

Ways to project fertility

HOW DO EUROPEAN COUNTRIES PROJECT FERTILITY AND WHAT ARE THEIR PERCEPTIONS OF CURRENT PRACTICES?

ASTRI SYSE & REBECCA GLEDITSCH, DEPARTMENT OF RESEARCH, STATISTICS NORWAY



Statistisk sentralbyrå
Statistics Norway

Why fertility?

- Almost 50% live in a country/area w fertility below 2.1 (UN WPP 2019)

- Cumulative effect over generations – high vs. low projected fertility

- Need well-tested and well-assessed methods

- Statistics Norway currently considering changing how fertility is projected
 - Norway have models for mortality and migration, not for fertility

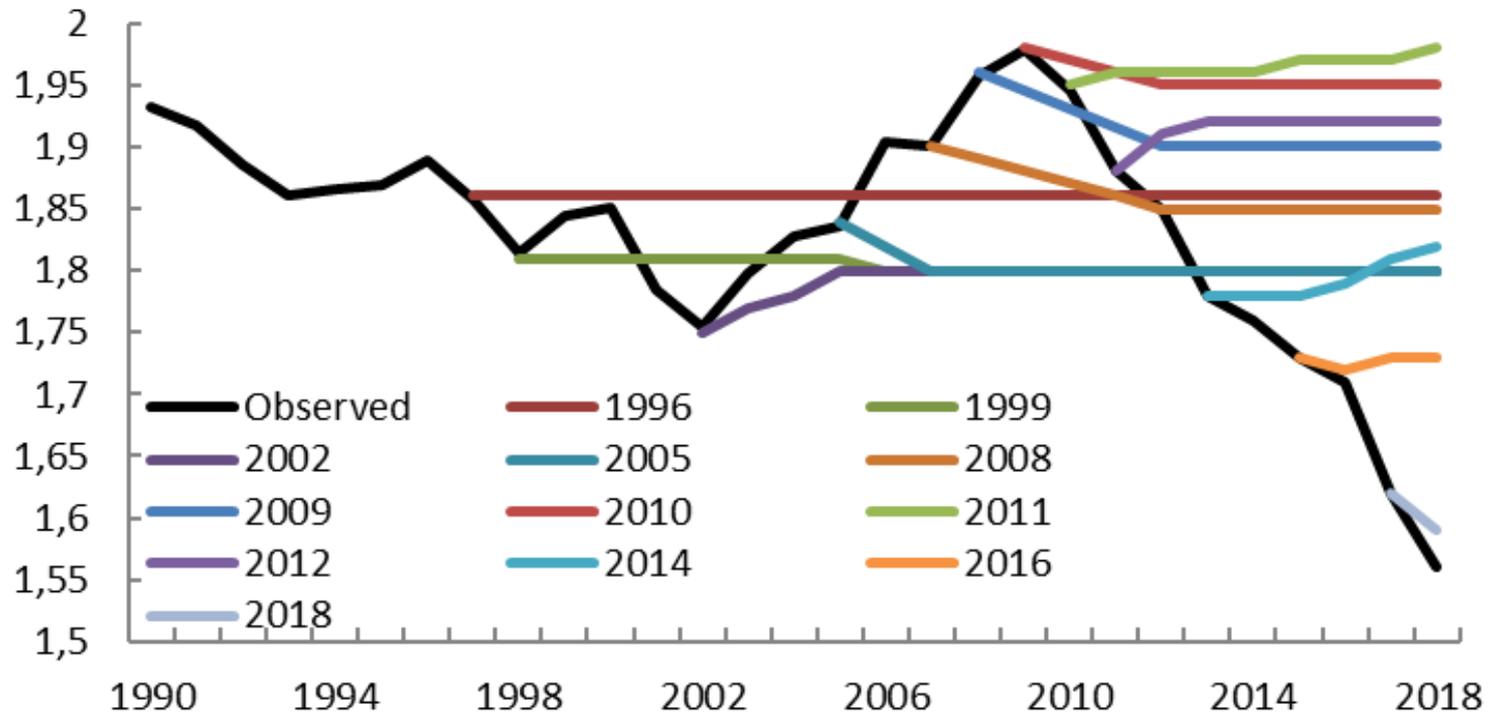
- Focus: Assumptions made to project period TFR
 - Advanced publication already exist on cohort-fertility (Bohk-Ewald, Li, Myrskylä 2018)

