

DEMOGRAPHIC SHOCKS: THE VIEW FROM HISTORY

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I

Demographic shocks convey the idea of a sudden change in those factors, external or exogenous to the demographic system, that affect mortality, fertility, or migration. Famines and epidemics, wars and displacement of people, can be seen as external disturbances to the normal functioning of a demographic system. Malthus renamed them "repressive checks" and made them endogenous to the system - the inevitable consequences of unsustainable population growth. Under a traditional demographic shock, mortality goes suddenly up, fertility goes down, mobility explodes, families break down; the after shock, however, implies changes that counter the initial consequences. In other words a steady or semi-steady state is broken and populations struggle to recover the equilibrium. This paper could limit itself to draw on the abundant literature on the subject both on historical and contemporary cases. However confining the discussion to this definition of shocks appears a limitation to the wider scope of the conference that includes the consequences of long term changes such as aging or international migration, whose current levels and trends appear unparalleled in the past. Indeed they are defined as "seismic shifts": and seismic derives from the Greek "seismos" or earthquake -- so, the idea is that we are going to experience an earthquake in slow motion, of which we already perceive the early subterranean rumblings. My task becomes more difficult, because I am required to deal also with long term profound changes that somewhat parallel those in store for the future.

This paper will basically deal with four issues. The first one puts current changes or shifts into an historical comparative perspective. The second deals with "traditional" shocks, or violent disturbances of the system and their consequences. The third discusses the "seismic changes" experienced in the past, attempts their measurement, exemplifies their effects on population and society. The fourth deals with the relevance that past experience has for current changes.

II

Let us consider the "seismic" changes that the rich world is experiencing. I will consider the 10 largest rich populations (US, Japan, Germany, UK, France, Italy, Spain, Canada, Australia and the Netherlands) that includes (2000) 767 million inhabitants according to the latest estimates (United Nations 2001), or 90 percent of the total population of the rich world. I will consider one indicator of future growth, or the ratio of the population 0 to 4 to that of their (theoretical) parents, on average 30 years older, aged 30 to 34. This ratio is easy to calculate and particularly useful because it is (a) a proxy of fertility, and very closely correlated with the total fertility rate; (b) it reflects the degree to which the generation of children is able to replace the adult generation; (c) it is a good proxy of future population growth, net of migration (it is closely correlated with population increase over the next 30 years); (d) "shifting" this ratio into the future - with a 30 years lag or more - we have an idea of the stress that will be undergone by the system of intergenerational transfers. For the 10 countries, the ratio was 78 percent in the year 2000, with a low of 55-56 percent for Italy, Spain and Germany and a high of 95 percent for the United States this only slightly below the 100 percent replacement level. The remaining 6 countries have ratios comprised between 69 of the Netherlands and 87 of Australia. Over one third of the rich population of the world (the US) is close to replacement ; about one fourth dangerously below. In Germany, Italy and Spain one child will have to replace (almost) two adults, in production and reproduction, in social life, in the web of affections and loyalties.

More than half a century ago, in 1945, the rich world was closing the traumatic experience of the Second World war. Several millions young people had died in the war; in Europe and Japan births were at a minimum. These losses depleted the young male adult cohorts, so let us calculate the children-to-adults ratios for the female population alone. The ratios - at this crucial point of the history of the 20th century - involve the relative few births of the early 40s and the 1910-15 birth cohorts, when fertility was higher (it had been affected only slightly by the war). It is, therefore, a moment of particular demographic weakness for the west. The ratio for the 10 countries was 116 (49 percent higher than that of the year 2000) with a maximum of 178 for Japan and a minimum of 86 percent for Germany (see figure 1, that compares 1945 with 2000). One could argue that this relatively favorable demographic situation contributed to the rapid process of economic recovery of Europe. The ratios

calculated up to now do not consider mortality attrition (or the losses between age 0 to 4 and age 30 to 34) that in 1945, with an expectation of life for females above 65 years, would have depleted a cohort by about 5 percent (and proportionally lowered the ratio), against 1 percent in the year 2000 (expectation of life close to 80).

Can we find in the western world modern history instances of large populations whose newly born generations were unable to replace the generations of their parents? Let us consider periods of particularly acute demographic crisis. In the First World War Germany and France were the western countries that had experienced the largest military losses (respectively 2 and 1.3 millions deaths: 15 and 17 percent of the mobilized forces) and that, in the aftermath, had acute need of demographic recovery. Children-to-adults ratio (for the female population in order to avoid the war losses bias) for France (1921) was 74 percent - lower than the 2000 one of 83 percent - and in Germany 85 percent - higher than the current (2000) 55 percent. The situation was considerably more favorable in the UK (108 percent) and in Italy (126 percent). Even in the Soviet Union in 1923, after the war, the civil war and the famine, the ratio was a "healthy" 215 percent. Discounting a mortality attrition of 10-12 percent (and more than double in the USSR), would lower the ratios by a correspondent amount, leaving them at a level considerably higher than the current one (except for France). Note that the birth rate in 1915-1918 was way below the normal level of peacetime years.

More than a hundred years before, after the fall of Napoleon, and after the bloody wars that cost the French army more than a million deaths, the children to adults ratio (female population) was a healthy 162 percent (Bourgeois Pichat 1951: 661) (which, net of a mortality attrition of about one third, typical of the high mortality levels of the times would be reduced to 108 percent).

