

Recent Forecasts of the Future Growth of Population in Italy

1. As readers will be aware, there are many methods in use for the purpose of estimating the future size of a country's population and its composition by age-groups. Not only can many different assumptions be made, and combined in different ways, but there are also numerous different procedures which can be adopted. As regards the underlying conception however, all the methods can be reduced to three main categories: (a) projection to a future date, or extrapolation, of the total number of the population; (b) extrapolation of the time-series of births and deaths; and (c) calculating the future population on the basis of fertility and mortality trends.

(a) To use the first method means neglecting the component elements which make up the total population and concentrating attention on this latter as the sum of those components. In this case one would have to select a mathematical function able to represent the past trend. Then by interpolating the corresponding curve between the known figures and prolonging it beyond the interval to which those figures refer, the theoretical values required will be obtained (1).

(b) In the second method one starts from the time-series representing the absolute figures of births and deaths and also, possibly, of migration. One next finds straight lines or exponential curves to fit these series. By extrapolation from these one estimates the figures for future births and deaths, and possibly for emigration and immigration;

(1) The choice of the fitting function is of course arbitrary. The simplest assumptions which can be made are that population is moving in arithmetic progression, in which case the fitting function will be a *straight line*, or in geometric progression, in which case it will be an *exponential curve*. Another type of curve which in some cases serves adequately to describe the development of populations is the *logistic curve*, and it is often used for that purpose.

and from these figures one arrives at the total population by simple arithmetic.

The two methods (a) and (b) are somewhat rough, and among other defects they throw no light on the future age-grouping of the population (2).

(c) The third method is to calculate the future population in terms of individual age-groups. The first step is to set down the age-groups as shown by the census. To these one applies the proper probabilities of dying as shown by the life tables (3), while the figures for age-groups to be formed in future from the newly born are determined on the basis of the current specific fertility rates (4). This assumes that both the probability of death and the specific fertility rate will remain unchanged over a period of time. Such an assumption is often unreal, especially for forecasts covering a lengthy period. One way

(2) With method (b) one can neglect migration and make the forecast on the basis of the natural population movement alone. This may be an advantage, since migration usually depends on economic and political factors, and is therefore subject to abrupt change. In fact migration generally is neglected in population forecasts, the results of these, if need be, being corrected on the basis of the most plausible assumptions as to its future extent.

(3) For example, the individuals found by the 1951 census to be at ages from birth to 4 years will in 1956 be those living at ages of 5 to 9 years. To estimate the number of these latter however the numbers found at ages from birth to four years will have to be reduced. It can be assumed that they will be eliminated by death during the five year period in a proportion corresponding to the risk of death at each age, which can be taken from the life tables.

(4) Clearly, if the method described in the previous note is followed, a constantly growing number of age-groups will be left uncovered as the forecasts are extended to more distant dates. If the forecasts reach 10 years ahead, the ages from birth to 9 years will be left uncovered; if they reach 20 years ahead, the ages from birth to 19 years will be left uncovered, and so forth. The figures can be found only on the basis of the fertility rates, which make it possible to estimate the numbers to be born in future years. These numbers will then have to be corrected by applying the coefficient of the death rate for the population, so as to evaluate the year-to-year reduction.

of dealing with this drawback is to take not the actual current rates for probability of dying and specific fertility, but theoretical rates. These may be obtained by extrapolation from the time-series representing past rates, or they may be deduced from assumptions as to the future trends. One may for instance assume that fertility and mortality will remain the same; or that fertility will fall while mortality is unchanged; or that both fertility and mortality will fall, and so forth (5).

This third method entails somewhat laborious calculation, but is undoubtedly the most logical (6).

2. As will be readily understood, the value and significance of forecasts resulting from such calculations will vary according to the assumptions on which they are based.

Italian demographic literature contains many reports of research work aimed at calculating the future population growth. The fullest calculations were made by the Central Institute of Statistics in 1930-31 on the initiative of Professor C. GINI, who was at the time President of the Institute, and extended to the year 1970 (7). They may be regarded as a model of their kind, since they comprised separate calculations made according to each of the three methods described above, in each case on the basis of several different assumptions.

However, after the derangement caused by the second world war it was found necessary to make new forecasts taking account of the more recent population trends. The following is a brief statement of the most important Italian and international forecasts.

(a) Recently SVIMEZ (8) commissioned Professor G. DE MEO to make forecasts of

(5) If it is assumed that fertility or mortality will increase or decrease at rates not representing extrapolation of past trends, it will of course also be necessary to determine the degree in which such increase or decrease is to be assumed to take place.

(6) Like method (b), this method neglects migration. Evidently it will indicate not only the total future population, but also its distribution by sex and age.

(7) C. GINI and B. DE FINETTI, *Calcoli sullo sviluppo futuro della popolazione italiana*, in « Annali di Statistica », Series VI, Vol. X, 1931.

(8) *Associazione per lo Sviluppo dell'Industria nel Mezzogiorno*.

population growth with particular reference to Southern Italy. The results of his calculations, which extend to the year 2000, have been published in book form (9).

(b) A short-term forecast by Professor S. SOMOGYI, relating to the period of twenty years from 1950 to 1970, was also published a little time ago. He made it on behalf of the working party dealing with population forecasts which was formed within the « Parliamentary Commission of Enquiry into Unemployment » (10).

(c) Mention may next be made of certain studies which were carried out on the international plane.

Ten years ago the League of Nations published the results of calculations by F. W. NOTESTEIN and other research workers, which covered the period from 1940 to 1970 and related to the various countries in Europe as well as the whole of the Soviet Union (11).

More recently the « Institut National d'Etudes Démographiques » in Paris set out to determine the probable future population in the principal countries of Europe within the framework of the problems as stated in terms of that continent. It entrusted this task to J. BOURGEOIS-PICHAT, who proceeded to make the calculations for a period of thirty years from 1950 to 1980 (12).

