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Assumptions on migration

Recent Refugee influx and migration assumptions in Germany – public debate and opportunities for projection makers

Note by Federal Statistical Office, Germany¹

Summary

The Federal Statistical Office of Germany published its latest coordinated population projection in April 2015, using the base year 2013. The recent influx of refugees right at the beginning of the projection horizon lead to a public debate on the migration assumptions of the official projection and its usability in general. The range of objections made to the projections was very broad – from being entangled with economic interests to being not visionary enough. The points of criticism made within several newspaper articles are discussed along with the reasoning behind the assumptions made on future migration trends. It is argued that phases of high net immigration always alternated with phases during which the migration situation was calmer. In all likelihood net migration levels will also be subject to great variation in the future as it was usual for the past. Hence, assumptions on future migration levels always have to be interpreted as long term averages. A simple increase of assumptions on net immigration would not be well founded based on the existing knowledge on the relevant migration streams. Opportunities to deal with related uncertainties of migration assumptions are discussed in detail.

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I. Introduction

1. The Federal Statistical Office of Germany published its latest coordinated population projection in April 2015, using the base year 2013 with net immigration of about 430,000 migrants. Two assumptions have been made as regards future net migration trends. In the scenarios, the balance of migration is assumed to decline gradually from 500,000 in 2014 and 2015 to either 100,000 or 200,000 persons by 2021 and to remain constant thereafter. The real development revealed a net migration of 550,000 migrants in 2014 and an estimated net migration of at least 900,000 persons in 2015². The pronounced increase in 2015 is driven by the migrations of refugees, which as an extraordinary development was not directly projected within the published population projection. Experienced users of projections use the results and realise that the recent development is not part of the assumptions without questioning the projection itself and its general indications (for example the German Federal Ministry of Finance for its report on sustainability of public finances). But several newspaper articles called the assumptions on migration and the usability of the whole projection into question. Thereby the authors criticize the projection makers for being too conservative on future net migration trends. The newspaper articles influence the more general view on the projections – especially of persons and institutions not working in detail with projections. The intention of the paper is to discuss the arguments made within the articles along with the reasoning behind the assumptions made on future migration trends within the latest population projection. As starting point for the discussion an overview about past and projected developments of migrations in Germany is given. In conclusion the opportunities for projection makers to deal with the uncertainties of population projections in general and migration assumptions in particular are discussed.

II. Migration assumptions and public debate

a) Migration for Germany – past and projected development³

2. With the exception of a few years, Germany has had positive net migration overall. On a long-term average, net immigration ranged between 142,000 persons per year before German reunification and 186,000 persons per year in the entire period between 1954 and 2013⁴. Persons with foreign citizenship account for more than 80% of the total volume of migration - i.e. immigration and emigration - and have largely dominated migratory movements (Figure 1). These average values are shaped by several waves of immigration, such as the recruitment of foreign workers in the 1950s and 1960s, subsequent immigration of family members in the 1980s, and the extremely high level of inward migration from Eastern Europe, states of the former Soviet Union and from war-torn Yugoslavia in the 1990s.

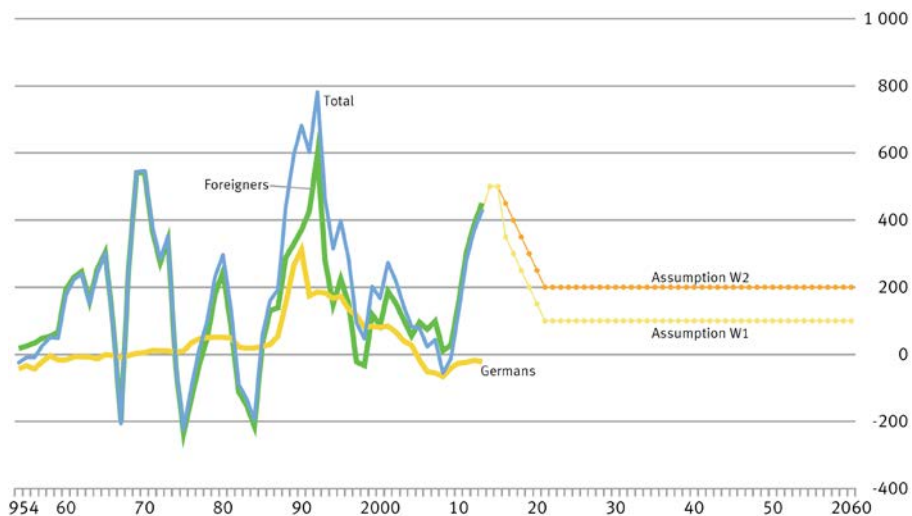
² https://www.destatis.de/DE/PresseService/Presse/Pressemitteilungen/2016/01/PD16_032_12411.html
[last access 22nd February 2016]