I have compared the potential for replacement and growth at the beginning of this millennium - after more than half a century of peace and prosperity - with the situation of periods of crisis, after conflicts that had depleted the adult population, lowered the birth rate, altered unfavorably the age structure. Only in the case of France in 1921 we find a situation worst than the average of the major 10 in the year 2000. Indeed the ongoing "seismic" changes pose challenges unparalleled in the past two hundred years.

Do we really want to look for a period when the potential for replacement and growth was, almost all over Europe, and for a long time, badly hampered? We have to go back to the late Middle Ages, when European populations were repeatedly hit by

the plague. Biraben (Biraben 1979) has estimated that the population of the continent had declined 30 percent between 1348 and 1400. An extraordinary documentation - *inquisitiones post-mortem* - or inquiries in the succession to a man who had died - have provided the raw material (Russell 1948: 92-117) successively re-elaborated by Hollingsworth (Hollingsworth 1969: 375-88), that allows the calculation of replacement rates. The replacement rates refer to the male population and are the ratios between surviving sons and men dying and leaving a succession. Now these ratios, well above 100 percent before 1350, fall below these level from 1351-55 onwards, getting as low as 68 percent in 1381-85 and gradually recovering thereafter -- re-emerging above the level of 100 percent from 1446-50 onwards. The estimates of net replacement rates (NRR) made by Wrigley and Schofield (Wrigley and Schofield 1981: 530) in their secular (1541-1871) reconstruction of the English population, shows that only the birth cohort born in 1641-46 experienced a replacement rate below 100 percent (actually 98.8) in a period almost three centuries long (1541-1831).

Another aspect that has been cited as a component of the current “seismic shifts” is aging, and the associated structural pressures on intergenerational relations and transfers and impact on fiscal and social policies. Is the current trend in aging different – in speed and intensity – from the past? There are two components in aging, the first related to the fall of the birth rate (aging from the “bottom” of the pyramid) and the second related to increasing survival of generations reaching old age (aging from the top). The first component has dominated the aging process until the ‘70s, but its impact has been declining thereafter once the birth rate had reached its bottom level. Increasing survival at old ages has been accelerating in the second part of the 20th century and is projected to continue in the future as expectation of life increases. Forecasts or projections of indicators of aging (percent of the population over a certain age; mean or median ages of the populations etc) depend heavily on hypotheses as to the future courses of fertility and migration (which are renewing the pyramid from the bottom); hypotheses on old age survival are also important but less “unpredictable” given the gradual historical changes in mortality and the fact that “potential” old age individuals 10, 20 or 30 years from now are mature cohorts already in existence. In the “major 10” rich countries, population over 65 has increased 73 percent between 1950 and 1975 and 56 percent between 1975 and 2000, and is expected to increase 54 percent between 2000 and 2025 (and 16 percent between 2025 and 2050). As a percentage of the total population, persons over 65 have increased from 8.2 percent in

1950 to 11.1 in 1975 and 14.9 in 2000, and are expected to grow to 21.7 per cent in 2025. So while “relative aging” is accelerating, the increase of the total number of old people is decelerating.

A broader picture of the changes in the age structure can be gained from figure 2, showing the mean age, the proportions below 15 and over 65, of the population of the “major 4” western European countries (France, Germany, Italy and the United Kingdom) from 1870 to 2000 (and the projected value for 2010, a date close enough yielding an estimate that can be safely relied on). The acceleration of the process of aging since the 1970s is quite evident, after a plateau in the central part of the century and a continuous increase from the end of the 19th to mid 20th century.

For a very long view of age-structure modifications, let us again look at England in the three centuries after 1541 (Wrigley and Schofield: 1981). The population over 60, for instance, has gradually increased from a minimum of 7.2 percent in 1566-71 to a maximum of about 10 percent in 1711-21, then gradually declining to a new minimum of 6.5 percent in 1826-36. These are significant but mild and slow changes hardly comparable with the swift fluctuations of modern times.

The process of aging will undoubtedly deeply affect western societies in future decades. But what really matters, in the long run, is the process of renewal and reproduction of the population, and its potential for growth. Never in the past – not even after long and deadly crises – has this process fallen to negative levels as it has at the transition of the millennium. Hence a somewhat disturbing question: is prosperity, and the dearth of births associated with it, the fourth knight of the (demographic) Apocalypse, riding astride with war, plague and famine?

III

Traditional shocks, or violent disturbances of the system caused by a sudden increase in deaths, have been the recurrent lot of high mortality in western populations. Indeed the gradual decline of mortality since the late 18th century has been characterized by a reduction of the number and intensity of mortality fluctuations. Major mortality shocks – or mortality crises entailing a doubling or more of the number of deaths in “normal” years – could normally hit a population once or twice over a generation (about 30 years). The highest incidence of crises in Europe occurred during the century following the arrival of the plague in (1347). In Tuscany mortality peaked in 1348, 1363, 1374, 1383, 1390, 1400. In the period 1340-1450 a crisis (defined as a