Thus there are a number of statements available with regard to the presumable future

(9) SVIMEZ, *Popolazione e forze di lavoro. Prospettive demografiche fino al 2.000 per l'Italia meridionale, Sicilia, Sardegna, Mezzogiorno, Italia*. Rome, 1952.

(10) S. SOMOGYI, *Previsioni demografiche a breve termine per l'Italia (1950-1960)*, in « Atti della Commissione parlamentare d'inchiesta sulla disoccupazione », Vol. II, Part 3, Rome, 1953. In actual fact the study is confined to the ten years 1950 to 1960; but Somogyi extended the forecasts to 1970, giving the figures in a paper which he presented at the « Journées européennes de population », 21-23 May 1953, in Paris. The paper was published in the records of that Conference (S. SOMOGYI, *Perspectives démographiques pour l'Italie jusqu'en 1971*, in « Etudes européennes de population », published by INED, Paris, 1954).

(11) LEAGUE OF NATIONS, *Future Population of Europe and the U.S.S.R. Forecasts of Population 1940-1970*, by F.W. Notestein, I.B. Taeuber, D. Kirk, A.J. Coale, and L.K. Kiser, Geneva, 1944.

(12) INED, *Les problèmes de population européenne*, II, J. BOURGEOIS-PICHAT, *Perspectives sur les populations*, in « Population », No. 1, January-March, 1953.

size of the population of Italy. The very fact that there are so many of these statements makes it desirable to present a comparative study of them. Otherwise, in view of the more or less considerable divergence between the results found by the various authors, doubts might well arise as to the meaning of those results and as to how far they hold good.

3. Table I collates the results of the relatively recent forecasts. In all cases the method of calculation is that described in paragraph 1 (c). If the figures relating to very distant dates are excluded, the differences between the different results are relatively small, although not negligible.

(a) The lowest figures are those calculated by *Notestein* for the League of Nations.

Notestein's calculations — which, as stated, refer to all European countries — have been made in accordance with a special procedure which leads one to foresee a very steep decline both of death and fertility rates in those countries where the prewar rates were high, and

viceversa a slight decline in those countries where they were already low (13).

The population of Italy as calculated by *Notestein* for January 1st, 1950, namely 46,060,000 (14), is appreciably less than the 46,738,000 actually found by the census of 4th November, 1951. If allowance is made

(13) The *average* demographic tendencies observed in the various countries have been used as the basis for the projections. In the case of mortality for instance it has been assumed that the future course of the specific rates representing the probability of death at the various ages in each country, starting from the level observed before the war in each of them, will be similar to the *average* movement observed in Europe in the past. In the same way, in the case of fertility it has been assumed that the future movement of the specific rates of fertility in woman at the various ages will be characterised in each country by a relation between the basis level of the rates and their rate of decrease equal to the *average* recorded in the various countries, with the average for the period between the two world wars assumed as the basis level.

The fact that the declines in mortality and fertility are in direct relation with the respective levels of the rates has been empirically ascertained, but if we base our calculation on that fact, the extent of the changes in trend may be exaggerated.

(14) The forecast was in fact 47 million, but the figure stated represents the population reduced to that within the new frontiers.

TABLE I
MOVEMENT OF THE ITALIAN POPULATION ON THE BASIS OF DIFFERENT ASSUMPTIONS
(thousands)

| Estimates and census | 1950 1951 | 1955 1956 | 1960 1961 | 1965 1966 | 1970 1971 | 1975 1976 | 1980 1981 | 1985 1986 | 1990 1991 | 1995 1996 | 2000 2001 |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <i>Estimates A</i> | | | | | | | | | | | |
| S.d.N. (<i>Notestein</i> and others) | {(46,060) 47,000 | {(47,130) 48,100 | {(47,922) 48,900 | {(48,412) 49,400 | {(48,550) 49,500 | | | | | | |
| INED (<i>Bourgeois-Pichat</i>) . . | 46,432 | 48,106 | 49,418 | 50,492 | 51,356 | 51,990 | 52,402 | | | | |
| Somogyi: Assumption A . . | 46,439 | 48,109 | 49,764 | | | | | | | | |
| » B . . | 46,439 | 48,366 | 50,620 | | | | | | | | |
| » C . . | 46,439 | 48,095 | 49,721 | | | | | | | | |
| » D . . | 46,439 | 48,079 | 49,607 | 51,350 | 52,601 | | | | | | |
| Svimez (<i>De Meo</i>) minimum assumption | 46,830 | 47,804 | 48,492 | 48,830 | 48,730 | 48,184 | 47,413 | 46,264 | 44,804 | 43,077 | 41,343 |
| Svimez (<i>De Meo</i>) medium assumption | 46,959 | 48,729 | 50,291 | 51,587 | 52,448 | 52,987 | 53,393 | 53,506 | 53,388 | 52,996 | 52,316 |
| <i>Estimates B</i> | | | | | | | | | | | |
| Svimez (<i>De Meo</i>) minimum assumption | 45,910 | 46,654 | 47,112 | 47,220 | 46,890 | 46,114 | 45,113 | 43,734 | 42,046 | 40,087 | 38,023 |
| Svimez (<i>De Meo</i>) medium assumption | 46,039 | 47,579 | 48,911 | 49,977 | 50,608 | 50,917 | 51,093 | 50,976 | 50,628 | 50,006 | 49,096 |
| Census | 46,738 | | | | | | | | | | |

Note: Estimates A are determined on the basis of the natural movement only; estimates B include also migratory movement. S.d.N.'s estimate is related to the pre-war boundaries. The figures calculated for the new boundaries are in brackets. The significance of the various assumptions is given in the text.

for the fact that the forecast relates to a date nearly two years before that of the census, it may be estimated to fall short of the actual figure by about 100,000 (15). But it must be borne in mind that the calculations assumed net migration to be nil, whereas in fact it certainly resulted in Italy losing more than 700,000 inhabitants during the 15 years from 1936 to 1950 (16). It thus becomes clear that *Notestein's* 1950 figure falls short by at least 800,000 (17) of what the population would have been at that date if there had been no migration during the previous 14 years.