Norway

- Deterministic population projections, cohort-component method
 - 15 scenarios, published biennially (next: June 2020)
- Fertility projected for 16 groups of women (up to year 2100)
 - 3 country groups of origin, 5 groups with different lengths of stay
- 3 fertility alternatives (low, medium, high)
- 3 annual fertility factors determined (1 for each alternative)
 - Annual factor for year t * age-specific fertility rates at baseline = assumption of future TFR
 - Same factor used for the 15 other groups
 - The age-specific fertility rates vary across the groups
 - Total TFR for the population as a whole thus an 'output'



Norway – past projections vs. registered



Present study

1. Examine the different methods utilized by European countries, Eurostat and the UN
2. Compare the methods
 - Assess their strengths and weaknesses
 - Assess short-term accuracy
3. Understand how the Offices of National Statistics view their methods
 - Usefulness, accuracy, how they are communicated to the public

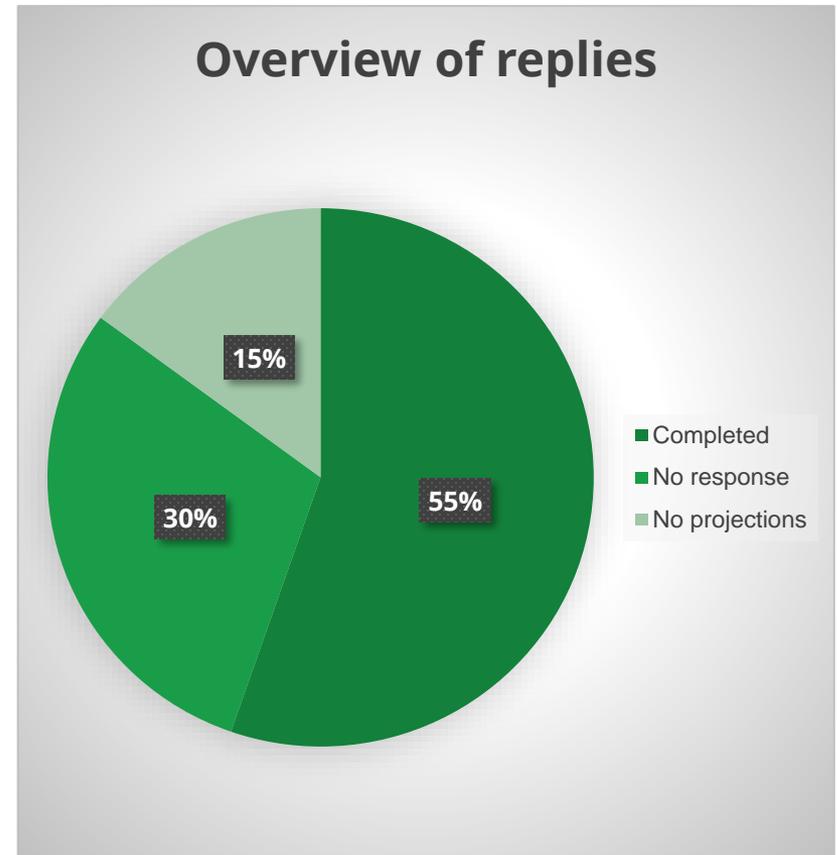
Aim: Enable Norway and other countries to evaluate current methods and whether other approaches might be worth considering

Data and Methods

- Mixed-method study
 1. **Survey regarding current practices**
 2. Document review: 8 countries will be selected for in-depth analysis (Eurostat and UN)
 - The countries will be selected based on diversity and “best practice”

Overview of survey

- Pilot survey distributed Oct 16
 - N = 5
 - Survey adjusted based on feedback
- Survey distributed Nov 5 to European ONS, Eurostat & UN
 - N = 41
 - Reminder sent Nov 21
- Strongly encourage non-responders to respond ASAP



Today's focus

1. Methodological approach
2. Evaluation of most recent population projections
3. Discrepancies between projected and observed fertility