threefold or greater increase over the normal number of deaths) occurred roughly every 9 years, and the average crisis represented a sixfold increase over the “normal” number of deaths (Livi-Bacci 1980). More or less the same frequency occurred in the other European countries – from England, where a *pestis secunda* is recorded in 1361 until a *pestis quinta* in 1391, to Russia with plague years in 1363-65, 1374-77, 1387-90 and 1396 (Livi-Bacci 1999: 73). In Tuscany, typhus-related mortality, in 1649, produced an increase of deaths 100 percent or more above normal in 25 out of 34 municipalities on record (Del Pantà 1980: 165). France, the largest country in Europe after Russia, suffered two devastating subsistence crises in 1693-94 and 1709-10, each one implying a doubling of the number of deaths. The frequency and intensity of crises declined during the 18th century, but the periphery of Europe continued to suffer until the 19th century: in Ireland the Great Famine produced an excess mortality of 1.1-1.5 million deaths in 1846-47 (at least a fourfold increase); in Finland famine induced mortality, in 1868, was three times greater than normal (Pitkänen 1993). A chronology would be out of place here: I wish only to make a general point. In a high mortality population (with a 3 percent death rate in “normal” years) a doubling of mortality – caused by plague, typhus, famine or other disturbances - would have caused an approximate decline of the population of 3 percent. Assuming that in normal times the population could grow at the speed of .3 percent (actually the population of Europe doubled between 1450 and 1750, with a rate of growth of about .2 percent), 10 years would be required in order to recover the pre-crisis size.

Things were a little more complicated than the above simple arithmetic calculations. The impact of the shock as well as the after-shock recovery were a function of many factors such as the cause and nature of mortality and its age pattern (smallpox killed the young, plague at all ages etc); whether or not the killing disease induced immunity in survivors; the negative impact on nuptiality and fertility and their rebounds; selection operated by migration. Figure 3 sketches the paradigm of a mortality crisis in a typical high mortality setting (Livi-Bacci 2000: 41). Let us assume that the mortality crisis was induced by an epidemic: its effects can be outlined as followed.

Deaths and mortality. The diffusion of the epidemic determined an increase in the number of deaths: as the number of non immune people decreases and the number of the immune increases, deaths, after reaching a peak, rapidly decline and bottom out at a level lower than the pre-crisis one. This is due to a double effect: the first is the

decline in size of the population, the second the weeding out, caused by the crisis, of the vulnerable, weak and frail in higher proportion than the rest of the population. As a consequence the number of deaths and the death rate fall below the pre-crisis level and this favorable effect lasts a few years before normality is restored.

Births and fertility. Conceptions usually decline when mortality increases, reach a minimum when mortality peaks and rebound to a maximum one or two years after the crisis. Births follow the same course with a nine months lag. The reason for the decline in conceptions are many: decline of new marriages; decline in sexual intercourse caused by stress; deliberate control; decline of fecundity because of starvation or infection. Increase in fetal losses may determine further decline in births. The rebound in conceptions and births may be due, among others, to the recovery of marriages, but also to increase of marital fertility. Even in non-controlling populations, there is evidence that cohorts formed after the crisis had a (natural) fertility higher than pre-crisis couples.

Marriages and nuptiality. When mortality increases, marriages are postponed or made impossible by death; after the crisis there is a recuperation of postponed marriages, an increase of marriages of widowed people, an acceleration of marriages made possible by transmission of property of deceased parents etc.

Natural increase. Strongly negative during the crisis, positive and higher-than-normal after the crisis, owing to the opposite rebounds of mortality and fertility. Return to normal patterns after a few years.

Mobility and migration. Increased out migration from the affected area during the crisis; outmigrants return after the crisis. Possible permanent losses of long-term outmigrants.

The textbook model outlined above maybe difficult to identify in the profile of many mortality crises of the remote (and less remote) past because of the varying combination of factors at play and the varying pattern of their insurgence and development. However, the forces indicated above are at work, and the paradigm recognized, in most mortality crises, included those induced by the two world wars of the 20th century.

IV

The depopulation of Europe in the century long period after 1348 had a profound impact on economy and society. Depopulation implied abandonment of farms and villages: all over Europe the number of *lost villages* increased. Demand for food declined everywhere, cultivations were abandoned and land turned into pasture (Slicher van Bath 1963). Prices of cereals declined everywhere and a shortage of manpower resulted in an increase of real wages. Demand for meat increased and diets improved, but this further stimulated the conversion of land into pasture (Boserup 1981: 95-96). The entire agricultural system underwent a profound process of extensification. The case of Languedoc, extensively studied by Le Roy Ladurie (Le Roy Ladurie 1969) can serve as an example in a variety of similar situations. Population reached a minimum in 1450 with a series of typical consequences. As elsewhere, villages were deserted and fields abandoned. Woods and forests regained the ground lost during the previous demographic growth cycle initiated in the 11th century. Stagnant waters expanded and so did fevers associated with them. Prices of basic staples went down, manpower was rare and wages went up. However there were additional interesting consequences concerning the distribution of land ownership. In Albi the extension of properties remained unchanged between 1343 and 1357, but the number of taxpayers went down from 1623 to 686. The mean size of holdings increased, since small ones disappeared or merged in larger units. This process of recomposition of farms and properties made economic sense in a system poor in labor but rich in land.