³ Parts of this section have been also published in Federal Statistical Office (2015)

⁴ The reported level of net migration tends to be too high because not everyone leaving the country officially deregisters and these individuals are therefore not included in migration statistics. Any need to correct the updated population size - such as after the 2011 census - primarily arises from underestimated emigration figures.

3. However, there were also phases of negative net migration in between - such as in the mid-1970s and 1980s - and phases where the migration situation was calmer, such as between 2004 and 2009 when net immigration was significantly below 100,000 persons. Since 2011, Germany is once again experiencing a marked increase in net immigration. Initially the increase was attributable to the free movement of workers for EU acceding states and immigration from Southern Europe (particularly affected by the economic crises) due to opportunities presented on the labour market. Latest by 2015 it was mainly driven by the influx of asylum seekers from areas of conflict and crisis in Asia and Africa.

Figure 1: Net-migration across German borders – from 2014, assumptions of the 13th coordinated population projection



Source: Federal Statistical Office 2015

4. Two assumptions on net migration have been made for the 13th coordinated population projection in awareness of the real development up until 2013. Both scenarios assume net immigration of 500,000 persons for 2014 and 2015. With regard to long-term migration trends, it was assumed that the level of migration will gradually ease off to levels that frame the long-term averages. Therefore net migration will decrease at a different pace within six years, depending on the particular assumption: Within assumption W1, annual net migration will already have dropped to 350,000 persons in 2016, and will then decrease gradually to 100,000 by 2021. Therefore, over the entire projection period from 2014 to 2060, a total of 6.3 million people would, on balance, immigrate to Germany, equating to an average net migration of 130,000 per year. Within assumption W2, net migration will decrease steadily to 200,000 persons. As a result, there would be cumulative net immigration of roughly 2.8 million persons by 2020 and of roughly 10.8 million persons by 2060. This is equivalent to a net migration of around 230,000 people per year on average for the period spanning 2014 to 2060.

5. These two assumptions set the range within which net migration has developed over a long-term average since the 1950s and within which migration patterns are likely to develop in the future. The assumed values must be interpreted

as long-term averages; in all likelihood net migration levels will also be subject to great variation in the future as it was usual for the past.

6. Furthermore, two additional model assumptions have been made for analytical purposes. Balanced net migration is assumed in one scenario, while the second model assumes long-term net migration of 300,000 persons per year (from 2016), or 14.5 million persons in the period between 2014 and 2060.

7. The structure of net migration in terms of age and sex is based on the empirical age distribution among immigrants and emigrants, which is particularly stable among foreigners. On average, persons immigrating to Germany are younger than those leaving the country. The population in Germany gets younger as a result. The level of emigration generally tends to be relatively constant over several decades. Because of this stability, one can speak of a ‘basic migration flow’ which always takes place irrespective of the current level of net migration. This basic migration has also been considered in the assumptions of the 13th coordinated population projection. The projected numbers of immigrants and emigrants behind the assumptions on net migration are shown in Table 1.