This marked difference between forecast and reality indicates that in the case of Italy *Notestein's* assumptions lead to a forecast falling well short of the true figure. Yet the recent population trends in Italy seem to show that the rate at which fertility is declining has become slower, while mortality is about stable (18). One cannot therefore rule out the possibility that the effects of these two facts may cancel each other out to such an extent that the present difference between forecasts and reality will become no greater in the future. There is however nothing to indicate that this difference may become smaller (19).

(b) *Bourgeois-Pichat's* forecast starts from the position in 1950, so that it cannot yet be checked against the actual development. His calculations are based on the assumption that the specific mortality and fertility rates will

(15) The figure of population as calculated by the Central Institute of Statistics at the end of 1949 was 46,121,000.

(16) Net emigration during the ten years 1936-45 was practically negligible, amounting to perhaps 50,000 to 70,000, owing first to the policy of repatriation and then to the war (see Tables 419 and 420 in *Annuario Statistico Italiano*, 1953). In the next period of five years however it may be estimated at over 650,000 (see « *Atti della Commissione d'inchiesta sulla disoccupazione* », *Relazione del gruppo di lavoro per i movimenti internazionali del lavoro*, Vol. II, Part 3, page 240).

(17) This figure represents a conservative estimate of the under-valuation, which might even be greater, as is suggested by the result obtained further on (see note 32).

(18) As from 1952 the generic birth rates have been declining at a slower rate, having been 18.5 in 1951, 17.6 in 1952 and 17.5 in 1953. The death rate on the other hand has been stable at around 10 per thousand since 1950, being 9.8 in 1950, 10.3 in 1951, 10.1 in 1952 and 10.0 in 1953.

(19) Actually the average natural increase from 1936 to 1949 was 8.3 per thousand, being the same as during the four years 1950 to 1953.

remain stable at the levels observed for mortality in 1950 and for fertility in 1950-52. He did however apply a correction to the fertility rate so as to allow for the typical post-war overtaking of the arrears of births, that is, of births which did not occur during the war, either because marriages were postponed or because procreation was interrupted, the result of such overtaking of arrears being of course artificially to raise fertility rates.

The assumption that current rate trends will remain stable is the simplest which can be made. It appears reasonable enough in the present state of demographic evolution in Italy, and thus meets fairly well the requirements of a short-term forecast. But the correction which is thus applied to fertility rates, and which for other European countries reduces the synthetic rate (20) by about 7%, brings it down in Italy by 13%. This difference between Italy and other countries may not be entirely due to the greater war-time and post-war derangement. It might indicate a lasting change in the reproductive behaviour of Italian married couples. In that case the level of fertility assumed by *Bourgeois-Pichat* as a « stable level » would be found unduly low. On the other hand stability in the death rate can be assumed only for dates in the very near future; on a longer view the rate must be expected to fall further, even if not by very much (21). Accordingly, while *Bourgeois-Pichat's* forecasts seem plausible for the immediate future, they probably under-estimate the population as from 1960-65.

4. We now come to the Italian forecasts.

(a) *Somogyi* also starts from the figures of population at the end of 1950 and, in so far as he makes short-term forecasts, he bases them on relatively simple methods of calculation. He works on four separate assumptions.

Apart from a few variants the first assump-

(20) The synthetic rate employed by *Bourgeois-Pichat* is the « gross reproduction rate ». It gives the average number of daughters who would be born to each woman during her whole reproductive life, if all women were to survive until the end of child-bearing age.

(21) Let it not be forgotten that the Italian death rate, especially among infants, is still high by comparison with the levels in more advanced countries.

tion is substantially the same as that made by Bourgeois-Pichat, namely that the specific fertility and mortality rates will remain constant at their initial levels. Accordingly he reaches almost the same results. For 1955 the two authors virtually agree on a figure of about 48,100,000. They diverge slightly for 1960, when Somogyi puts the figure at 49,764,000, while Bourgeois-Pichat has it about 350,000 lower. This is because Somogyi has not applied to fertility rates the reduction discussed above.

Somogyi's second estimate is a good deal higher, exceeding the first by nearly a million for 1960. This is because it assumes that fertility will remain unchanged at 1950 levels, while mortality will fall in geometric ratio during the next ten years until, in 1960, it reaches the level observed in 1950 in the Netherlands. This is of course an extreme and highly optimistic assumption (22), since it is difficult to conceive that the death rate could show so great a further decline in so brief a period.

The third assumption is similar to the first, differing from it only in certain minor details. It accordingly results in figures very close to those found on the first assumption.

The fourth assumption was made by Somogyi with a view to extending his forecasts to 1970. It is that the present downward trend in fertility will last until 1955, after which it will flatten out, but that mortality will continue to decline in geometric progression until in 1970 it reaches the average level observed in 1950 in the four low-mortality countries Norway, Denmark, the Netherlands and New Zealand. This assumption, which appears very reasonable, results in future population figures slightly lower than those found on the first assumption. They are however well above those forecast by Bourgeois-Pichat, especially from 1960 onwards. In fact, whereas the difference in that year is less than 200,000, it rises by 1970 to more than 1,250,000.

(22) The death rate in the Netherlands in 1950 was 7.5 per thousand as against 9.8 per thousand in Italy. During the next years the Italian death rate, so far from going down, varied around 10 per thousand.