The population crisis produced also another interesting institutional change. Landlords were forced to be less exacting towards their bondsmen and tenants. The attempt to tighten the bonds of servitude failed, because it was easy to move or emigrate "and this emigration contributed towards the total disappearance of bondage in most of Western Europe (in the East it was on the increase). The only way to keep or attract tenants, *fermiers* or *métayers* was to give in to their demands and lighten their dues." (Duby 1972: 213). The crisis of the seigneurial estates went to the benefit of peasants. Another interesting phenomenon accompanied the recomposition of properties, and this was a process of restructuration of families in larger units. Married brothers and their families remained united in *frèrèches* under the authority of the father. Dotal and succession rules reinforced this process, and "all these rules underline the surprising strengthening of the family as an institution between 1300 and 1500. The extended family was a paternalistic and suffocating institution, but very protective towards

children with old and young couples bound for life.” (Le Roy Ladurie 1969). Writes Duby (Duby 1972:184) "while the demographic catastrophes and the concomitant migrations were leading to the disintegration of the family framework, it seems that the bonds of kinship grew tighter in the face of need. The large family units subject to the strict control of the eldest male again came into being, and the *affrèment*, fraternal joint-ownership associations frequently grouping together men from different families, increased in number. These compact groups were the only effective defense against the difficulties resulting from depopulation". The cities that had expanded until the beginning of the fourteenth century, were demographically and economically depleted and put in action policies favoring immigration.

Population decline in the plague age may have had yet another relevant consequence. In Italy, France and elsewhere, documentary evidence shows rather peculiar patterns of marriage, very precocious for women but much later for men. Working with the Florentine cadastre of 1427, Herlihy and Klapisch have derived an average age at marriage of 17.6 for Florentine women, that increased to 20.8 in 1480; men married on average ten years later (Herlihy and Klapisch 1978). Women of Prato married at 16.8 years on average in 1372 and at 21.1 in 1480. The trend in the countryside was similar, although age differences between brides and grooms were smaller. The situation in France – in Toulouse, Périgieux, Tours – was similar. Christiane Klapisch concludes that “throughout Europe, adolescents between 14 and 18 years old became the brides of men six to ten years older” (Klapisch 1988). Russell and Hajnal have reached similar conclusions for England according to the Poll Tax of 1377, although these conclusions have raised controversies. Little is known about pre-plague marriage patterns. The hypothesis has been made that the high nuptiality system prevailing in the late fourteenth and fifteenth century was a structural reaction to the devastating plague losses and a breaking down of the economic obstacles (scarcity of land, for instance) that restricted access to marriage. Besides the effects on the marriage system (up to now nothing more than an hypothesis), plague-related human losses put in motion rebounding mechanisms that determined a population recovery in the second part of the fifteenth century. In much of Europe – as in Languedoc - depopulation seems to have sorted the effect of reorganizing the surviving “human capital” in larger units (families) more efficient in dealing with a sudden increase of per-capita physical capital.

Certainly the best known and most extensively studied mortality crisis after the plague is the Great Irish Famine of mid-nineteenth century. There are many reasons for the great interest in the famine: it happened in the aglosaxon cultural area and this has converted the Famine in the focus of the developed world; it fits well the Malthusian paradigms; it has been seen as the crucial factor of the transformation of the Irish demographic and social system; it has been the most deadly episode in a large western population (Finland in the 1690s and Iceland in 1780 have suffered deadlier crises, but their populations were much smaller). Finally there is another aspect of great interest for our purposes: the Great Famine initiated a long-lasting cycle of population decline, from 8.2 million people in 1841 to 5.4 in 1871 and 4.5 in 1901. There is no other instance, among western nations, of a sustained population decline after the Industrial Revolution, if we exclude the case of the Democratic Republic of Germany whose population fell, between 1950 and 1990, from 18.4 to 16.2 million. Prior to Ireland, the last episode of a sustained and large decline is that of the German population in the first half of the seventeenth century as a consequence of the devastation of the Thirty Years war (a fall from 16,2 in 1600 to 9 or 10 million in 1650 in the area corresponding to 1914 Germany) (Pfister 1992).

Interpretations of the consequences of the Great Famine are not unanimous, but its demographic consequences are well known (Edward and Williams 1957; Mokyr 1983; Mokyr and O' Grada 1984; O' Grada 1993). The death toll of the potato blight was enormous: it has been estimated that 1.9 million died in 1846-50, with an excess of deaths of about 1.1 million (13.4 percent the population recensed in 1841); about 200.000 people per year left Ireland between 1847 and 1854. Age at marriage increased and the proportion remaining single declined, and mass migration (mainly to America) continued throughout the century. Fragmentation of land gave way to the recomposition of holdings in larger units. Inheritance customs changed. A classic interpretation of the events associated with the Famine is typically malthusian (Connell 1950). In Connell's view, a natural tendency of the Irish to marry early was inhibited by the difficulty of obtaining land on which to build a house and start a family. This obstacle was removed in the second half of the eighteenth century by a series of complex factors – among them the great success of the potato – which allowed the extension of farmland. As a consequence nuptiality increased and, together with a high natural fertility and a not too high mortality, this resulted in a high rate of growth. Population increased from 3.2 million in 1751 to 6.9 in 1821 and 8.2 in 1841. Connell wrote “In the late eighteenth and early nineteenth centuries it is clear

