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Fifty-fourth plenary session
(Paris, 12-16 June 2006)

**REPORT OF THE SEPTEMBER 2005 JOINT EUROSTAT-UNECE
WORK SESSION ON DEMOGRAPHIC PROJECTIONS**

Prepared by the UNECE secretariat

INTRODUCTION

1. The Joint Eurostat-UNECE Work Session on Demographic Projections was held in Vienna, Austria, on 21-23 September 2005 at the invitation of Statistics Austria, and with the additional support of the Vienna Institute of Demography (VID), the International Institute for Applied Systems Analysis (IIASA), and the Netherlands Interdisciplinary Demographic Institute (NIDI).
2. The meeting was attended by over 100 participants from National Statistical Institutes, demographic research institutes, universities, and other institutions representing the following countries: Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Republic of Korea, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and the United States. Representatives of the United Nations Population Division and the International Labour Office (ILO) also participated.

3. Opening statements were made by Mr. Peter Hackl, Director-General of Statistics Austria, Mr. Paolo Valente, UNECE, and Mr. Michail Skaliotis, Eurostat.
4. Mr. Frans Willekens (Netherlands) was elected as Chair of the meeting.
5. Two keynote lectures were given: by Mr. David Coleman (University of Oxford, United Kingdom) on “The Future of European Population” and by Mr. Jerome Vignon (European Commission) on “The view of the European Commission (Green Paper)”.

II. ORGANIZATION OF THE MEETING

6. The following study topics were considered in special sessions at the meeting:

Session 1: International population and labour force projections for Europe (Session Chair: Wolfgang Lutz, IIASA – VID)

Session 2: Population projections: current practices, future developments and use for policy planning (Session Chair: Michel Poulain, GÉDAP – UCL)

Session 3: Fertility (Session Chair: Joop De Beer, NIDI)

Session 4: Mortality (Session Chair: Nico Keilman, University of Oslo)

Session 5: International migration (Session Chair: Michel Poulain, GÉDAP – UCL)

Session 6: The future of population projections, including Round table discussion “From measurement of uncertainty to management of uncertainty” (Session Chair: Frans Willekens, NIDI)

Session 7: Specific projection issues (Session Chair: Gustav Lebhart, Statistics Austria)

Closing session: Roundtable discussion on “European future population trends: implications for demographic statistics and demographic research” (Session Chair: Nico Keilman, University of Oslo).

7. In total, 28 working papers were presented and discussed in the different sessions.
8. The presentations and discussions were of high quality and relevance to the major research and policy questions related to demographic projections.
9. The main conclusions reached in the various sessions of the meeting will be presented in the Summary of the discussion that will be distributed to the participants by email by 7 October 2005 and posted on the UNECE website at:
<http://www.unece.org/stats/documents/2005.09.projections.htm>

III. RECOMMENDATIONS FOR FUTURE WORK

10. The meeting was informed that the involvement of the UNECE in the field of demographic projections would be discontinued after the September 2005 Work Session, as indicated in the Statistical Programmes of the UNECE for 2004 and 2005 that were approved by the Conference of European Statisticians.
11. The meeting regretted the decision and stressed the need to continue this series of meetings, which started in 1988, with the participation of the United Nations. The meeting

highlighted the importance of the involvement of the UNECE, which contributed significantly to the success of this series of meetings, and suggested that ways be explored to continue the involvement.

12. The meeting recommended that a similar meeting take place in three years' time.

13. The meeting also recommended that consideration be given to the following issues with regard to future work in this field:

- a) there is a need for more intense and structured communication between the actors: producers of statistics and/or projections, researchers, policy-makers, and the public;
- b) increased attention should be given to the availability and quality of data for the production of projections;
- c) all actors should share the responsibility to develop transparent and credible science-based projections.

IV. CONCLUDING REMARKS

14. The meeting expressed gratitude to Statistics Austria for the excellent facilities and infrastructure provided for the meeting, which contributed significantly to the success of the meeting. They also expressed appreciation to the Vienna Institute of Demography (VID), the International Institute for Applied Systems Analysis (IIASA), the Netherlands Interdisciplinary Demographic Institute (NIDI), the Groupe d'Etudes de Démographie Appliquée of the Université Catholique de Louvain (GéDAP/UCL) and the University of Oslo for their topical assistance and input to the meeting.