(b) *De Meo's* forecasts start from the 1931 position and extend to 2001, so that they are long-term in character. In such forecasts it is always desirable to make the calculations on more than one assumption. That has in fact been done by De Meo, who has considered a number of different possibilities for Southern Italy. For the whole country however he has confined himself in substance to two assumptions only. He rules out stable or rising mortality and fertility rates, and assumes that both will in future tend downwards. In each case however he has assumed two different percentage rates of reduction of the specific rates between 1931 and 2001. In the first case the reduction is more marked, with «medium mortality» and «low fertility»; in the second it is less so, with «high mortality» and «medium fertility». In both cases the reduction varies as between different ages. The combining of the two assumptions for fertility and mortality could have produced four sets of forecast figures. De Meo however has considered only two sets. The first represents an extreme pessimistic assumption of «low fertility» and «high mortality»; the second is based on the assumption, which he thinks more likely, of «medium fertility» and «medium mortality».

To realise their bearing, it should be noted that: 1) on the assumption of «low fertility» the gross reproduction rate (23) would decline from 1.66 in 1931 to 0.73 in 2001, whereas on that of «medium fertility» it would drop from 1.66 to 0.98; and, 2) on the assumption of «medium mortality» the average expectation of life at birth (24), which was 54.9 years in 1931, would rise to 68.6 years, while on the assumption of «high mortality» it would go up to 66.2 years.

As will be seen, the percentage rates of reduction are substantial, both for fertility and for mortality (25). Actually the «me-

(23) The meaning of this index is explained in footnote 20.

(24) As is known, the average expectation of life at birth as calculated from the life tables is the number of years which each new born would live, on the assumption that the total length of life of all children born in a given year be equally divided between them.

(25) They are taken, with certain modifications, from those used in the United States in some recent forecasts: U.S. DEPART-

dium fertility» assumption, which puts the gross reproduction rate at 0.98 in 2001, makes it 1.29 in 1951, while the «low fertility» assumption of 0.73 in 2001 means a rate 1.11 in 1951 (26). As against this the observed gross rate in 1950 was 1.22 (27). It was thus well above that forecast on the minimum assumption, but also considerably below that which the medium assumption gives. From this it may be deduced that the downward trend in fertility during the twenty years from 1931 to 1951 was more pronounced than it would have been on the assumption which De Meo thought the most reasonable.

As to mortality, the absence of recent life-tables (28) makes it impossible to check precisely how far the figures forecast agree with present facts. It may however be remarked that the infant mortality rates (under 1 year of age) as recorded in 1951 were 69.1 per thousand for males and 60.4 per thousand for females. These figures are well below those obtained on the «high mortality» assumption, which are 84.6 per thousand for males and 75.1 per thousand for females; and they are also lower than those found on the assumption of «medium mortality», namely 75.5 per thousand in the case of males and 66.9 per thousand in that of females (29). Although the reductions in infant mortality have been greater than those in mortality in general, it seems fair to conclude that up till now both the «high mortality» and the «medium mortality» assumptions have turned out to be pessimistic.

Accordingly the more plausible final forecast, combining the assumptions of «medium fertility» and «medium mortality», amounts

MENT OF COMMERCE, BUREAU OF CENSUS, *Forecasts of the Populations of the United States, 1945-1975*, United States Government Printing Office, Washington, 1947. The whole procedure followed by De Meo is in fact similar to that used in the United States forecasts.

(26) These rates are derived from the specific rates forecast on the two assumptions as shown in Table 24 on page 164 of the book cited in footnote 9.

(27) This figure is given by Bourgeois-Pichat, loc. cit., Table III, page 32.

(28) As will be remembered, the last Italian life-tables for both sexes are those calculated in 1931, and for the female sex alone those of 1936.

(29) See op. cit., Tables 22-23 on pages 162-3, showing the specific mortality rates forecast on the basis of the two assumptions.

to setting off two over-estimates against each other, although the offsetting effect is not enough. Actually De Meo calculates the population as on 21st April, 1951 to be 46,959,000 before allowing for migration, whereas the census showed it to number 46,738,000 on 4th November in that year. If allowance is made for the interval of roughly six months between the two dates 21st April and 4th November, the difference is increased to approximately 350,000 (30). This difference however still falls short of the loss suffered by the entire Italian population through emigration between 1931 and 1951. De Meo himself puts that loss at over 900,000, although according to the available sources it was actually about 850,000 (31).

De Meo did in fact wish also to estimate the effect of migration on changes in the Italian population. With this in view he stated two assumptions. The first was that emigration would cause a constant annual loss of 46,000; the second was that the annual loss would be reduced by 10,000 in each ten-year period from 1971 onwards because the pressure of population would be smaller.

In the upshot both the figures for the 1951 population which De Meo gives after allowing for migration are smaller than the total shown by the census. The figure resulting from the assumption of medium mortality and medium fertility, which De Meo thought the more reasonable, is 46,039,000 as at 21st April, 1951, as against 46,738,000 found by the census on 4th November. Even if allowance is made for the interval of six months between the two dates, one may reckon that De Meo's forecast falls short of the true figure by more than half a million (32).

(30) The average of the figures of population calculated by the Central Institute of Statistics as at the end of 1950 and the end of 1951, which may be taken as being an over-estimate of the population on 21st April, 1951, is in fact 46,600,000.

(31) Compare the sources indicated in footnote 16.

(32) This conclusion does not fully agree with that which we reached when criticising the findings of Notestein (see page 61), which we thought to be too low by more than 800,000.