that the Irish were insistently urged and tempted to marry early: the wretchedness and hopelessness of their living conditions, their improvident temperament, the unattractiveness of remaining single, perhaps the persuasion of their spiritual leaders, all acted in this direction” (Connell 1950: 81-2). The increasing demand of foodstuff in England led to the expansion of arable land and to its subdivision for a fast increasing population of tenant farmers; subdivision was enhanced by the rapid diffusion of the potato as the main (and highly productive) food staple of the Irish. But this equilibrium became precarious as a result of excessive growth until the Great Famine permanently upset the old demographic and social order. During the following decades a new régime of land use and ownership and a new nuptial order (late marriage and high proportion of unmarried), supported by the large landowners and clergy, together with massive migration resulted in a steady decline of the population. The average age of women at first marriage increased from 23-24 between 1831 and 1841 (a level already higher than the one prevailing in previous decades) to 27-28 at the end of the century. The proportion of married women in fertile age declined and at the end of the century about one fifth of those above age 50 (and one fourth among men) had never married. Extraordinary mortality and massive emigration “emphasized the precarious nature of an agrarian system based on sub-division and potato culture, and particularly from the 1870s, the existing trend towards consolidation of holdings accelerated, strengthening the forces leading to emigration” (Clarkson 1982: 244). Certainly the fear of the repetition of the disaster had a profound impact at the individual as well as at the societal level.

Recent scholarly work has greatly deepened the understanding of the Irish case. Mass emigration was not initiated by the Famine but had been increasing in the preceding decades; age at marriage was probably not so precocious as many thought and an increase was already evident before the famine; profound differences existed – before and after the famine – between the east and the west of the country, that was far from being homogeneous, and responded in different ways to the catastrophe. The strains that exploded with the famine were already evident and it is legitimate (although not very productive) to think that they would have eventually led to a gradual abandonment of the old system. But the profound shock of the Famine certainly was more than a mere catalyst of the transformation.

Did Ireland perform, under the economic profile, less well than other European countries? According to Maddison (Maddison 1995), the average GDP per capita of 15 European countries in 1820 was 1142 dollars (Geary-Khamis 1990 dollars) against

954 for Ireland (Ulster excluded); in 1900, the European average was 2583 against the Irish 2495, with a gap considerably reduced in relative as well as in absolute terms. In 1820 only three countries (Russia, Finland and the part of the Austrian-Hungarian Empire corresponding to former Czechoslovakia) were doing worst than Ireland; in 1900 two more countries – Spain and Italy – must be added to the former three.

VI

The Great Irish Famine is not the last crisis typical of the old demographic régime in Europe. The northern and eastern periphery of Europe continued to suffer severe episodes emerging in backward rural contexts, generally the consequence of bad harvests. The 1860s were years of high mortality not only in small Finland (a threefold increase of deaths in 1868) but also in Russia where famines were recorded in 1872-3, 1882-84, 1892, 1906 and 1911. But from the 1870s famines became more localized than in the past, retreating from the North, the West and the Center of the country and the Black Earth region and concentrating in the Volga region, southern Ukraine and Northern Caucasus (Ademets forthcoming). Famine hit Russia again in 1921-22, causing a high number of deaths in the Volga region and Ukraine. However the 1921-22 losses are only the final act of the troubled decade initiated in 1914, compounding military and civil losses due to the world war and to the civil war, the effects of the influenza epidemic and those of the famine, and the general territorial, economic and social dislocation caused by the Revolution. “Excess deaths amounted to about sixteen million - soldiers and civilians who were killed or who died prematurely. Simultaneously, the birth rate temporarily declined, and as a result the number of children born in this period was ten million less than normal. At the beginning of 1923, the population was 4-6 million smaller than in 1914, and some 28 million smaller than it would have been if pre-war death and birth trends had continued” (Wheatcroft and Davies 1994: 57-8).

It is in the Soviet Union that the last European, hunger-related, catastrophic event took place. Accelerated industrialization, increased appropriation of grain from the peasants, forced collectivization, liquidation of the kulaks, production declines and hunger are the main links in the chain of events that led to the famine of 1932-33 and to millions of deaths. A recent estimate of the losses due to these series of events leads to a “plausibility range” of excess deaths between 5.6 and 13.4 million in the intercensal decade 1927-36, with a mid-range estimate of 9.5 million (Livi-Bacci 1993). Figure 4 shows the monthly series of death and conception rates for rural Ukraine in 1931-34. The sequence of events; the political determinants; the intermediate factors of the high

mortality and the demographic impact closely resemble the patterns of 1959-61 Chinese catastrophe following the Great Leap Forward.

The direct determinants of the crisis are evident: hunger, together with typhus and other epidemics, and outright starvation are certainly the immediate causes of human losses. Hunger was – at least partially – determined by a poor harvest in 1932: it is commonly held that the areas sown diminished, fields were not properly harvested and productivity in the collectives went down. Increased procurement and exports of cereals compounded their effects and deprived the producers in favor of urban populations or particular sectors of the population “entitled” to special treatment. The crisis was largely man-made, or policy-generated, quite different from other crises of the past. Other “intermediate” factors are likely to have amplified the crisis. The “great turn”, the “leap forward” and the brutal collectivization that went with them weakened the social fabric, crippled the traditional defenses to economic and social stress and amplified the effects of the economic disaster. These “intermediate” factors can be classified under different headings, each acting with different force, but all pushing in the same direction. The first factor was residential dislocation. Its negative effects were all too evident in the case of deportations which accompanied *dekulakisation*, but dislocation hit millions of migrants who built industrial “*konbinats*” or worked in gigantic public projects. The efficiency of mutual help in case of stress provided by the family or the community was probably lowered for millions of people. The mass phenomenon of abandoned children reappeared all over the Soviet Union. On the other hand, mobility was prohibited (re-introduction of internal passports; prohibition of the sale of railway tickets to farmers etc) when it might have been a counteractive measure to starvation and disease. Secondly, collectivization deprived peasants of some of their traditional buffers against nutritional stress. Private plots and individual trading was prohibited, thus eliminating an important source of food and income; forced to join the collectives, peasant slaughtered cattle, consumed stocks, and sold the tools thus thinning their means of survival. Thirdly, generalized collectivization dramatically changed social relations and shifted the locus of responsibility from the individual, the family or the community to large and anonymous collectives like the *kolkhoz*. Fourthly, concealment of the famine for its adverse internal and external political consequences was consistent and persistent, denying any organized form of famine relief, an extreme but often decisive help for the doomed. In short, the population was thus deprived of

