A. Wrigley, R.S. Davies, J. Oeppen and R.S. Schofield, 1997). The purpose of this comparison is to show and underline the possible existence of similarities or common demographic characteristics.

Geographical and Historical References

This study focuses on two of the most important regions of Northern Italy: Piedmont and Emilia-Romagna. Piedmont is located in the north-west of the peninsula and it covers a vast area from the western part of the Alps at the French border to the Padana plain. This region is important for many historical and economic reasons. Firstly, its noble royal family of Savoia played a central role in Italian history because they led the process of national unification. In addiction to this, a very active and powerful bourgeosie created in Piedmont the bases for a strong industrial development. In addition to this, it is worth to underlining that during the period under study the smaller alpine region of Valle d'Aosta was included in the historical boundaries of Piedmont.
Emilia-Romagna is located in the centre of Northern Italy and includes the southern Padana plain territory from the Adriatic Sea to the Appenine Mountains. However, we won't be examining the whole region but only a smaller part comprising the ancient Duchy of Modena. The territory under the old jurisdiction of the Duchy coincides with the present Provinces of Modena and Reggio Emilia. During the Modern Age, the Duchy's government developed an efficient administration and a healthy economy based on farming and commerce.

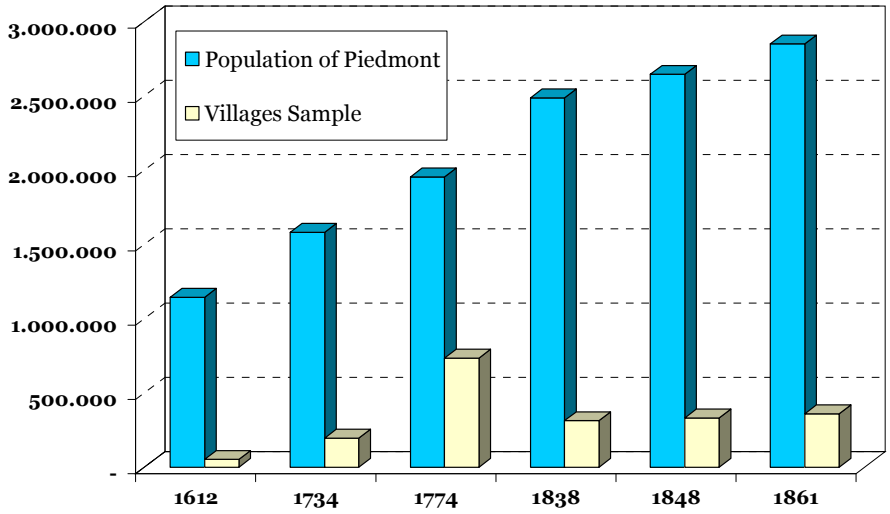
Available Data, Sources and Periods

The available data is based on a collection of many parish registers and *Status Animarum* from a large sample of villages and towns. The parish data is necessary to create the continuous series of births and deaths. On the other hand, the data of the *Status*

Animarum offers important information about the number of inhabitants in every village. Moreover, fiscal enumerations and censuses give other important information about the population's size in the villages and the regional areas (Castiglioni, 1861; Prato 1906, Beloch, 1994).

The available data covers different periods: parish data from Piedmont covers a very long period from 1600 to 1900[1], whereas the interval for Duchy of Modena is shorter and covers a period from 1770 to 1900[2]. It's also important to describe the consistency and the weight of the sample data. The number of the considered parish registers of Modena is constant: indeed, the sample represents about 4,8% of the Dukedom's population, whereas the weight of Piedmont sample isn't constant: given the longer period of reference, the sample includes a variable amount of population and its weight changes largely on the time axis.

Figure 1 – Piedmont: Example of sample weights



Method of Estimation

The regional estimations of birth and death series of Piedmont are based on the sample data which was illustrated in the previous paragraph. The estimate calculations are based on a simple procedure. First of all, the ratios between the population of every village and regional population are calculated at each census time. Secondly, the annual number of vital events are added for every village. Afterwards, it is necessary to multiply the ratios for each annual value of the parish series. In the end, the regional estimations of the annual number of births and deaths are obtained.