V. ADOPTION OF THE REPORT

15. The participants adopted the report of the meeting at its closing session.

VI. SUMMARY OF THE DISCUSSION AND MAIN CONCLUSIONS REACHED AT THE MEETING

Keynote lecture: The future of European Population

David Coleman, University of Oxford

16. The lecture provided a general overview of the most important European demographic trends. In the European Union these trends are going in different directions and the assumption of convergence of all demographic components is much less supported than in the past.

17. Ageing and population decline are not common European problems, and this poses stress upon certain consolidated demographic theories based on convergence. It is very difficult to devise European population policies in a framework where cross-national and even regional demographic situations are so different.

18. It is important to incorporate “feed-back” mechanisms into the projection models, in order to give a plausible and more robust assessment of family, labour market and gender policies.

Key-note lecture: The view of the European Commission (Green Paper)

Jerome Vignon, European Commission

19. The lecture described the role played by demographic projections in shaping the overall political mindset in the last fifteen years, from a “neutral” attitude towards demographic developments, prevailing at the beginning of the nineties, to the more pro-active attitude prevailing today.

20. Furthermore, demographic projections brought on several changes at the level of the open public debate, when the possible implications of these projections became clearer. The wide discussion of the Commission Green Paper “Confronting demographic change: a new solidarity between the generations” could be considered good example of this new debate.

21. The increasing importance of demographic projections poses new challenges to the scientific and research community. One crucial element will be, in the future, the necessity of an increased collaboration between experts in national and international statistical offices and independent experts.

Session 1: International population and labour force projections for Europe

Session Chair: Wolfgang Lutz, IIASA – VID.

Papers and presentations:

- *Eurostat 2004-based population projections for the European Union, Bulgaria and Romania* (Fabio Sartori – Eurostat)

- *Labour force projections: a set of data for assessing the long-run economic impact of ageing* (Giuseppe Carone – European Commission)

- *Population and labour force forecasts for 27 European countries, 2002-52* (Jakub Bijak, Dorota Kupiszewska, Marek Kupiszewski, Katarzyna Saczuk - Central European Forum for Migration Research).

22. This session of the meeting aimed at providing an overview of recent activities at the EU level in the field of population projections and assessments of the long-term economic consequences of the expected demographic trends.
23. In the first presentation, Fabio Sartori of Eurostat gave a comprehensive summary of the recent (2004-based) round of Eurostat population projections for the 25 member countries, as well as for Bulgaria and Romania.
24. Giuseppe Carone of the European Commission presented the main findings of a major EU exercise for adding labour force projections to the population projections and studying possible long-term economic impacts of alternative trends. This presentation provided a good background against which to assess the importance of population projections.
25. Similarly, the third presentation by Marek Kupiszewski of the Central European Forum for Migration Research presented alternative combinations of future population trends with future trends in age- and sex-specific labour force participation rates for 27 European countries.
26. At the end of the session, all three presentations were discussed together. Aside from specific questions of clarification, there was an interesting discussion about how the alternative fertility, mortality and migration assumptions should be combined when presented as alternative scenarios (variants). Since the number of scenarios that can be presented to the public is limited, Eurostat had so far released the combinations of high life expectancy and high fertility (high growth scenarios) and low life expectancy and low fertility (a low growth scenario). These combinations do not include the rapid aging resulting from the combination of high life expectancy and low mortality. It was mentioned that a transition to probabilistic projections could help to solve some of the issues related to the combination of assumptions.

Session 2: Population projections: current practices, future developments and use for policy planning.

Session Chair: Michel Poulain, GéDAP – UCL.

Papers and presentations:

- *The way population projections are conducted in France* (Isabelle Robert-Bobée – INSEE, France)
- *Small-area population projections for Austria* (Stephan Marik, Gustav Lehart – Statistics Austria)
- *MicMac: combining micro and macro approaches in demographic forecasting* (Nicole van der Gaag, Joop de Beer, Frans Willekens – Netherlands Interdisciplinary Demographic Institute)
- *The use of long-term population projections in public policy planning* (Harri Cruijssen – Democast).

27. The second session was dedicated to current practice and future development of population projections, and their use in policy planning. The first presentation by Isabelle Robert-Bobée presented the way population projections are conducted in France and how demographers and users are involved in the elaboration of scenarios by showing the impact of different sets of assumptions.