those mechanisms of defense and protection against stress built and tested by many generations.

Are there other long term consequences of the 1932-33 famine? This is quite difficult to assess since the cataclysm of the second world war wiped out the traces of earlier events. However a political consequence is clear: the régime tried to conceal the catastrophe and the 1937 Census that revealed a population much lower than anticipated by Stalin (162 instead of 170 million) was “suppressed”, and the Census leading team liquidated. The “liberal” population policies enacted in the 20s, equating de facto unions and civil marriage, facilitating divorce, liberalizing abortion were dismantled in 1936 in favor of a policy supporting the family and restricting divorce and abortion (Blum and Darskij 1999). The change of policy was announced by Stalin in May 1935 in his speech “Man, the most precious resource”. The Soviet Union, not unlike Italy, Germany or Japan, became pro-natalist and pro-growth.

VII

In Europe proper - west of Russia - the 20th century demographic "seismic shifts" were due to wars, to the related human losses - civilian and military - and to the geopolitical revolution of the continent through population transfers, refugee movements etc. Due to the modifications of warfare between the first and the second World War - in 1939-45 warfare was less "labor intensive" and increasingly "technological" - the balance between military and civil losses has shifted, the latter having increased their share in the tally. With a relatively young age structure, fertility usually above replacement and long term falling mortality (excluding the war years) war losses were soon recovered by the European population, However, between 1913 and 1920 the population declined from 340 to 337.7 million (-0.7 percent) against an increase from 97.2 to 106.5 (+9.3 percent) in the United States (Svennilson 1954: 63). The age group 15 to 64, however, increased from 210 to 216.3 million (+3 percent). Military losses in the five largest belligerent countries - Austria-Hungary, Germany, Great Britain, France and Italy - were close to 6 million (out of a total of 10 for all of Europe, including Russia), over a total of 41.5 million of mobilized men (one in seven) (Becker 1999: 80).

Did the war losses affect the economic development? Human capital was depleted (mobilized men underwent a medical selection; the warfare exacted a high number of lives among officers; many of the survivor were sick or disabled). But the

issue is complex: one must not forget that Europe was losing population through migration in the years before the war, an outflow that came to an halt during the conflict, in some measure diminishing the negative impact of war losses. Moreover, during the war many women joined the labor force, replacing men in many activities, in the fields as well as in the factories. Many of these remained in the labor force once the war was finished. In the absence of reliable and comparable data on labor force, figure 5 relates the change in the male population of active age (15 to 64) between 1913 and 1920, and the change of GDP per capita over the same period for 15 European countries. The figure shows a positive association between the two indicators and does not reject the hypothesis that depletion of human capital went hand in hand with a weak or negative performance of per capita income. However it is likely that countries that suffered the most in terms of human losses were also those whose physical capital was most damaged by the conflict and the association recalled above may be partly spurious.

The case of France is interesting. It was the European country most deeply scarred by the warfare on its own territory, a strip 500 kilometers long from the North Sea to the frontier of Switzerland laid waste. Military deaths were 1.3 million, or 34 per thousand population, the highest rate in Europe (Becker 1999: 80). For a population with the lowest natural increase of Europe, the negative impact was serious. France had favored immigration during the war, particularly in the agricultural sector where the scarcity of manpower was particularly felt. Immigrants came from Spain, Portugal and Greece, but also from Indochina and North Africa. After the war the Government, faced with the task of reconstruction and the restructuring of the economy, initiated a policy of immigration (particularly from Italy, Poland, Czechoslovakia): between 1921 and 1931 the foreign population increases from 1.5 to 2.9 million, while .4 millions foreigners were naturalized French. The gross inflow of foreign workers, in the period 1921-30, was 1.7 million, mostly in agriculture, mining and manufacturing (Garden 1988: 106-7, 112) .

The case of Britain was different. Human losses were lower than France's (0.7 against 1.3 million), and Britain's demography was much more dynamic. It was quality, more than quantity that mattered. A common opinion was that the war had been "dysgenic" because it had stripped the country of the best young people: those who joined enthusiastically and early the armed forces and who were in the forefront of the battle, were also more educated and skilled. The myth of a "Lost Generation" was

created. J.M. Winter has tested the Lost Generation hypothesis against the available data: officers had proportionally more killed, wounded, missing and prisoners of war than other ranks. Members of the Universities of Cambridge and Oxford who joined the Army had a much higher proportion of casualties than average (Winter 1977). The negative effects of the war on the élites were further compounded by the gender asymmetry created in the marriage market forcing many women to renounce marriage and forgo reproduction. The higher toll of the élites in the war is proved by French and Italian data: officers' mortality was substantially higher than that of man of other ranks.