Table 1 – Piedmont: population, ratios and intervals of estimation

Sources	Piedmont Population (1)	Village Population (2)	Ratios (1) / (2)	Interval
Census 1861	2.849.930	360.493	7,9	1849-1861
Census 1848	2.644.928	331.675	8,0	1848-1838
Census 1838	2.487.561	313.804	7,9	1815-1827
Census 1838	2.487.561	267.832	9,3	1800-1814
Fiscal enumeration 1774	1.954.150	734.691	2,7	1770-1799
Fiscal enumeration 1734	1.581.694	variable	variable	1600-1769

However, it is not necessary to estimate birth and death series between 1828 and 1837 because the complete data for the entire regional state regarding that period was published by the Statistical Office of the State of Piedmont (G. Muttini Conti , 1962).
It is also important to underline that the multiplier on the 1600-1769 period is not constant. Parish series cover different lengths on the time axis and thus the consistence of the sample of villages is variable (see table 1). In this time interval, the multiplier varies largely from 8 to 24, which was the highest value registered in the early years of the considered period.

The series of the Duchy are estimated by using a slightly different method based on the natural movement data. Firstly, totals of births and deaths in the entire Dukedom were published by the Ducal Statistical Office for the periods 1770-1787 and 1818-1846. Secondly, births and deaths data is collected on a sample of 17 parishes. Afterwards, the multiplier calculations are based on the ratios between the number of events counted in the sample parishes and the total registered in the Duchy.

Table 2 – Duchy of Modena: ratios and intervals of estimation

Period of reference	Ratios		Period of estimation
	Birth	Death	
1770-1787	1.60	1.71	1788-1817
1818-1846	1.65	1.66	1847-1859

After the National Unification of Italy, official statistical sources are used to cover the period 1861-1900 for both Piedmont and the Duchy of Modena (Istituto Centrale di Statistica, 1965).

The Inverse Projection Technique Application

Since the annual series of vital events and population levels at several censuses are available, it's possible to calculate the total fertility rates (TFR) and life expectancy by using an annual inverse projection procedure (R. Lee, 1974). This method allows the estimation of proper fertility and survival indicators in the absence of a complete mortality table and without the distribution of the births by mother's age (for further details about the inverse projection technique see R. Lee, 1974). As regards the inverse projection processed for the Duchy of Modena, the specific input information considers the structure of the population by age based on the 1871 census data and the life table calculated by using the official ducal death data collected from 1852 to 1856.
Regarding Piedmont, the life table was calculated by using official data collected during the period 1881-82. The basic hypothesis is that the life table of 1881-82 could be adopted as a good model of the Italian risk of mortality by age before Unification. Indeed, it is possible to believe that during the modern age the curve of death probability by age remained almost the same, while only the intensity of mortality was subject to significant change. Nevertheless this assumption is not valid for certain epidemic crises, when the mortality structure by age could change in a dramatic way. In a second step, standard tables of Coale and Demeny are used to estimate the distribution by age of the Piedmont population, because this kind of data is not available for the long period before the nineteenth century. After comparing the 1881-82 life table of Piedmont with a Coale and Demeny standard mortality model, the procedure adopted the structure by age corresponding to a level 8 table for the southern female area with a rate of increase of 7 ‰. Indeed, in the long term between XVIIth and XIXth centuries, the population of Piedmont experienced a rate of increase which was equal to 7 ‰. The basic idea of this hypothesis is that during the

modern age population of Piedmont followed the typical trend of a stable population (F. Scalone, 2001).
In the end, the final input information for both Piedmont and the Duchy of Modena was the fertility model of Coale and Demeny with a mean age at birth of 32 (see R. Lee, 1974) and a standard schedule of net migrations by age in which most migrations concern the population between 15 and 35 years and ages of childhood (F. Scalone, 2001).