Notestein's figure falls short by 900,000 of that found by De Meo before allowing for migration; but the difference may be taken as being reduced to about 400,000 if allowance is made for the fact that the figures relate to two dates sixteen

True, such a gap between forecast and fact is small for the period of twenty years from De Meo's starting date of 21st April, 1931. One must however not forget that he under-estimated the drop in both mortality and fertility, and that the two under-estimates roughly cancelled each other out. This coincidence may not last. But some different arithmetical process may in future produce similar effects (33), so that De Meo's figures, forecast on his medium assumption, may still remain not very far from the actual numbers of the population.

5. It is not possible in the present article to go beyond this analysis of the various forecasts. To accept one of the forecast figures or another, or to put forward a new figure, would mean making fresh calculations on the basis of different assumptions. That has not been our intention, since the main object of the article was to bring out the meaning of the available forecasts. In any event the movement in the Italian population is now at a phase in which it is particularly difficult to foretell the probable future trends. Be this as it may, it does seem fair to draw one definite conclusion from the various forecasts. This is that the population of Italy will probably continue to grow for at least a quarter of a century, although more slowly than hitherto.

In fact those calculations which go beyond the next twenty years still show an increase at least until 1980. There is an exception in the case of the minimum assumption of De Meo, on the basis of which the peak would be reached as early as 1966-71. But, even in the improbable event that the present population trends should change so that *in future* they conformed to De Meo's minimum

months apart. If therefore De Meo under-estimates the true figure by more than half a million, Notestein would be under-estimating it by 900,000. This slight divergence between the two conclusions is due to the uncertain and approximate character of the data which can be taken as a basis for allowing for the effect both of migration and of changes in the total population between one reference date and the other.

(33) The tendency to approximate stability which now seems to be appearing in the rates of both mortality and fertility might in fact produce a similar result.

assumption, the date of reaching the peak would still be postponed owing to the effect of the movements which have taken place *up till now*.

However, even though Italy may rely with some certainty on her population continuing to grow for a further twenty or thirty years, the increase must be expected to be rather small. Short of radical changes in the trends of natural movement, or of a virtually complete stoppage of emigration, the total will not go beyond 52 or 53 million. In other words the further addition which may be expected cannot be much more than 5 million (34). Accordingly over a period of 25 to 30 years the population increase may be expected to amount to between 10% and 12%. The increase in the first 25 years of this century was 22%, and in the next 25 about 18%, in spite of the very large losses due to migration and the effects of several wars including the two world wars. These facts show the full significance of the slowing down in the rate of increase.

6. Such a conclusion might have seemed absurd even as late as 1931, when it was forecast that the population would number about 50 million in 1951 and more than 53 million in 1961 (35), so that the increase would amount to more than 27% between 1921 and 1951 and to some 37% between 1921 and 1961. In comparing the 1921 population of Italy and other countries with that forecast for 1951 Professors Gini and De Finetti concluded that, during that period of 30 years,

(34) In point of fact the peak figure forecast is that on the basis of De Meo's intermediate assumption. This is 53.5 million for 1986 if migration is nil, and about 51 million if allowance is made for emigration. Even if one allows for the fact that De Meo's figures may be lower than those which can be actually expected, it is not easy to conceive figures higher than 53 million if one admits that a certain amount of emigration will continue.

(35) In point of fact the forecasts of C. Gini and B. De Finetti (*op. cit.*) give the figures which are reached on the assumption that both fertility and mortality will decline at a rate equal to that recorded from 1921 to 1928 (assumption III-C), with the net loss from emigration estimated at 40,000 per annum. These forecasts of course relate to the old frontiers of Italy; but, if they are reduced by adjustment to the present frontiers, the figures do not greatly fall. They then become 49 million for 1951, rising above 52 million for 1961.

the population increase in Italy would be not only well above that in France — which was foreseen to be entering the stage of decline — but would also greatly exceed that in Great Britain, Germany and Denmark (36). The real facts have been somewhat different, as can be seen from Table II, which sets the actual figures for 1951 against those forecast, in each case in percentages of those for 1921.

In point of fact it is only in the case of Italy that the increase forecast was greater than that which really occurred. In all the other countries, on the contrary, the real figures were greater than those forecast (37). This happened because in Italy the rate of decline in fertility exceeded that in mortality, whereas in the other countries covered by Table II, owing to an unexpected reversal of trends which took place about 1935 to 1940, fertility rose to levels well above those which were thought to be foreseen.

TABLE II
POPULATION OF 1951 IN PER CENT OF THAT IN 1921

| Country | As forecast | Actual figures |
|-------------------------|-------------|----------------|
| Italy | 127.4 | 125.8 |
| France | 98.8 | 108.4 |
| Great Britain | 112.9 | 114.2 |
| Denmark | 119.1 | 132.2 |
| U.S.A. | 141.4 | 143.3 |

The change in the conditions affecting the movement of population in Italy as compared with that in other countries now suggests that the Italian population will become stationary at or only a few years after the date foreseen for the countries of North-Western Europe. Even ten years ago this would have seemed inconceivable. In this connection it is interesting to compare the dates at which it was estimated that the populations of certain European countries would have reached their peak. The calculations are those made by Notestein

(36) See C. GINI and B. DE FINETTI, *op. cit.*, pp. 116-21.

(37) The forecast figures in Table II for Italy allow for migration, while those for the other countries do not. Comparison with the true figures is therefore justified only in the case of Italy. It should however be remembered that this fact can assume a certain importance only in the cases of France and the United States, owing to the extent of immigration in those countries; and that it would not seem likely that figures more optimistic than the reality would have been found if immigration had been allowed for.

about 1940 and by Bourgeois-Pichat in 1950-1952.