28. Gustav Lebhart described small-area population projections developed for Austria and the city of Berlin. The authors emphasized the need for population projections at regional and local levels. The proposed methodology includes the concept of “area type” characterised by demographic similarity with regard to births, mortality and migration. In addition, the new housing units are considered as well as the relation between migration and housing. This innovative methodology is useful to serve the needs of regional and local planners.

29. Nicole van der Gaag described the EU funded research project named MicMac. The aim of this project is to develop a new methodology that combines micro and macro approaches in demographic forecasting. The output of micro-level models of individual life course including such variables as age, health, labour career and education, will be used as input in macro-level models of population dynamics. The models also consider uncertainty. The tool will be available for the community of demographers and statisticians.

30. Finally, Harry Cruijssen presented the results of another EU research project on the use of long-term population projections in public policy planning. The first results of this survey show that the use of the population forecast figures varies significantly according to the topics, e.g., it is used more for ageing policies and less for national migration policies.

31. The discussion that followed emphasized the high quality and the complementarity of the four papers. A more intense cooperation is called for between statisticians and demographers.

Session 3: Fertility

Session Chair: Joop De Beer, NIDI.

Papers and presentations:

- *Missing births: decomposing the declining number of births in Europe into tempo, quantum, and age structure effects* (Tomas Sobotka, Wolfgang Lutz, Dimiter Philipov – Vienna Institute of Demography)

- *Cohort process toward the lowest fertility in Japan: application of an empirically adjusted Coale-McNeil model to estimation and projection of lifetime measures of first marriage and birth* (Ryuichi Kaneko - National Institute of Population and Social Security Research)

- *Childless societies? Trends and projections of childlessness in Europe and the United States* (Tomas Sobotka – Vienna Institute of Demography)

- *Recent change in the first marriage behaviour and the couples' reproductive behaviour in Japan* (Miho Iwasawa - National Institute of Population and Social Security Research).

32. The session on fertility included four papers. Two papers were presented by researchers of the Vienna Institute of Demography. They discussed the size of tempo and quantum effects on changes in the number of births. Both papers show that changes in the timing of fertility have been an important source of changes in births in all European countries, but that there have been considerable cross-country differences.

33. Dimiter Philipov presented three scenarios of the future number of births based on different assumptions on future changes in timing. He showed that even if the quantum effect is assumed constant, the future number of births might change strongly.

34. Thomas Sobotka presented projections of childlessness, based on first birth probabilities that are adjusted for tempo effects. He showed that childlessness might be expected to increase in almost all European countries, although the size of the change varies across countries. In contrast, for the United States a slight decline in childlessness is projected.
35. Two other papers were presented by researchers of the National Institute of Population and Social Security Research in Tokyo. They analysed the effect of changes in the first marriage rate on the timing and level of fertility in Japan.
36. Ryuichi Kaneko showed that there were successive phases of change in cohort behaviour. Initially, marriages were delayed, resulting in postponement of childbirth. Later, there was both a delay in marriage and a decrease in the proportion of women ever marrying, leading to both postponement and a decrease in the level of fertility.
37. Miho Iwasawa showed that changes in fertility in Japan up to 1990 could be explained largely by changes in first marriage behaviour, whereas the decline of fertility in the 1990s is increasingly due to changes in the reproductive behaviour of married women.
38. One general conclusion of the presentations and the discussions in the session is the importance of cohort analyses for forecasting fertility. It is particularly important to disentangle the effects of changes in tempo and quantum. Life course analyses are useful for assessing the causes of changes in fertility, for example the effect of changes in household formation (increase in living alone and cohabitation, postponement and decrease of marriage, increase of separation and divorce) on the timing and level of fertility. In making projections, it is important to bear in mind that timing may affect quantum as postponement of fertility may lead to a lower ultimate level of fertility. Thus quantum effects may not simply be assumed constant. Moreover, the effect of international migration on the level of fertility should be taken into account in countries with a relatively high level of immigration.

Session 4: Mortality

Session Chair: Nico Keilman, University of Oslo.