So one provisional conclusion is that war depleted the human capital in quantitative and qualitative way. In terms of per capita welfare, losses may have had a depressive impact, at least in the short term. In the case of France - where losses had been very serious - immigration provided a solution.

VIII

The consequences of the 1939-45 war were deeper than those of the war of 1914-18. Human losses were less pronounced in 1939-45 than in 1914-18 in France, the United Kingdom, Belgium or Italy; they were of the same order in Germany; they were much heavier in Eastern Europe and the Soviet Union. Living standard fell much more during the Second World War than during the First, and the destruction of the capital stock was much more extended and pronounced. Germany lost its territorial acquisitions, plus East Prussia and other territories west of the Oder-Neisse line. Forced migrations of ethnic Germans living in Poland and Czechoslovakia added millions of people to the Federal Republic of Germany. The redefinition of the borders added some 14 million people to USSR. More than 100 million people living in Eastern Europe were absorbed into the socialist political and economic system (Maddison 1972: 468-73). Separation of the effects of the demographic shocks from those of a political, social and economic nature goes beyond the forces of this author and – perhaps – beyond the scopes of the Conference. We have seen, however, that in terms of “potential growth” (the ratio of the 0 to 4 to the 30 to 34 people), the European countries in figure 1 were better off in 1945 than in 2000 or 1920. Economic reconstruction in western Europe and the quarter of a century of strong growth after the end of the war certainly benefited from a plentiful supply of cheap labor through immigration; this held down the cost of labor and goods, enhanced international competition, promoted mobility between economic sectors. Between 1950 and 1970, France, Germany, Benelux countries, Switzerland had a net immigration of about 8

million people, mainly coming from Italy and the Iberian peninsula, areas that were still generating large rural population surpluses and benefited from the migrants' remittances. So immigration was, for western Europe, an easy and convenient response to the war human losses.

IX

Developments of the late '80s and '90s in the former Soviet Union and in Central and Eastern Europe have not ceased to produce consequences and are not yet "history". But they offer many opportunities for meditation on the nature and effects of demographic shocks. Populations in this region have suffered a marked worsening of survival during the economic and political transition; fertility has declined way below replacement and negative growth has set in almost everywhere. The transition mortality crisis has been very severe in Russia and Ukraine, particularly for the male adult population. In Russia male expectation of life has declined from 64.2 in 1989 (more or less the level achieved in the 60s) to a minimum of 57.6 in 1994; the following recovery has been modest and it is estimated that in 1999 expectation of life was only 59.9, about 15 years below the level of the western populations. Among women, the fall of the expectation of life has been smaller, from 74.5 in 1989 to 71.2 in 1994. Declines in Ukraine have been about half those in Russia. It has been estimated that over the 1989-95 period the crisis has caused 2.6 million excess deaths in Russia and Ukraine (Cornia and Panicià 2000: 5). In Russia, expectation of life for men had started deteriorating since the late '60s; there was an improvement widely credited to the anti-alcohol campaign in 1985-7, than the decline resumed in 1988-91 and accelerated in 1992-94, with a stabilization in the following years. Increased mortality was particularly strong among adults 30 to 60 years old and was due, above all, to cardiovascular diseases, injuries and violence. Shkolnikov and Cornia (Shkolnikov and Cornia 2000: 272-7) have explained the crisis under five different headings:

(1)*Rising poverty*. Poverty soared from 10 percent in 1991 to 30-40 percent in 1993-94 - increasing malnutrition and undernutrition. However the authors estimate that the impact must have been reduced, owing to the modest increase of poverty-related diseases, such as infectious, parasitic and respiratory diseases.

(2)*The collapse of the health system*; this, however, seems unable to explain the increased incidence of cardiovascular attacks and of violent and accidental deaths.

(3)*The weakening of the state* – testified by the increase in homicide and injury rates, caused by the erosion of law and order. The authors underline also the inability of Russian leadership to recognize the gravity of the problem and to cope with it with adequate policies.

(4)*Adverse change in lifestyles* such as smoke and, particularly, alcohol, this latter closely related to the staggering increase in violent deaths as well as with a wide range of causes of deaths.

(5)*Rising psychosocial stress*. In transitional societies, unemployment, job insecurity, family instability, personal insecurity, marginalization, changes in social hierarchies – all factors of psychological stress and disadaptation - have been rising and, in the opinion of the authors, contributed to the rise of mortality.”Stress and mortality rises were less marked among women, the youth, people in stable employment, married people and people with higher education” (Ibidem: 277). Alcohol consumption is closely associated with stress. Figure 6 shows the negative association between the absolute decline in expectation of life in the various regional areas of Russia, between 1989 and 1993 and a “stress index” summarizing the impact of changes in unemployment, labor turnover and marital status over the same period.

The Russian case – as well as events in other countries of former USSR and Central and Eastern Europe – suggest two relevant reflections. The first is that extended survival is a complex achievement, consequence of the incremental accumulation of material resources, scientific knowledge, technological advance, efficient social action and policies, correct personal behavior, control of the environment. Extended survival must be sustained, it is not irreversible, and it is jeopardized by a profound crisis – first of all political, but also economic and social – such as that undergone by former USSR populations in the ‘90s. The second consideration concerns the relevance of psychosocial stress among the factors determining the mortality crisis and, therefore, the importance of policies able to reduce or buffer stress, such as labor policies, policies against social exclusion, measures enhancing personal security.