TABLE III
DATES FORECAST
FOR ATTAINING MAXIMUM POPULATION (a)

| Country | Date forecast by: | |
|-----------------------------|-------------------|------------------|
| | Notestein | Bourgeois-Pichat |
| Italy | after 1970 | after 1980 |
| Germany | 1955 | 1975 (b) |
| Belgium | 1945 | 1975 |
| France | 1940 | after 1980 |
| Netherlands | 1970 (c) | after 1980 |
| England and Wales | 1945 | 1960 |
| Spain | 1965 | 1980 (b) |

(a) Since the figures are given for periods of five years, we have indicated in each case the first year of the five-year period preceding that in which a decrease is forecast. The dates must therefore be regarded as being rounded off downwards. In cases where the population was expected to be still definitely increasing at the end of the 5-year period, we have stated « after . . . ».

(b) Western Germany.

(c) Stationary as from 1965.

(d) Practically stationary as from 1975.

Among the countries covered it will at once be seen that in accordance with Notestein's forecast Italy is definitely in the best position in spite of the fact that he had greatly under-estimated the growth of population there, as we have already shown. According to Bourgeois-Pichat's forecast on the other hand Italy's advantage is greatly reduced (38).

Thus we again have confirmation of the change in demographic conditions in Italy as compared with those in the other countries. If fertility and mortality were to be stabilised in Europe at their present levels, as Bourgeois-Pichat assumed, then from 1950 to 1908 Italy would show an increase of 12.9%. This would be greatly exceeded by that of 40.3% in the Netherlands, while Italy would be closely followed by Spain with 11.1%, and at a greater distance by France with 8% and Western Germany with 6.7%. In Belgium there would be a much smaller increase of 3.4%; and there would be none at all in England, where the population would already be declining as from

(38) One must of course not overlook the difference between the assumptions on which the two calculations are based. In particular, for example, Notestein regarded as something quite passing the recovery of fertility which had already taken place in France, Belgium and England at the time when the calculations were made.

1965, and by 1980 would have returned to the level of 1950.

7. As is well known, the development of population in Italy varies a good deal as between different regions, the overall evolution being largely the result of the natural increase in the South. The Southern population would be much the largest element in that of Italy, were it not that emigration to foreign countries and migration

for Sardinia and for the entire South (40). He has also extended the enquiry to the four chief Southern cities of Naples, Bari, Palermo and Cagliari. In view of the purpose of the enquiry and of the particular interest which attaches to it the number of assumptions considered for the South is not merely two, as for the whole of Italy, but seven. They represent the most probable combinations of four assumptions taken for mortality and three for fertility (41).

TABLE 4

MOVEMENT OF SOUTHERN ITALY POPULATION ON THE BASIS OF DIFFERENT ASSUMPTIONS
(absolute numbers; thousands)

| Estimates and census | 1951 | | 1961 | | 1971 | | 1981 | | 1991 | | 2001 | |
|--------------------------|---------|-------------------|---------|-------------------|---------|-------------------|---------|-------------------|---------|-------------------|---------|-------------------|
| | A-mount | % of Italy popul. | A-mount | % of Italy popul. | A-mount | % of Italy popul. | A-mount | % of Italy popul. | A-mount | % of Italy popul. | A-mount | % of Italy popul. |
| <i>Estimates A:</i> | | | | | | | | | | | | |
| Minimum assumption . . . | 18,283 | 39.0 | 19,843 | 40.9 | 21,041 | 43.2 | 21,660 | 45.7 | 21,753 | 48.6 | 21,191 | 51.3 |
| Medium assumption . . . | 18,432 | 39.3 | 20,760 | 41.3 | 22,948 | 43.8 | 24,803 | 46.5 | 26,379 | 49.4 | 25,578 | 52.7 |
| Maximum assumption . . . | 18,922 | — | 22,074 | — | 25,487 | — | 29,003 | — | 32,967 | — | 37,169 | — |
| <i>Estimates B:</i> | | | | | | | | | | | | |
| Minimum assumption . . . | 17,083 | 37.2 | 18,043 | 38.3 | 18,640 | 39.9 | 18,658 | 41.4 | 18,153 | 43.2 | 16,992 | 44.6 |
| Medium assumption . . . | 17,233 | 37.4 | 18,961 | 38.8 | 20,548 | 40.6 | 21,803 | 42.7 | 22,778 | 45.0 | 23,372 | 47.6 |
| Maximum assumption . . . | 17,723 | — | 20,274 | — | 23,088 | — | 26,003 | — | 29,367 | — | 32,970 | — |
| <i>Census</i> | 17,379 | 37.2 | | | | | | | | | | |

Note: Estimates A are determined on the basis of the natural movement only; estimates B include also migratory movement.

within Italy were constantly tending to restore equilibrium as between the population masses in the North and the South — although actually during the last few years the position has begun to be that such equilibrium is not fully restored (39).

It will therefore be apparent what advantage there is in estimating the comparative future development as between the different areas, with reference incidentally to the programmes of measures which are now being applied for the economic development of the South. This is the purpose which De Meo is trying to serve in his study which has already been mentioned.

De Meo has made his calculations separately for the Southern mainland, for Sicily,

(39) A brief statement on this subject, based on the census figures, was given in our article in No. 25 of this Review, on « Some Aspects of the Italian Demographic Situation ».

Table IV shows the figures for the whole South on the basis of only three of the seven assumptions. Two of these are the same as those taken for the purpose of forecasting the population of all Italy, namely the minimum and the medium assumptions, while

(40) In the geographical sense Sardinia does not belong to the South. The demographic and economic characteristics of that island are however similar in many respects to those of the Southern regions, in which it is rightly regarded as being included.

(41) The assumptions used for the forecasts are:

- 1) low fertility and low mortality;
- 2) low fertility and medium mortality;
- 3) low fertility and high mortality (extreme pessimistic assumption);
- 4) medium fertility and low mortality;
- 5) medium fertility and medium mortality (intermediate assumption);
- 6) high fertility and low mortality (extreme optimistic assumption);
- 7) medium fertility and mortality in 1981 equal to present mortality in the U.S.A.

the third is a maximum assumption assuming low mortality and high fertility. The table also shows the figures calculated after allowance for migration, which De Meo estimates for the whole of the South at 60,000 per annum (42), and the percentage ratio of the Southern population to that of all Italy as forecast on the basis of the same assumptions.