Table 1: Migration across German borders – assumptions of the 13th coordinated population projection

Years	Persons, total					
	Assumptions W1 => 100.000			Assumptions W2 => 200.000		
	Immigrants	Emigrants	Net migration	Immigrants	Emigrants	Net migration
2014	1 200 000	700 000	500 000	1 200 000	700 000	500 000
2015	1 200 000	700 000	500 000	1 200 000	700 000	500 000
2016	1 000 000	650 000	350 000	1 150 000	700 000	450 000
2017	950 000	650 000	300 000	1 100 000	700 000	400 000
2018	850 000	600 000	250 000	1 000 000	650 000	350 000
2019	750 000	550 000	200 000	950 000	650 000	300 000
2020	650 000	500 000	150 000	850 000	600 000	250 000
2021-2060	600 000	500 000	100 000	750 000	550 000	200 000
Annual Average	650 000	520 000	130 000	800 000	570 000	230 000

Source: Federal Statistical Office

b) Critical perception of the projection

8. Critical articles on the population projections by the Federal Statistical Office have been published in several German newspapers. The range of objections made to the projections was very broad – from being entangled with economic interests to being not visionary enough. The starting point was the discrepancy between actual and projected migration numbers in each case. In conjunction with this discrepancy, the current increase of the total population in contrast to a projected shrinking in the long term by the present projection and previous versions of it was shared as main argument for considering the projections as misleading.

9. The article published in the “Frankfurter Allgemeine Zeitung”⁵ criticises that the projections postulate a certainty of future population developments while neglecting the important secondary conditions. The author deplors that the Federal Statistical Office only provides scenarios that lead to a shrinking population. The projections erroneously do not consider what would happen if the current inflow of migration will continue in combination with increased fertility. In order to consider uncertainty it is suggested to use probabilistic projections instead of the “pseudo-computable” deterministic projections.

10. “Unworldly numbers” was the headline of an article published in the “Sueddeutsche Zeitung”⁶ for describing the results of the current population projection for Germany. The authors argue that the Federal Statistical Office makes efforts to talk the current immigration down, thereby neglecting the fact that the current high numbers could be a permanent phenomenon. They point out that the official argumentation ignores that the high immigration in the 90s only went down because of changes in law. The authors doubt that a long term average has any predictive power and consider a permanent migration pressure as foreseeable. It is highlighted that migration has shaped Germany’s society during the last decades and assumed that this process will accelerate in the future.

11. A column published in “Neues Deutschland”⁷ also considers the assumptions on migration as “wrong and way too pessimistic”. The author argues that the turbulent development of the last months has shown in an impressive way how wrong they have been. He refers to the “youth bulb” in Africa and in the Middle East in combination with underemployment which will make immigration an abiding theme for the next decades. In conclusion the assumptions on net migration with 100,000 or 200,000 persons per year are labelled as “absurd”.

12. Another critical article⁸ argues that the German population is increasing already since 2011 although earlier projections indicated a long-term shrinking. A professor in statistics is cited with a statement that “projections are not worth the paper they are written on”, referring to unpredictable events that were happening since the 1960s and shaped the German population in 50 years retrospective. Examples are the immigration by “guest-workers”, the introduction of the contraceptive pill or the German reunification.

c) Reflection on points of criticism

13. The intention of the Federal Statistical Office with its population projections is to reveal the future development of the population in case the long term demographic trends continue. Unpredictable events such as changes in law (e.g. immigration laws, family policies), epidemics or wars/crises and associated migration waves cannot be considered in such a projection. This is one of the reasons why the official projection is labelled projection and not “forecast” – to underline the hypothetical character of such an exercise. Nevertheless population projections have a high relevance. This is due to the strong influence the current

⁵ Frankfurter Allgemeine Zeitung, Sep. 23rd 2015, “Deutschland will einfach nicht veröden” by Christian Schwägerl

⁶ Sueddeutsche Zeitung, Nov. 6th 2015, „Weltfremde Zahlen“ by Stephan Lessenich and Reinhard Messerschmidt

⁷ Neues Deutschland, Dec. 30th 2015, “Rechnungen ohne den globalen Wirt“ by Thomas Gersterkamp

⁸ Berliner Zeitung, Jan. 2nd 2016, „Falsch vorhergesagt“ and Frankfurter Rundschau, Jan 4th 2016, „Das Volk wächst allen Prognosen zum Trotz“ by Stefan Sauer

age structure and the size of the population have on future population developments (population momentum) and the high persistence of trends in the subfields of fertility and mortality. Although migrations as third subfield are much more unstable, a projected long-term development of the population describes a consistent development which will be realised if future fluctuations around long-term averages cancel each other out. Of course, the assumed values for single years must be interpreted as long-term averages, which is due to the fluctuating character of the phenomenon.