X

We have dealt with a series of crises – or shocks, seismic shifts, catastrophes - of the past in the western world. These were due to a variety of causes that range from those completely exogenous to the demographic system, such as the plague, literally

“disembarked” from ships coming from another continent, to those that were completely endogenous, such as famines generated by the inability of the economic system to cope with a growing population. Of course the concept of “endogenous” and “exogenous” depend on the definition we give of a “demographic system” that can be alternatively seen as a simple interplay of pure demographic phenomena, or as a complex web of interactions between demography, economy, society and biology.

In closing these pages it maybe of some interest a recapitulation of the possible impacts of crises and shocks on demography, economy and society.

Demographic consequences: losses and rebounds. Crises have a demographic impact, in the sense that excess deaths (for instance) and deficit of births determine a certain decline or a negative “deviation” from the trend. Moreover, there is a selectivity of mortality (by gender, age, frailty, social characteristics etc.) that has an impact on subsequent demographic growth, determining “rebounds” in the short or the medium period (figure 1) that buffer short term losses. Consequences may also be of negative nature, because cohorts most affected by the crises may later suffer higher mortality than those not touched by it (Caselli et al. 1987).

Demographic consequences: structural changes. Crises may have a permanent demographic impact, in the sense that they might determine, or open the way for, long lived or permanent modifications of the demographic system. The hypothesis has been advanced that the plague might have caused early and high nuptiality, typical of the late 14th and 15th century, that has accelerated the recovery of population. In the case of Ireland, the Great Famine has opened the way for a transition to a system of late and low nuptiality and – perhaps - has made emigration a permanent strategy of Irish families. In the case of Central and Eastern Europe, the recent transition may have (according to points of view) favored, accelerated or determined the passage to the current very low fertility – way below replacement – as an adaptive response of families to economic hardships, curtailing of welfare, rising insecurity, competing appeal of new consumption models.

Economic consequences. In rural society, crises have raised the ratio of capital (land) to labor, increased the price of labor, apparently improving the standard of living. After the plague there was a process of “deintensification” of agriculture, recomposition of land holdings, decline in prices and increase in real wages. A process of recomposition of land holdings took place in Ireland after the Famine. Historically,

after serious subsistence crises new cultivation – as the potato or maize – have become popular in many areas of Europe, finding a central place in the diet. In general, in rural societies, post crises societies seem not to have impeded (some would say: seem to have determined) an increase in personal welfare. Modern wars, on the contrary, causing destruction of physical capital as well as of human capital, determine a decline of personal welfare in the short or medium term.

Human capital. Post-plague societies tended to “reorganize” human capital in more efficient ways, particularly through the restructuring of family units in larger and more structured groups. Settlement was reorganized, abandoning isolated units or depopulated villages. Policies fostering urban immigration were enacted. Emigration and immigration have been powerful adaptive strategies: emigration for overpopulated Ireland, immigration for depleted French society after the First World War and for western European industrial countries after the Second World War.

Institutions and policies. These may go in a plurality of directions and their categorization is a difficult. A few instances have been mentioned, such as the loss of power of seigneurial estates in favor of peasantry after the plague or urban immigration policies. Another example is the gradual establishment in all of Europe of “boards of health” which monitored epidemics and reacted accordingly with measures of quarantine, cordon sanitaire, blockade of merchandises, patents of ships and the like. Or the progressive assumption by the state and public authorities of relieving citizens in case of sacristy and famine, through massive purchases, procurement etc. One could also cite the change in population policies enacted by Stalin in 1936 after the 1932-3 catastrophe, although one could find many other political reasons for it.

In general one could say that the adaptive responses to crises depend very much on the characteristics of societies affected, on their flexibility and ability to adjust at the societal as well at the individual level. This flexibility was probably much higher in rural societies with a moderate degree of specialization of functions, where people could easily replace one another. The labor force was the entire pool of able bodied men and women: ability to work, rather than age, was the important factor. Crises in rural societies had an impact because of the degree of depletion of human capital rather than because of the characteristics, as age distribution, of the losses. Families would easily reorganize themselves in more efficient units in order to provide labor and solidarity. Crises, and their consequences, are much more severe when the traditional mechanisms of solidarity, coping strategies, economic buffers are destroyed.

This was the case of the 1932-33 crisis in the USSR where universal collectivization (going to the extreme of prohibiting cultivation of plots for personal use) deprived individuals of a traditional mode of life making them more vulnerable to hardship. Societies open to immigration were, and are, much less vulnerable to the consequences of human losses.

Conditions at the beginning of the millennium, in the rich world, are structurally very different. Low fertility and aging, in Europe and Japan, are at the base of the prospective negative demographic dynamic. We have seen, at the beginning, that replacement levels are much lower than at any crucial point of European history, perhaps with the exception of the plague times. The future will depend on (a) the ability to correct ongoing negative trends, through a recovery of fertility; (b) opening up to immigration; (c) social flexibility, through a reconsideration of the “age” and “gender” patterns of social functions. (1 Maggio 2001)