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Summary

Population forecasts for cities and local areas

By Hannes Hyrenius

Retrospective studies of population changes undertaken in recent years have revealed the difficulties in expressing the population changes during a period as a function of the historical background and the facts known at the beginning of the period. It is hence not surprising that population forecasts for cities and local areas have often had very little success. Analyses of a number of such forecasts are useful in finding out which methods seem to be most realistic.

The various methods used in making local population forecasts are briefly discussed in this paper. The conclusion is drawn that the first task would be to estimate the economic development of the area. With the demographic situation of the area itself and of its hinterland one might then try to make a forecast of the active population engaged in the so-called primary industries. Subsequently one might estimate the corresponding total population. In order to build up realistic assumptions, close co-operation is necessary between demographers, sociologists, economists, the management of the main industries, etc.

* General distribution of this document is limited to the introductory summary. Participants who have been invited to take part in the meeting referred to above will receive also the full text of the paper. Other participants in the Conference will receive the full text upon request.

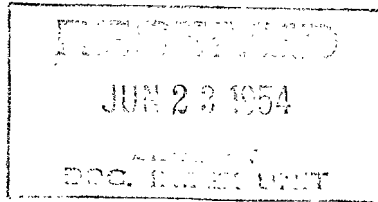
Pour la traduction française voir au verso.

Les prévisions démographiques concernant les villes et les régions localisées
par Hannes Hyrenius

Résumé. Les études rétrospectives entreprises ces dernières années sur les mouvements de la population ont montré la difficulté d'exprimer ceux-ci, pendant une période donnée, comme une fonction des événements antérieurs et des faits connus au commencement de la période. Il n'est par conséquent pas surprenant que les prévisions démographiques portant sur les villes et les régions localisées n'aient eu que très peu de succès. L'analyse d'un certain nombre de ces prévisions est utile pour déterminer quelles sont les méthodes qui paraissent donner les résultats les plus exacts.

L'auteur passe rapidement en revue les diverses méthodes appliquées pour faire des prévisions portant sur les populations locales. Il conclut qu'il faut, en premier lieu, prévoir comment évoluera, sur le plan économique, la région étudiée. En partant de la situation démographique dans la région même et dans son hinterland, on peut essayer de prévoir quelle sera la population active employée dans les industries dites primaires. Puis on peut évaluer la population totale correspondante. Pour établir des hypothèses exactes, une collaboration étroite est indispensable entre les démographes, les sociologues, les économistes, la direction des principales industries, etc. ...

* Seule la présente analyse d'introduction fait l'objet d'une distribution générale. Les participants qui ont été invités à assister à la séance mentionnée ci-dessus recevront en outre le texte intégral du document. Les autres participants au Congrès recevront le texte intégral sur leur demande.



Population forecasts for cities and local areas

By Hannes Hyrenius, University of Gothenburg.

Most people who have made population forecasts would probably admit that the result of their calculations could have been better. Today, so many forecasts have been made for so many different types of population, with so many diverging methods and for such a long period, that one can make systematic investigations into the results of the forecasts. Some studies of this type have in fact been made in recent years, but so far no detailed and penetrating investigation has been made.

In order to investigate the possibilities of making useful local population forecasts, various methods may be followed. The most natural thing would seem to be making retrospective analyses of the various forecasts. For various reasons, such studies can, however, hardly reveal the whole truth. It is afterwards very difficult to know which data were available and which methods had been developed at the time when the forecasts were made. A serious drawback also lies in the fact that various reports usually give very little information about the details of the methods and their applications. The numerical results obviously depend not only on the general type of method employed but often even more on all those special modifications and approximations which are necessary because of the statistical material available.

It is reasonable to say that, before one tries to make population forecasts, it is desirable to find out whether the population to be studied shows any kind of, let us say, normal behaviour with regard to its changes in size and structure. It would a priori be of little use making a lot of calculations if the elements of population movement do not follow some laws or patterns or trends which can be estimated within reasonable limits and hence can be extrapolated. One can expect in advance that, if such patterns do exist, they will vary from region to region and from one type of community or local area to another. This is as obvious as is the varying picture of the population itself.

As an example of such an analysis may be mentioned a study recently undertaken by Dr. Goesta Ahlberg in Stockholm. By means of the official Swedish population statistics, based on complete population registers, censuses and annual population reports for each community, Dr. Ahlberg studied the population changes from 1910 to 1950 for various types of communities, namely purely agricultural, mainly agricultural, mixed and mainly industrial communities, cities etc. The purpose of the investigation was to find out whether it was possible to express the population increase or decrease during a period as a function of the historical background, demographic and economic facts, and the size of the community and its geographical situation.

The findings were somewhat discouraging for a social planner even though certain valuable observations could be made. Thus it was found that the regularity or, maybe one ought to say, predictability was better for large and medium-sized cities than for small cities. It was to some extent also better for communities with a many-sided

economic life than for economically one-sided areas.

It may seem trivial to point out that the socio-economic structure and the development of the labour market play an integrating rôle in the development of the total population of an area. It should be observed, however, that these factors also constitute the most useful among available estimators or "predictors". This means that one ought to find a way of forecasting the labour force, after which the rest of the population should be estimated just as an additional population.

Before going further into this approach, it may be desirable to mention briefly which various methods are usually employed in making local population forecasts. A survey of the methods used in local forecasts reveals a great variety of ideas and techniques.