The population of the Italian South as found by the 1951 census was 17,379,000. This is very close to the figure of 17,233,000 as found by De Meo on his medium assumption after allowing for migration (43). The medium assumption therefore fits better for the South than for the whole of Italy, this being probably because in the Southern regions the rates of decline of both fertility and mortality have remained closer to those assumed (44).

De Meo's calculations point to the conclusion that the population of the South will continue to grow for some decades, even after that of the Northern regions is definitely decreasing. In fact his forecast for the year 2001 on the intermediate assumption after allowance for migration is 23,378,000, or considerably more than that of 22,778,000 for ten years earlier. This suggests that the peak figure would be reached some time later still, whereas for the whole of Italy the peak date is expected to be about 1981.

Even if one allows for the possibility that De Meo's forecasts for the whole of Italy may under-estimate the real future figures, as we have seen that they under-estimated the

(42) The figure would include the loss due both to emigration to foreign countries and to internal movements of population. It has been found from past experience, and corresponds in practice to the average for the period 1936-51.

(43) The difference of 146,000 must be regarded as being in reality much smaller if allowance is made for the fact that the census relates to 4th November, a date more than six months later than 21st April, the date to which the forecasts refer.

(44) It has already been shown on page 62 that the reductions in both fertility and mortality in Italy between 1931 and 1951 were greater than those taken in De Meo's intermediate assumption. While the statistics available are not enough to support a precise statement in terms of figures, it does seem that the rate of decrease has been smaller in the South. The birth rate has in fact fallen less in the Southern regions than in those of the North, and in general the drop in the death rate has also been smaller in the South.

present figure, it seems impossible to doubt that the ratio of the Southern population to that of all Italy will continue to grow in the future. According to De Meo's figures that ratio will rise during the next 50 years from its present level of about 37% to more than 47%, and would reach some 53% if there were no migration.

From 1861 to the present day the ratio of the Southern population to that of all Italy has remained almost unchanged at around 37% (45). There is of course no doubt that the « southernisation » of Italy has been going on for some time, because the more rapid growth of population in the South is not a matter of recent date. Up till now however this has not resulted in a relatively greater population in the South because the balance has been restored by the flow of internal migration, as much as or more than by emigration to foreign countries. Hitherto in fact the difference in expansive force as between the peoples of the South and the North has led to what may be called a process of pervasion, so that « southernisation » has meant a greater quantity of Southern blood flowing in the veins of people in the North.

For the future much will depend on the course of economic events. If the plans for the recovery of the South yield substantial results, the growth in population there may be reflected in a corresponding increase of density in that region (46). It is therefore only in this case that the ratio of the population of the Southern areas is likely to rise appreciably in relation to the total population of the Republic. Failing this, the flow of internal migration will become greater, more especially if the North should begin to show

(45) This approximate stability was also observed by De Meo. In commenting on the forecasts indicating that the percentage of the Southern population will increase progressively, he writes that this appears to be in some measure a new fact in the demographic history of Italy (op. cit., page 94).

(46) Some Southern regions already have great density of population. Campania for instance has the highest in Italy, with 317 per square kilometre. In others however the density is extremely low, as in the Basilicata with 61 and Sardinia with 52. This is partly due to the nature of the soil, but mainly results from the extreme backwardness of the economy. Economic progress could certainly make it possible for a good many more people to live on the same ground.

signs of any considerable fall in population (47). If that happens, « southernisation » will continue to take place by pervasion, as it has done up till now.

8. As was stated at the outset, it may be of considerable interest to know approximately how the age-group composition of the population will change.

Clearly any difference between one total or another which is forecast for the population of Italy will also be found in the component elements which make up the age-group structure. But in a general way there is a fair agreement between results if one takes

tendency to progressive aging of the Italian population appears clearly in every case. The process however does not yet seem to be very far advanced, and for some further decades the percentage of people of the economically productive ages (15 to 64) will continue to grow. In other words the ratio of producers to consumers will rise, reaching its presumable peak during the decade 1970-1980, and then slowly falling away. However, it is not the ratio between producers and non-producers (or between reproducers and non-reproducers) that is of most interest, but rather the internal structure of the two groups. The first point to notice is that

PERCENTAGE COMPOSITION OF ITALIAN POPULATION BY MAJOR AGE-GROUPS
ON THE BASIS OF DIFFERENT ASSUMPTIONS

TABLE 5

| Estimates and census | 1950-51 | | | 1960-61 | | | 1970-71 | | | 1980-81 | | | 1990-91 | | | 2000-2001 | | |
|---|---------|-------|-----|---------|-------|-----|---------|-------|------|---------|-------|------|---------|-------|------|-----------|-------|------|
| | 0-14 | 15-64 | 65+ | 0-14 | 15-64 | 65+ | 0-14 | 15-64 | 65+ | 0-14 | 15-64 | 65+ | 0-14 | 15-64 | 65+ | 0-14 | 15-64 | 65+ |
| <i>Italy:</i> | | | | | | | | | | | | | | | | | | |
| INED (Bourgeois-Pichat) . . . | 26.2 | 65.7 | 8.1 | 23.9 | 67.1 | 9.0 | 21.1 | 68.5 | 10.4 | 20.3 | 67.2 | 12.5 | — | — | — | — | — | — |
| Somogyi: assumption D . . . | 26.2 | 65.7 | 8.1 | 23.8 | 67.2 | 9.0 | 21.9 | 67.6 | 10.5 | — | — | — | — | — | — | — | — | — |
| SVIMEZ (De Meo) medium assumption | 25.1 | 67.2 | 7.7 | 24.4 | 67.4 | 8.2 | 22.5 | 68.0 | 9.5 | 20.3 | 68.1 | 11.6 | 19.8 | 67.8 | 12.4 | 18.9 | 67.3 | 13.8 |
| ISTAT - Estimates according to the census | 26.2 | 65.7 | 8.1 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| <i>Southern Italy:</i> | | | | | | | | | | | | | | | | | | |
| SVIMEZ (De Meo) medium assumption | 29.9 | 63.4 | 6.7 | 29.1 | 64.3 | 6.6 | 27.1 | 65.7 | 7.2 | 24.7 | 66.5 | 8.8 | 23.9 | 66.6 | 9.5 | 23.1 | 66.0 | 10.9 |

