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On the reliability of population projections

# On the reliability of population projections

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The unexpected increase in the German population to an estimated 82.8 million as a result of the influx of refugees has sparked a debate on just how reliable population projections are. The key question is how quickly these projections should be adjusted to reflect current developments, given that they form an important basis for political decisions. The reliability of population projections rests on the quality of the pool of data and of the assumptions on the future development of demographic parameters, i.e. mortality, birth rates and net migration. The assumptions include both values based on experience and current developments, which are often difficult to confidently categorize as trends or one-off blips at the time the projection is made. The population forecasts of the Federal Statistical Office of Germany (*Statistisches Bundesamt*) show that the predictive accuracy of birth rates and life expectancy has improved over the last few decades as the development in these two parameters has become more stable, whereas net migration has been virtually impossible to predict given its volatility in the past.

## Sustained high level of immigration pushes population figure up more sharply than expected

In 2015, the Federal Republic of Germany reported net migration of 1.14 million people due to the influx of refugees from the Near and Middle East, the highest level reported in its history. A total of 2.14 million people moved to Germany, while just under 1 million people left the country - both record values.<sup>1</sup> 2016 is expected to bring positive net migration of at least 750,000 people. This pushed the total population up to 82.8 million by the end of 2016<sup>2</sup>; in its current 13th population forecast<sup>3</sup>, the Federal Statistical Office of Germany had only expected net migration of just under 500,000 and an increase in the total population to up to 81.6 million<sup>4</sup> in 2016.

This differential sparked a debate on how quickly population projections should be adjusted to reflect current developments in order to provide a reliable basis for political decisions, such as decisions on how much to invest in infrastructure, residential construction or educational institutions, but also on the structure of the social security system. As yet, there is no definitive answer to the key question as to whether the current level of immigration signals the start of a new long-term trend, or is a temporary, exceptional situation that can be traced back mainly to the current crises in the Near and Middle East. The developments seen in 2016 do not yet provide a definitive answer either: although the German Federal Ministry of the Interior has since made a downward revision to its information on the number of asylum seekers in 2015, reducing the figure by around 200,000 to 890,000<sup>5</sup>, and despite the fact that, at 280,000, the number of asylum seekers coming to Germany in 2016 was much lower than in 2015, net migration nevertheless remained at a very high level: the figure is expected to come to around 750,000 in 2016, which would still be the second-highest value seen in the history of the Federal

<sup>1</sup> Cf. Federal Statistical Office of Germany (2016): *Bevölkerung und Erwerbstätigkeit: Vorläufige Wanderungsergebnisse 2015*.

<sup>2</sup> Cf. Federal Statistical Office of Germany (2017): *Bevölkerung in Deutschland voraussichtlich auf 82,8 Millionen gestiegen*.

<sup>3</sup> The population forecasts of the Federal Statistical Office of Germany are not forecasts in the narrowest sense of the term, but rather statistically-based extrapolations of demographic structures taking the assumptions applied into account. Cf. Pötzsch, Olga (2016): *(Un-)Sicherheiten der Bevölkerungsvorausberechnungen*, pp. 37 et seq.

<sup>4</sup> Cf. Federal Statistical Office of Germany (2015): *Bevölkerung 2060. Ergebnisse der 13. koordinierten Bevölkerungsvorausberechnung*.

<sup>5</sup> Cf. German Federal Ministry of the Interior (2016): *890.000 Asylsuchende im Jahr 2015*.

Republic of Germany after 2015 (and together with 1992).<sup>6</sup> A look at the history of population forecasts also shows just how difficult it actually is for forecasters to pick up on trend shifts in time.