14. The reasons why all the main scenarios of the latest population projections lead to a shrinking population in the long term can also be derived by looking at the long-term demographic trends and the current age-structure of the German population⁹. Especially the development of the number of births and the number of deaths is marked already out to a large extent, since the underlying demographic parameters on fertility and mortality show persistent trends. In addition to that, these numbers are greatly dependent on the current age structure. This can be made more explicit by referring to two key developments: The large cohorts of the “baby boomers” (the cohorts born between 1955 and 1965, approximately) will reach the higher ages with high probabilities of dying within the projection horizon and thereby drive the annual number of deaths above one million. At the same time, the number of women in the fertile ages will be on the decrease – this is also marked out by the current age structure. Even if fertility increases from 1.4 to 1.6 children per woman, the number of births will decline during the projection horizon in comparison with the current numbers of about 700,000 births per year. Thus, the difference between the number of births and the number of deaths will reach levels between 300,000 and 500,000 per year. Developments in fertility and/or mortality that might prevent such high numbers for the deficit of births are currently not in sight.

15. In theory a long-term shrinking of the population can be prevented by permanent high net immigration. But the assumptions made on net migration are shaped by looking at the migration history of Germany, in which phases of high net immigration alternate with phases during which the migration situation was calmer. In the 90s, for instance, net immigration went down from levels of almost 800,000 to levels of less than 100,000 within a few years. Changes in law that were partly responsible for that development are as likely for the future as they were in the past. Current policy discussions in reaction to the recent influx of refugees already point to a similar direction. In addition to that, the economic attractiveness of Germany as important predictor for migration is also subject to fluctuations that affected the migration balance in the past. Such fluctuations will most likely also happen in the future, but cannot be foreseen over the usual projection periods of population projections (i.e. for 50 years or more).

16. The long-term average since 1954 for immigration gains of Germany is 186,000 persons per year. That this number will nearly double in the next five decades appears not to be foreseeable even though current numbers are much higher. This is why an assumption that departs from 300,000 net immigrants per year was labelled only as a model scenario within the recent projection and not regarded as one of the main variants. High net migration for several decades to

⁹ See Federal Statistical Office (2015, Chapter 3.3.) for a detailed description.

come appears even less likely if we consider that traditional (and current) countries of origin (southern and eastern European states) are projected to age and experience shrinking population sizes themselves during the projection horizon. In ten to twenty years, there will be fewer people of active migration age in those countries. Furthermore, the need for those countries to retain their own workforce is likely to increase. This means that the external migration potential will decrease with the result that Germany can probably expect far less immigration from countries which have been the most important regions of origin in the past. Compensation with migration from Africa and Asia (as refugee flows or in consequence of globalisation or other factors such as climate change) is theoretically possible. The young populations in many of the potential countries of origin provide a large migration potential. Nevertheless, these migration streams are hard to predict, based on the knowledge available on them so far.

17. Using probabilistic projections instead of deterministic projections is from today's perspective no way out of the uncertainties linked with any kind of projection. Unpredictable events will always lead to discrepancies between the projected and the real development. The real values in such a case fall outside the corridors that different scenarios or confidence intervals based on observed trends up until the base year of the projection can provide. The current population increase of Germany falls outside the variants of a probabilistic projection for Germany calculated by Bohk (2012)¹⁰ or the 95 % confidence interval of the latest population projections made by the UN for Germany¹¹. The projection by Bohk (2012) thereby explicitly includes uncertainty of migration trends, whereas the UN projection does not do so. For a statistical office it is difficult from our point of view to publish probabilities on future trends. They would suggest a certainty that does not exist in reality. Deterministic what-if-scenarios have a clear and definite result, whereas projected confidence intervals do not only depend on the assumptions with regard to fertility, mortality and migration, but also on different methods and expert judgments. Since there is no probability for unpredictable events (wars/crises, policy changes etc.), it is doubtful that there is a probability for any kind of future population development, as the current population development in Germany shows. Nevertheless, deterministic and probabilistic population projections come to the same conclusion for the long term population development of Germany: a shrinking of the population is almost inevitable from today's perspective. Only rigorous and persistent changes in demographic trends could alter this development.