First Results and Provisional Conclusion

Table 3 shows the considerable demographic growth experienced by the population of England during the nineteenth century (E.A. Wrigley, R.S. Davies, J. Oeppen and R.S. Schofield, 1997): in seventy years the population rises from 8,6 to 21,5 million. In the same period, the population of Piedmont rises from 2 to 2,9 million. However, before the industrial revolution and during the eighteenth century, Piedmont and England register the same rate of increase: more than 4,5 ‰ (see table 3). In the period before 1700, the rate of increase of Piedmont is largely variable because this region suffered many severe mortality crises and epidemics (see figure 2 and 3). From a strictly Malthusian perspective, in Piedmont and partly in Duchy of Modena, these periodic and severe mortality crises work as a mechanism of control of the demographic growth and represent a typical positive check.

Table 3 – Piedmont, Duchy of Modena and England: population and rates of increase

	Piedmont		Modena		England	
	Population	Annual rate of increase ‰	Population	Annual rate of increase ‰	Population	Annual rate of increase ‰
1616	1.108.646				4.568.410	
1701	1.255.766	1,47			5.210.623	1,55
1801	2.029.664	4,80	334.210		8.671.439	5,09
1871	2.903.099	5,11	513.866	6,15	21.500.720	12,97

Figure 3 shows the life expectancy at birth: England's trend appears more stable without intense fluctuations, always remaining above the Piedmont's level and reaching a value of life expectancy equal to 40 by the last decade of XVIII. In contrast Piedmont experiences many evident survival crises. In the long period, the demography of Piedmont appears a typical high pressure demographic regime. In this context, strong and frequent mortality crises played a key role causing repeated falls of fertility and consequently depressing the potential demographic growth. Only after the first part of the eighteenth century, the survival indicators of Piedmont improve and become more stable. Thus the disappearance of the catastrophic mortality crises could be considered a turning point towards a new demographic regime (L. Del Panta, M. Reginato, F.Scalone 2002). In addition to this, it must be noted that Duchy of Modena follows almost the same trends confirming the same demographic framework of Piedmont.
These schemes confirm that the early phase of mortality transition has been characterized by the decline, or even disappearance, of mortality crises caused by epidemic infections/disease (R. Schofield and D. Reher, 1991). Indeed, the "stabilisation of mortality" in Piedmont led to the gradual elimination of the characteristic "peaks" on all mortality trends. Moreover, the different trends of life expectancy between Piedmont, the Dukedom and England demonstrate the existence of wide regional differences in the historical European mortality pattern.
In one of its early formulations (F.W. Notestein, 1945), the theory of demographic transition declared that the "transitional growth" came substantially from the mortality decline provoked by the new controls over diseases, sanitary and medical advances, etc. Even if this is the basic and general scheme, the comparison of our results reveal a more

articulated pattern of demographic evolution. Both the population of Northern Italy and England are observed in the earlier stages of their demographic transition, but the demographic growth was generated by slightly different mechanisms. During the three centuries in question, the fertility of England is stationary and varies within a short range of values. The fertility rate of Piedmont shows large oscillations but it stops fluctuating after 1750.
In the long run, while survival levels in England are always higher than those in Piedmont, the rise of the gross reproduction rate in England between the second part of the XVIIIth century and the beginning of the XIXth barely reaches the high levels that Piedmont had maintained since the XVIIth century (figure 4).

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[1] The data of the following series of births and deaths is included in the sample of Piedmont: Abbazia di S. Benigno, Abbazia di S. Mauro, Acqui, Alba, Alessandria, Angrogna, Arona, Asti, Ayas, Bandissero, Barbaresco, Biella, Bobbio, Borgosesia, Bra, Brusson, Busca, S. Michele, Candia, Carignano, Carmagnola, Casale Monferrato, Castellamonte, Ceva, Challand St. Victor, Cherasco, Chieri, Chiasso, Ciriè, Collegno, Cuneo, Fontainemore, Fossano, Gaby, Gressoney, Grinzane, Issime, Ivrea, La Morra, Lanzo, Lilianes, Luserna S. Giovanni, Lusernetta, Mazzé, Moncalieri, Mondovì, Muriaglio, Nizza Monferrato, Ormea, Perloz, Pinerolo, Pocapaglia, Polonghera, Rivarolo, Rivoli, Romano, Rorà, S. Damiano, Saluzzo, San Front, Savigliano, Settimo Torinese, Strambino, Susa, Torino, Torre Pellice, Torre S. Giorgio, Verduno, Vicariato di Capriata, Villanova Solaro, Villar Pellice, Vischi, Viù (for further details, see L. Del Panta, M. Reginato and F.Scalone 2002).
[2] The data of the following parishes is included in the sample of the Duchy of Modena: Carpi, Finale Emilia, Guiglia, Ligorzano, Minozzo, Mirandola, Monteobizzo, Contese, Pavullo, Rubiera, S. Agostino, S. Biagio, S. Felice, S. Martino Spino, S. Pietro, Sestola, Vignola (for further details, see L. Del Panta, and F.Scalone 2002).