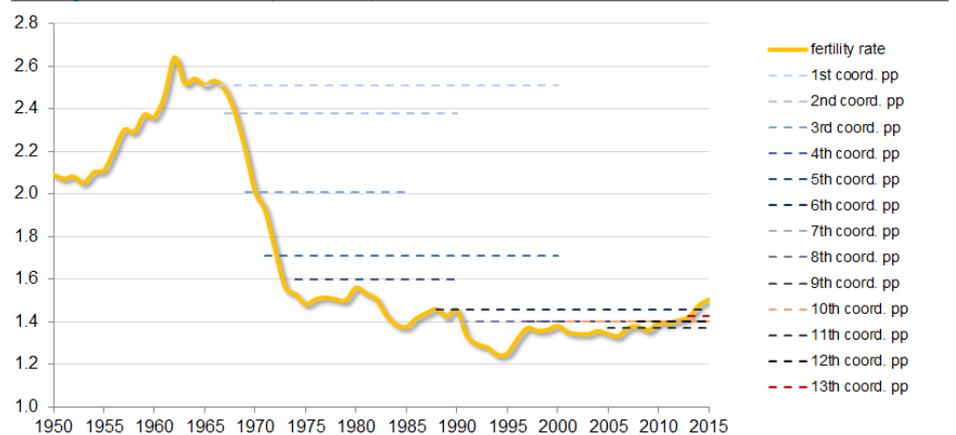
### Birth rates: the baby boom and pill-induced "baby bust" caught forecasters off-guard

In the first population forecasts of the 1950s, for example, the the number of births was underestimated because the birth rate was not expected to increase from the level seen in the immediate aftermath of the Second World War. The baby boom starting in the mid-1950s, which peaked at 1.4 million babies born in 1964, took the forecasters just as much by surprise as the drastic downturn in the birth rate in the 1970s did.

In the first, second and third coordinated population forecast based on the years 1965, 1967 and 1969, the birth rate observed in the year taken as a basis/predicted for the following year was expected to remain constant. This meant that the number of births in the 1960s was significantly underestimated. The very opposite was true in the 1970s. As such a drastic slump in the birth rate was unprecedented at that time, the first scenario of the fourth population forecast, which took 1971 as a basis, assumed that the birth rate seen in 1972 would remain constant, while the second scenario assumed a 10% drop in the birth rate in the period leading up to 1975. In the fifth coordinated forecast, the birth rate was predicted, in light of the current developments, to drop by 1.0%/1.5% in the period leading up to 1976, and then to remain constant. In both cases, the birth rates assumed proved to be too high in retrospect.

### In the last 30 years, assumptions about the future development of fertility hit the mark

Total fertility rate, various population projections (pp)  
(Average number of children per woman)



Sources: Federal Statistical Office of Germany, Bretz, Manfred (1986 and 2001) and Pötzsch, Olga (2016).

Since the seventh coordinated population forecast based on 1989,<sup>7</sup> the Federal Statistical Office of Germany has assumed a constant average birth rate of around 1.4 children for the old (former West German) federal states. The development in the birth rate in Ger-

<sup>6</sup> Cf. German Federal Ministry of the Interior (2017): 280.000 Asylsuchende im Jahr 2016 and Federal Statistical Office of Germany (2017): Bevölkerung in Deutschland voraussichtlich auf 82,8 Millionen gestiegen.

<sup>7</sup> The sixth coordinated population forecast, based on 1988, was not completed due to German reunification.

many, as in most developed countries, has, in fact, stabilized at a low level, fluctuating between 1.3 and 1.4 children per woman in the period from 1995 to 2014. In 2015, the consolidated birth rate rose to an average of 1.5 children per woman for the first time since 1982; this was due to an increase in the birth rate among German women to 1.43 children and among foreign women to 1.96 children.<sup>8</sup> So does 2015 mark a turning point and the start of a trend back towards higher birth rates, perhaps even to the sort of birth rates seen in Sweden or France? Could it even be the case that the assumption of an increase in the birth rate to 1.6 children by 2028 in the alternative scenario of the Federal Statistical Office of Germany will prove to be too conservative given the high level of immigration and much higher birth rate among foreign women?<sup>9</sup> No serious answers to these questions have been identified so far.

### The increase in life expectancy was underestimated

While the development in the birth rate was overestimated for quite some time, the increase in life expectancy was underestimated. The first trend that emerged was that, thanks to medical advances and a rapid increase in the standard of living, child mortality, in particular, dropped more significantly and more quickly in the post-war years than had been expected. Since the 1970s, the life expectancy trend has been determined largely by the drop in mortality in old age, which was sometimes much more pronounced in the past than the forecasts had assumed.

Due to the stagnation in life expectancy trends observed from the middle of the 1960s onwards<sup>10</sup>, the Federal Statistical Office of Germany assumed that the respective mortality levels seen in 1967 and 1971, the years taken as a basis for its second and fourth coordinated population forecasts, would remain constant; in the third forecast, only child mortality was expected to decline. This resulted in the number of deaths being considerably overestimated. In the 1980s, the actual figures were generally 15% to 20% lower than the figures set out for the respective years in the third population forecast.<sup>11</sup>

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<sup>8</sup> Cf. Federal Statistical Office of Germany (2016): homepage.