18. From our perspective, discussions on the future aging of the population are even more relevant than the discussions on its future shrinking. We left out the discussion on that issue here, since the authors of the newspaper articles referred to that topic only in a marginal way, if at all. Results on future population aging are even less sensitive to unpredictable events than results on population shrinking. The Federal Statistical Office addressed this issue with a special press release¹².

¹⁰ Bohk, Christina (2012). Ein probabilistisches Bevölkerungsprognosemodell – Entwicklung und Anwendung für Deutschland, Springer VS.

¹¹ United Nations Population Division. 2015 Revision of World Population Prospects, <http://esa.un.org/unpd/wpp/>.

¹² https://www.destatis.de/DE/PresseService/Presse/Pressemitteilungen/2016/01/PD16_021_12421.html [published 20th Jan. 2015, last access 25nd February 2016]

III. Conclusion

19. In the context of the debate on migration assumptions for Germany, there are several options available to projection makers in theory for dealing with unpredictable events such as the recent influx of refugees. In the following we conclude on them one by one, based on the previous elaborations.

20. The first option would be a new projection in which the projected number of net immigrants for the whole projection period is simply raised as required in the newspaper articles. In light of what we know about the history of migration in Germany, this option can in our opinion not be justified in a convincing way. To implement scenarios with increased net immigration, detailed knowledge about the extent and the duration of that phenomenon would be necessary. The scenarios cannot be based on observations of one or two years. Several arguments give some indication that a corridor of 130,000 to 230,000 net-migrations per year averaged over the projection horizon as assumed in the recent population projection is realistic from today's perspective: phases with high net immigration have always alternated with phases of low immigration. Traditional countries of origin are aging and shrinking, too. Policies tend to restrict migration as soon as particular streams gain a certain momentum. Furthermore, the corridor also includes the possibility that the future long-term average will be about 1/3 higher or lower than the one valid for the past decades (186,000 per year).

21. Another option would be to broaden the range of potential migration developments within the first years of the projection and to reach long-term averages only in the medium term within deterministic assumptions. This option would have the advantage that several potential developments are included from the beginning of the projection horizon. But it would also contradict the idea that migration can only be projected in terms of a long-term average. Achieving the long-term average linearly year by year over a short period of time is one way to communicate that the last observed value is losing its predictive power as the distance to the jump-off year grows, and that the importance of long-term averages grows at the same time. Annual values of assumed net migrations shall not be mistaken as point projections in any way.

22. We also mentioned the option of communicating the inherent uncertainty of population projections by using probabilistic methods. The results of comparable probabilistic projections caused the same irritations with regard to current population developments as the deterministic projections did. Unpredictable events at the beginning of a projection period can question both kinds of projections to the same extent. Since it is difficult to assign probabilities to unpredictable events, it will be hard to assign reliable probabilities to future population developments for official projections. In addition to that, probabilistic projections require additional assumptions and statistical techniques that are difficult to make transparent to users of projections, which is problematic for a statistical office.

23. With the aim to increase the short-term accuracy of population projections, it is also possible to consider approaches for deriving assumptions in the short term that differ from the ones that have been used for the conventional long-term projections. The usual methods which are based on long-term trends would have to be combined with econometric models and/or with expert judgements on economic, political and social factors influencing fertility, mortality and especially

migration within a short time horizon. Taking into account these factors might enable to capture some of the variability in a small time horizon that is ignored by conventional long-term projections. The results of such an approach could then really be interpreted as forecast of the population development a few years ahead. However, it would be necessary to examine whether or not a concurrent existence of long-term population projections and short-term forecasts does not only add additional confusion to the discussion on future demographic trends.

Reference:

Federal Statistical Office of Germany (2015): Germany's Population by 2060 - Results of the 13th coordinated population projection.