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Figure 2 – Population rate of increase

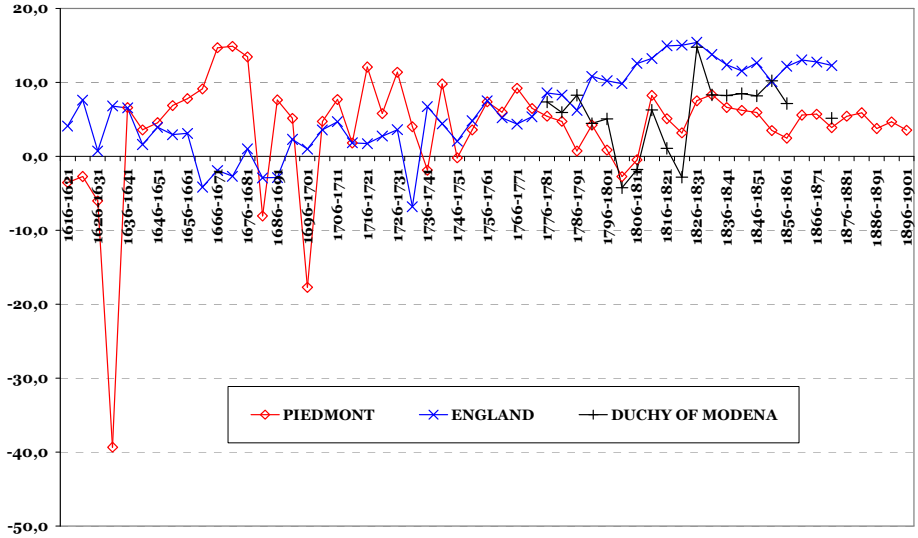

Figure 3 – Life expectancy

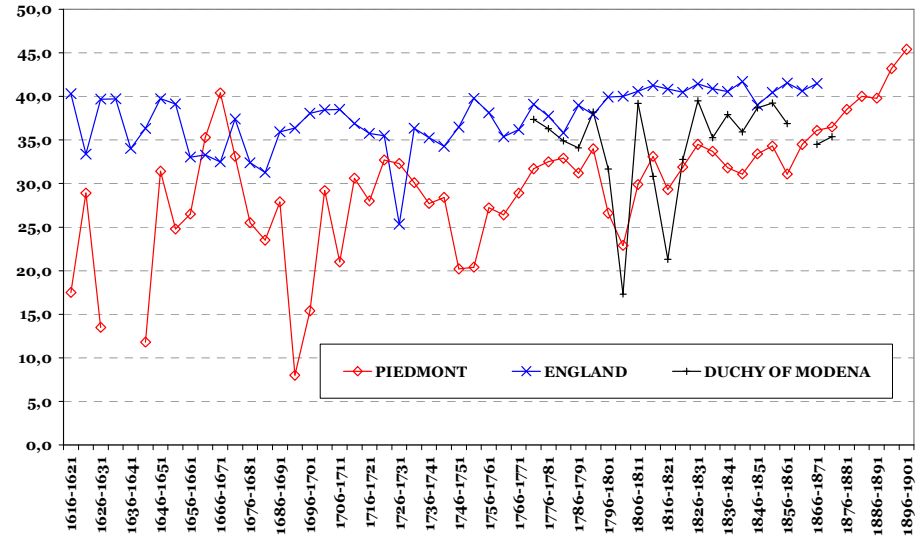

Figure 4 – Gross reproduction rate