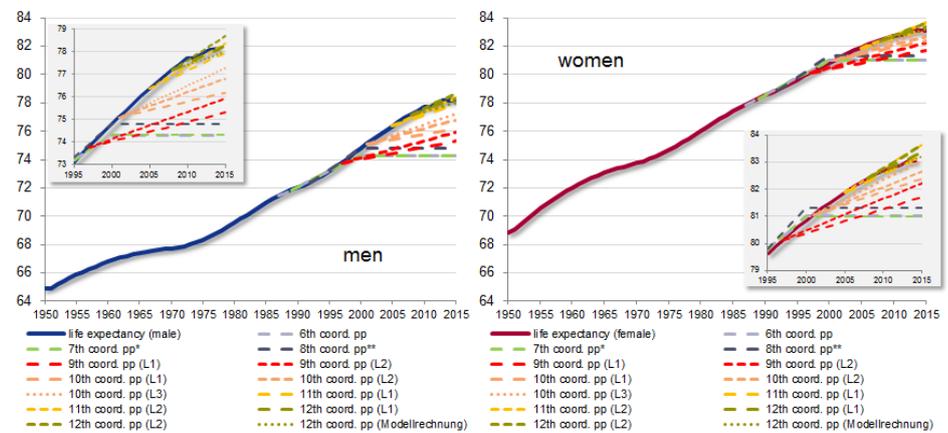
<sup>9</sup> Cf. Federal Statistical Office of Germany (2015): *Bevölkerung Deutschlands bis 2060. Ergebnisse der 13. koordinierten Bevölkerungsvorausberechnung.*

<sup>10</sup> In particular, male life expectancy did not increase by as much as it had in previous years due to changes in lifestyles. The prevalence of cancer, cardiovascular disease, but also fatal road traffic accidents increased during this period. Cf. Keilmann, Nico (2008): *European demographic forecasts have not become more accurate over the past 25 years*, p. 145.

<sup>11</sup> In 1984 and 1985, the actual number of deaths was around 20% lower than the figure predicted for this period in the third coordinated population forecast from of 1969. Cf. Bretz, Manfred (2001): *Zur Treffsicherheit von Bevölkerungsvorausberechnungen*, pp. 909 et seq.

## Increase in life expectancy has been underestimated

Life expectancy at birth, various population projections  
(in years)



Sources: UN Population Division, Federal Statistical Office of Germany, Bretz, Manfred (1986 and 2001) and Pöttsch, Olga (2016).

In the fifth coordinated population forecast, it was assumed that the trend observed between 1961 and 1972 would continue up until 1980. For the years that followed, leading up to 1990, life expectancy was not expected to increase any further. In its seventh coordinated population forecast based on 1989, the first forecast after reunification, the Federal Statistical Office of Germany predicted that life expectancy in the western German federal states would have risen from 72.6 to 74.3 by 2000 for newborn boys, and from 79.0 to 81.0 years for newborn girls. It did not predict any further increase for the period thereafter. As far as the new (former East German) federal states were concerned, it was assumed that the life expectancy level would have been brought into line with the former West Germany by 2030.<sup>12</sup> In actual fact, average life expectancy in the former West Germany had already risen to 75.4 for a newborn boy and 81.2 for a newborn girl in 2000; in the former East German states, the figures came to 73.7 and 80.5 respectively.<sup>13</sup> Life expectancy has risen further since then. According to the current period mortality table, a boy born today has an average life expectancy of 78.2, with a girl born today expected to live for 83.1 years.<sup>14</sup> So looking back, the increase in life expectancy for boys was underestimated by 3.9 years, and that for girls by 2.1 years, at the time of reunification.

In the eleventh and twelfth population forecast, on the other hand, the increase in life expectancy was overestimated. First, the life expectancy applied to the base year was too high; the mortality tables were corrected to reflect the results of the 2011 census. Second, the increase in female life expectancy slowed, resulting in less of a gap between male and female life expectancy. This explains why the current 13th coordinated population forecast assumes, for the very first time, a slightly weaker increase in life expectancy than the previous population forecast.