Papers and presentations:

- *Modelling gains in life expectancy by sex in 228 countries from 1950 to 2050* (Patrick Gerland – United Nations)
- *Mortality in stochastic population projections* (Michael Hartmann – Statistics Sweden)
- *The Lee-Carter method for forecasting mortality, the Portuguese experience* (Edviges Coelho – INE Portugal)

39. Three papers were presented in this session. Patrick Gerland (United Nations Population Division) spoke about the gains in life expectancy by sex in 228 countries from 1950 to 2050. Analyses of existing model life tables by Coale & Demeny, the OECD and the UN have not revealed a universal mortality pattern. Mortality differs strongly by region and over time.
40. Considering that the pace of improvement varies among populations, three different models of plausible change in mortality in the future (fast, medium and slow) were developed. For each country, a model is selected on the basis of the most recent level of mortality and its

speed of improvement over the last decade(s). The improvement in life expectancy is analysed by decomposing gains by main age groups and modelling jointly childhood and senescent mortality by sex across countries and regions. This method supplements Lee-Carter based methods for mortality extrapolation for those countries that have good data.

41. Michael Hartmann (Statistics Sweden) spoke about mortality in stochastic population projections. He presented a one-parameter version of the Brass logit life table system, and illustrated the model using Danish and Swedish data. Time series for the estimated parameter, and its link with the life expectancy, were also presented. The speaker concluded that the one-parameter model could be a suitable model for stochastic population forecasts.

42. Edviges Coelho (National Statistical Institute of Portugal) presented an application of the Lee-Carter model with Portuguese data. She focused on the stability and the stationarity of the model's general mortality index. She argued that there was a structural break in the Portuguese trend occurred in 1976, which coincided with a period of abrupt political, economic and social change. The consequences of the revision of Portuguese mortality data were also discussed.

43. During the discussion, the impact of data quality on UN's extrapolation method, the possible convergence of international mortality trends, the stability of Lee-Carter estimates, the assumed underestimation of uncertainty in the Lee-Carter model, the omission of risk factors from mortality models, and the restriction to only one parameter in the Brass logit life table model were questioned.

Session 5: International migration

Session Chair: Michel Poulain, GéDAP – UCL.

Papers and presentations:

- *What are the implications of the Demographic Transitions process for 21st century European populations* (José Antonio Ortega Osona - Universidad de Salamanca)

- *Replacement migration revisited: migratory flows, population and labour force in Europe, 2002-52* (Jakub Bijak, Dorota Kupiszewska, Marek Kupiszewski, Katarzyna Saczuk - Central European Forum for Migration Research)

- *Data on international migration flows available in selected Central European countries to project future trends* (Beata Nowok - Central European Forum for Migration Research).

44. Three papers were presented in the session on international migration. In the first paper, José Antonio Ortega revisited the demographic transition process as far as today's population is concerned. He linked the different phases of the demographic transition with specific migration flows (emigration in growth phase, immigration in the late phase).

45. In the second paper by Beata Nowok, the reliability and comparability of international migration data was assessed for the Central European countries. The overall low quality of the data was emphasized but hopefully improvements are on the way that may bring more reliable and comparable data in future.

46. Finally, Jakub Bijak came back to the labour force projections in Europe presented by Marek Kupiszewski during the first session, and revisited the number of replacement migrants

that are needed in order to keep specific equilibrium in the labour force and in the balance between successive generations.

Session 6: The future of population projections

Session Chair: Frans Willekens, NIDI.

Papers and presentations:

- *From demographic to biographic forecasting* (Frans Willekens, Joop de Beer and Nicole van der Gaag – NIDI)

- *Stochastic population forecasts for the countries of the European Economic Area* (Nico Keilman – University of Oslo).

47. The session was based on two papers. Frans Willekens, Joop de Beer and Nicole van der Gaag proposed a transition from the forecasting of the population by age and sex to the forecasting of the lives of people. Biographic forecasting yields detailed projections that include the number of people in the different stages of life and the durations of the stages. The research is part of the Specific Targeted Research Project (FP6) Bridging the micro-macro gap in population forecasting (MicMac).

48. Nico Keilman presented stochastic population projections for the countries of the European Economic Area. Uncertainty is quantified by means of stochastic models. The research is part of the Targeted Socio-Economic Research Project (FP6) Changing population of Europe: Uncertain future (UPE).

49. Roundtable discussion: “From measurement of uncertainty to management of uncertainty”

Chair: Frans Willekens, NIDI.