Note: All the estimates are based on the natural movement only. Bourgeois-Pichat and Somogyi's estimates are related to the years ending with zero and start from the 1950 situation; De Meo's estimates are related to the years ending with 1 and start from the 1951 situation.

not the absolute figures but the percentage ratios, which are of course what is of most interest from the point of view of the structure.

In Table V we give some of the figures classed in three main age-groups, and compared with the present figures as shown by the 1951 estimates of the Central Institute of Statistics (48). As can be clearly seen, the

(47) There are some regions in Northern Italy such as Piedmont and Liguria where the « natural increment » is already negative, and where the population is growing only as the result of immigration.

(48) We have selected these among the results obtained on the basis of the assumption which may be regarded as the most reasonable. The estimate of the Central Institute of Statistics for 1951 was obtained by distributing the population in accordance with the census data, for which the classification by age is not yet known.

the percentage changes in the medium age-group are relatively small in both the rising and the declining phase. This accords with Sundbaerg's empirical law, which states that the percentage of that group in different populations will be approximately constant (49).

(49) Sundbaerg found at the beginning of the 20th century that the proportion of individuals aged 15 to 50 remains with some consistency around 50% even in highly diverse populations. Gini recently drew attention once more to this phenomenon pointed out by Sundbaerg (see C. GINI, *Le pourcentage des vieillards*, in « Etudes européennes de population », Paris, INED, 1954). He recalled that it has been confirmed by the researches of several writers both for stationary and for stable populations, the latter in the sense of populations in which fertility and mortality are constant. Clearly if the upper limit of the group is raised from 50 to 65 years of age its proportion to the total will rise. It is however likely that the ratio will then remain fairly constant, even though the fluctuations may be a little greater.

It follows that the changes in question are certainly not the most important element in the process of evolution known as « aging ». That process is on the contrary characterised by the difference in relative importance of the infantile and senile groups, as well as by the difference in « average age » of the producers (or reproducers).

The figures in Table V clearly show that during the next 30 years the infantile group ranging from birth to 14 years of age will decline from more than a quarter to about a fifth of the whole population, while the senile group (65 and over), now about 8%, will rise to at least 12%. In future moreover the average age of the body of Italian producers will progressively rise in proportion as that body comes to be increasingly formed of older members. In 1980 for instance, as the forecasts of Bourgeois-Pichat and De Meo agree in saying, the number of people aged 40 to 64 will be 47% to 48% of those aged 15 to 64, whereas at present they are only about 40%. The conclusion is that, even if the aging of the Italian population produces no exceptional effects on the country's economy during the next 25 to 30 years, the substantial increase which is forecast for the older and senile age-groups is such as to give rise to the same apprehensions for Italy as those which have been felt for some time past in other countries.

This problem arises in quite different terms for the North and the South, the former being well ahead in the process of aging and the latter about 20 years behind. In view of this fact and of the difference in demographic expansive power as between the two regions it would be desirable to encourage the process of pervasion from South to North which was mentioned above. That process is undoubtedly beneficial from both the demographic and the economic points of view, since it must help to bring about uniformity as between conditions in the two regions, which are different and tending in opposite directions.

In point of fact De Meo's conclusions as to the possibility of improving the economic situation of the South through the present plans for development are highly pessimistic, since he thinks that the best which can be hoped is to maintain the standard of living at its present level (50). This fully agrees with the view of Molinari (51) and of Lasorsa (52). In our view also it is more than justified because, as we believe, the economic problem of the South can be solved only within the framework of an overall solution of the whole Italian economic problem. The development programmes now contemplated or being carried out are a necessary palliative, but are quite insufficient.

In these circumstances the movement of more people from South to North is the best thing which could happen. This possibility, which is also mentioned by Molinari (53), seems to us by no means remote in view of the progressive depopulation of some Northern regions. It would incidentally be desirable for the purpose of correcting the unfavourable age-group structure in the North. That therefore is the end to which effort should be directed, rather than to the promoting of mass emigration to foreign countries. Not only does such emigration appear difficult to achieve, but it would in the longer run aggravate the problems which are set by the progressive aging of the population of Italy.

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(50) He reaches similar conclusions when he calculates the annual capital investment required in the South to deal with the increase in the labour force (see SVIMEZ, *op. cit.*, pages 67-69). It has been calculated that the capital investment required for putting each individual to work is 2 million lire. This is on the basis of the figures found by Guidotti (S. GUIDOTTI, *Stima del capitale necessario nei principali rami produttivi per occupare un'unità lavorativa*, a paper presented to the « Convegno di studi statistici sulla disoccupazione », Rome, 15-16 March, 1952).

(51) A. MOLINARI, *Il Mezzogiorno tra due censimenti*, Rome, SVIMEZ, 1952.

(52) G. LASORSA, *Main d'oeuvre et chômage dans les zones de dépression de l'Italie*, in « Etudes européennes de population ».

(53) *Op. cit.*