A special method, which does not necessitate any forecasting calculation at all, is the so called analogy method. The development of the population of a city is supposed to run more or less parallel to the development shown by the population of another selected city some decades earlier. The danger of such assumptions is so obvious that the method ought to be left to the archives.

Many local forecasts have been made on the basis of very simple extrapolations, arithmetic or geometric, or by using a logistic curve. When the problem only involves a forecast of the total population over a fairly short future period or just consists of making up-to-date estimates from some old population figures, then these methods seem fully acceptable. A necessary condition is, however, that no exceptional changes have occurred since the time of the latest population figure or can reasonably be foreseen.

A special method for local forecasts is the so called ratio

method. It can be used when forecasts are already available for larger units, such as regions, groups of cities, or the whole state or country. The method consists in studying the ratio between the population of the local area and that of the region. If the ratio turns out to change along a stable curve, it can be extrapolated and then be applied to the future population of the region as given by the forecasts already available.

The methods of population forecasts used for the populations of whole countries, states and regions are sometimes called analytic methods, sometimes cohort methods. The idea is to follow the development of the various cohorts of the actual population by means of extrapolated, future estimates of the various components of population movement, notably the number of births, deaths and migrants.

It is not necessary here to go into details about how these components are measured and how one may try to estimate the future development of various curves. From the viewpoint of local population forecasts it should only be observed that the volume of the net migration of a country, state or region is usually fairly limited, while it may be of considerable importance for the population of a city or small area.

It may seem possible at first sight to extrapolate the mortality trend within populations with a declining mortality. Experience shows, however, that the changes are more complex than to allow a simple arithmetic treatment. The problems of measuring and analyzing fertility trends are far more complicated, as can be certified by every serious forecaster. And yet the problem of how to get hold of the pattern of migration and its changes is still more difficult. The

changes of births and deaths are to some extent dependent on biological factors, while migration is entirely the result of economic, social, psychological and cultural factors. Especially important are, of course, the differences in economic and social life and prospects between the area of emigration and the area of immigration. It should be remembered, however, that it is not only the real conditions which play a rôle but also to a considerable extent the illusions which the potential migrants have about them.

We find that attempts to apply the cohort method for making local population forecasts will rely heavily on the possibility of grasping the significant characteristics of the migration of the area. This in turn depends on the structure and changes of the economic life of the area, the sensitivity of its main industries with regard to economic cycles, the structure of the economy and of the population of the surrounding region, etc.

We are hence faced with the problem of making forecasts not for the local population but for the economic set-up. From this as a first step, one might, at least in theory, as a second one find the corresponding net changes of the economically active population. The third step would be to evaluate the corresponding net migration, with a certain subdivision into economic branches, sex and main age groups. The fourth step would be an investigation of whether a net migration of that size and structure would be in accordance with the demographic and economic structure of the surrounding region, the hinterland, with which the local area or city has its main exchange of population. Such an investigation would frequently lead to certain modifications and probably to the establishment of an upper and a lower limit of the

volume of net migration of people in active ages. Finally, as a fifth step, the non-active population would have to be estimated from the projected size and structure by age and civil status of the active population.

Attempts have been made to divide the economic branches into primary and secondary industries and to concentrate the forecasts on the primary industries. It will not be discussed here which single industries should be considered as primary. It should be pointed out, however, that what is considered as a primary economic activity in one area might have the character of a secondary activity in another. The size of the secondary industries shows certain numerical relations to the primary industries of a fairly stable nature. The active population engaged within the secondary industries may therefore be estimated as an additional population to the active population engaged in the primary industries.

This approach to the problem of making economic forecasts of local areas has proved very useful in some analyses and forecasts of the population of cities undertaken in Sweden during recent years. Its usefulness depends, however, very closely on the economic and social structure of the societies and the predictability of their main primary industries. The method also requires good co-operation with the management of the main industries with a view to performing a realistic analysis of the possibilities and chances of future development.

In making a summary of our present situation and the needs in this field, the following observations may be made.

1. In order to make the various local forecasts within a region

or a state realistic, it is necessary to establish a framework by means of population forecasts for the total region. This task should not be left to the various local forecasters but should be made at a higher level by a team of specialists or a responsible state institute.

2. The local forecasts should be based on a study of both demographic and economic conditions and attempts should be made to make future estimates of the economic development of the main economic branches, especially the primary industries. In order to estimate the possible range of future migration, a study must also be made of the economic, social and demographic conditions of the nearest surrounding region.

3. There is a strong need for further studies of the technical methods to be used in local forecasts. One type of study is the searching for such economic, social and demographic characteristics as can serve as good and stable predictors. Another problem is how to obtain reliable statistical data for measuring empirically these characteristics during the past and for estimating their development in the near future.

4. No realistic local forecasts can be made solely by means of simple schematic extrapolations. Co-operation with the leaders of the main and especially the primary industries, of economic organisations and of labour unions is not only desirable but to some extent necessary. Sociological surveys form another method of obtaining information about needs, desires, motives for migration, economic prospects etc.

5. It should never be forgotten that forecasts are only attempts to evaluate, to the best of our knowledge, the informations

we have at a specific moment. Tomorrow we may have more informative data with possibly better prognostic value. It is therefore necessary to make continual revisions of the various assumptions and of the factual data on which the forecasts are based. This statement may seem trivial but in fact most of the benefit of our population forecasts is usually lost just because the calculations are not kept up to date.

Finally it ought to be stressed that local forecasts can never give good results as long as they are not based on good co-operation between demographers, statisticians, geographers, economists, sociologists, city planners and social engineers.