Composition of the roundtable:

Wolfgang Lutz, IIASA

Valerio Terra Abrami, ISTAT

Joop de Beer, NIDI

Nico Keilman, University of Oslo

John Long, US Bureau of the Census.

50. Wolfgang Lutz addressed the use of expert opinions in demographic forecasting. Expert opinions are important in forecasting. Experts should realize that their knowledge is domain-specific. They should be encouraged to rely on scientific arguments in providing their views.

51. Valerio Terra Abrami addressed the contribution of judgments to forecasting. A total knowledge framework is needed. The framework includes a database system specifically designed for forecasting purposes, including past trends and available knowledge in a coherent framework.

52. Joop de Beer addressed the uncertainty in forecasting. Good methods exist for quantifying the degree of uncertainty. However, effective methods to reduce the uncertainty are missing. Such methods require a knowledge of the processes of demographic change.

53. Nico Keilman addressed the use of loss functions in demographic forecasting. If a loss function could be specified then critical areas could be identified in forecasting methodology where research is most needed. When the future performance of public pension systems is analysed, overprediction of the life expectancy is less harmful than underprediction.

54. John Long addressed the question of where action is most needed to improve forecasts. He observed that theory is often absent from demographic forecasting. Theory may also be used to disaggregate a population into homogeneous groups for the purpose of forecasting.

Session 7: Specific projection issues

Session Chair: Gustav Lehart, Statistics Austria.

Papers presented:

- *Impact of racial and ethnic exogamy on forecast population distributions for the United States in 2030: results of a macro-simulation* (Frederick W. Hollmann, W. Ward Kingkade – U. S. Census Bureau)
- *Religions in Austria: the future* (Katrin Fliegenschnee, Anne Goujon, Vegard Skirbekk, Pawel Strzelecki - Vienna Institute of Demography)
- *Why fertility should become a matter of public concern in Romania* (Aura-Mihaela Alexandrescu – National Statistical Institute of Romania)
- *The impact of geographical and socio-economical mortality and fertility differences on population growth* (Laszlo Radnoti - Hungarian Central Statistical Office)
- *Forecasting the population with a foreign background in the Netherlands* (Maarten Alders - Statistics Netherlands).

55. Specific population projection issues are complex and politically sensitive subjects that can be difficult to measure and to project. Significant changes in the demographic patterns in industrialized countries have been observed for years and these structural changes are likely to continue. Reasons for demographic changes pertaining to “stock” and “flow” of migrants in the countries of origin and of destination are similarly complex and difficult to interpret.

56. The papers presented in this session referred to some basic notes on the methodology in the area of specific projection issues showing possibilities and restrictions in the modelling of assumptions. One of the core problems is that administrative registers and other administrative sources can produce only a certain number of relevant socio-demographic variables, which often cannot be easily updated. Due to this lack of information, the specification of assumptions for specific population issues is restricted to some extent. The papers gave an outlook of possible further methodological development to refine the modelling instruments for specific population projections.

57. The synergy effects of analyzing different methods used in Statistical Offices in collaboration with research institutes can help to find the best practice of harmonized methods and measurement approaches in the field of population projections.

Closing session: Roundtable discussion: “European future population trends: implications for demographic statistics and demographic research”

Chair: Nico Keilman, University of Oslo.

Composition of the roundtable:

Michail Skaliotis, Eurostat

Frederick Hollmann, US Bureau of the Census

Chris Shaw, Government Actuary Department, UK

Joshua Goldstein, Princeton University

Alain Belanger, Statistics Canada

Wolfgang Lutz, Vienna Institute of Demography and International Institute for Applied Systems Analysis

58. The participants in the roundtable gave their views on the following issues: (i) what are research priorities for improving population forecasts? ; (ii) how can such research best be organised?.

59. Panellists noted that the current series of meetings should be continued with a frequency of 3 years. Contacts with the users are important, both in meetings of the current type, but also in shaping the research programme. More research time should be devoted to forecast uncertainty at the regional level, to communicate uncertainty to the users in an effective way, to study causes of death and cohort patterns in mortality, motives of international migration, and fertility and mortality dynamics. A plea was made for including risk factors in mortality studies, and for including educational and cultural factors in studies of population. The use of microsimulation models was also stressed. Finally, the role of experts and the use of existing networks such as the European Association for Population Studies were mentioned.