Methodological approach

- Around half are currently using formal statistical models
 - Majority use deterministic models
 - Five respondents use probabilistic models
- Majority provide several alternatives
 - Two provide only one
 - Majority provide three
 - A few provide up to five
- More than half update fertility assumptions at least every third year
 - Ranges from quarterly to every ten years
- More than half (also) use expert opinions

Preliminary categorization of methods

Type of fertility projection

1) Model-based, deterministic

2) Model-based stochastic

3) Expert opinion/historical development

4) Other methods

5) No projection

Classification of countries/organizations

Austria, Czechia, Denmark, Eurostat, Germany, Greenland, Poland, Portugal, Spain, Sweden, Ukraine, United Nations

Faroe Islands, Iceland, Netherlands, United Nations

Belgium, Bulgaria, Czechia, Estonia, Finland, France, Iceland, Luxembourg, Norway, Romania, Serbia, Slovakia, Sweden, Switzerland, UK

Eurostat, Hungary

Armenia, Belarus, Latvia, Lithuania, Montenegro, North Macedonia, Slovenia

Only countries/organizations that have responded are included, listed in alphabetical order. Some countries use both models and expert opinions, and are thus categorized twice. Both frequentist and Bayesian approaches are included in the model-based stochastic group. Most countries use not *only* experts, but consider historical trends as well as the research of others.

Evaluation of most recent population projections

- Main response: “Adequate”
- Majority considers the information available to make fertility projections to be adequate
- Majority views time spent on fertility projections and frequency of updates to be adequate
- Majority views the numbers of scenarios/levels provided to be adequate
- Majority views their fertility projections as adequate
 - Some are currently experimenting with other methods (e.g. Bayesian or functional models)
 - Some are currently evaluating whether the methods are adequate
 - Some have plans to change their methods
 - E.g. introduce probabilistic methodology, attempt to construct stochastic fertility models, compare current methods to methods of other countries

Discrepancies in projected and registered fertility

- Majority of respondents do some form of assessment between projected and registered fertility
 - Some analyze the short-run deviations while preparing the next update
 - Some measure the accuracy of projections and individual assumptions 2-3 years after publication
 - Some analyze each projection, but do not publish the analysis
 - Some responded that they do not make any assessment of short-term or long-term accuracy
- The discrepancies varies
 - Nordic countries: Slight overestimation of predicted fertility over the past years, in a period of fertility decline
 - Overall, variation across European countries – no clear pattern
 - Overestimations, underestimations, some with only small differences, some with major discrepancies
- Few formal publications on long-term discrepancies exists
 - Insee (France) have published several (www.insee.fr/fr/statistiques/1374368?sommaire=1374377)



Preliminary conclusion

- Majority seem to view their methods as adequate, with some potential for improvement
 - Some countries have planned changes in their upcoming projections
 - Some countries are currently experimenting with other methods or evaluating accuracy of current methods
- Variation in accuracy of predicted fertility levels over the past years
 - No clear pattern, except in the Nordic countries
- Likely to benefit from increased interaction and exchange of ideas/views regarding fertility projections
 - Nordic meetings, Eurostat meetings and seminars, as well as demographic workshops, seminars and conferences etc.
- Aim of the finalized paper:
 - Helpful resource
 - Increase learning and the exchange of ideas across European countries
- Conclusions will be finalized by January 2020

Please respond



References

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Questions, comments?



Distribution of survey

Overview as of November 22nd

Completed	No response	No projections
1. Austria	1. Albania	1. Armenia
2. Belgium	2. Bosnia and Herzegovina	2. Belarus
3. Bulgaria	3. Croatia	3. Latvia
4. Czechia	4. Cyprus	4. Lithuania
5. Denmark (P)	5. Eurostat	5. Montenegro
6. Estonia	6. Greece	6. North Macedonia
7. Faroe Islands (P)	7. Greenland	7. Slovenia
8. Finland	8. Ireland	
9. France	9. Italy	
10. Germany	10. Kosovo	
11. Hungary	11. Liechtenstein	
12. Iceland (P)	12. Malta	
13. Luxembourg	13. Turkey	
14. Netherlands		
15. Norway (P)		
16. Poland		
17. Portugal		
18. Romania		
19. Serbia		
20. Slovakia		
21. Spain		
22. Sweden (P)		
23. Switzerland		
24. UK		
25. Ukraine		
26. UN		