The question is, however, whether the life expectancy assumed in the base year is not systematically underestimated. After all, the population forecast is based on period life tables. These are cross-sectional analyses that use current life expectancy trends to show

<sup>12</sup> Cf. Bretz, Manfred (2001): Zur Treffsicherheit von Bevölkerungsvorausberechnungen, p. 917.

<sup>13</sup> Cf. Federal Statistical Office of Germany (2016): 1999/2001 mortality tables.

<sup>14</sup> Figures relate to Germany. Cf. Federal Statistical Office of Germany (2016): 2013/2015 mortality tables. Cf. Eisenmenger, Matthias und Dieter Emmerling (2011): Amtliche Sterbetafeln und Entwicklung der Sterblichkeit, p. 224.

the average number of additional years that a person of a certain age could still live for, assuming no change in the mortality conditions set at the time of the analysis during that person's entire lifetime. This means that life expectancy gains resulting from possible medical progress are not included in the assumption. The effect of events like these only shows up in the generation life tables showing the average number of years lived by people born in a certain year in a long-term evaluation performed in retrospect. According to the general life table from 1910/11, the average life expectancy was 47.4 years for a newborn boy and 50.7 years for a newborn girl. According to the generation life table, the long-term evaluation, boys and girls born in 1910 who lived through both World Wars reached an average age of 52.1 and 58.8 respectively. This means that the average life expectancy for people born in 1910 was underestimated by five and eight years respectively at the beginning of the last century.<sup>15</sup> If the generation life tables are projected forward, then a boy born in 2009 would have had an average life expectancy of 83.0 at the time of his birth and a girl born in the same year would be expected to live until the age of 88.2 on average; based on the period life tables, on the other hand, the average life expectancy of a newborn baby in 2009 "only" came to 77.3 and 82.5 respectively.

### Assumptions on net migration were the biggest source of errors in population forecasts

The net migration figures proved to be much more volatile than the development in the birth rate and life expectancy, which ultimately made them the biggest source of errors in the forecasts.

In its first estimate based on 1951, for example, the Federal Statistical Office of Germany assumed, in its scenario for the "likely development", that net migration would be balanced at best. This assumption rested on the fact that net migration was still in negative territory at the beginning of the 1950s. It was only in an additional model that 100,000 people were predicted to migrate to Germany every year in the period leading up to 1972.<sup>16</sup> But in actual fact, net migration had risen to 547,085 people by 1973 due to Germany's drive to attract foreign workers, meaning that net migration averaged around 155,000 in the period between 1952 and 1972.<sup>17</sup> A comparison of the population forecast for 1980 and the actual population level in that year shows a deviation of 16%, with 61.7 million people already living in what was then the Federal Republic of Germany instead of the just under 50 million that had been predicted.<sup>18</sup>

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<sup>15</sup> Cf. Federal Statistical Office of Germany (2015): Generationensterbetafeln für Deutschland.

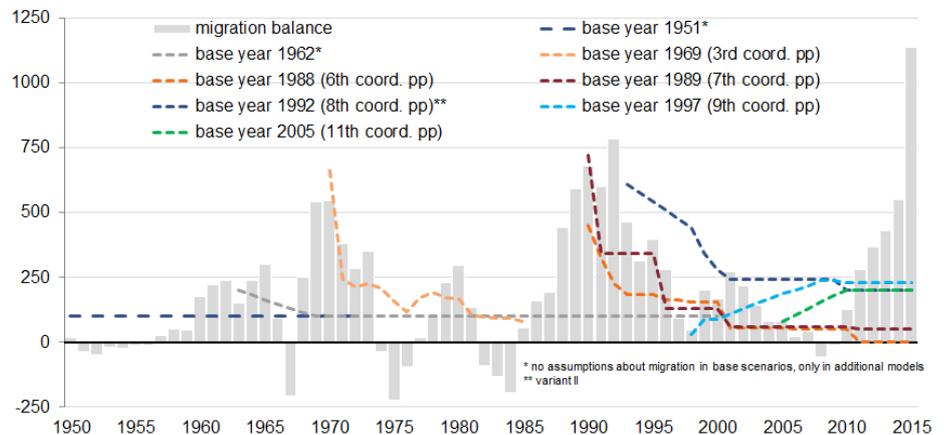
<sup>16</sup> Cf. Bretz, Manfred (2001): Zur Treffsicherheit von Bevölkerungsprognosen, p. 917.

<sup>17</sup> Cf. Federal Statistical Office of Germany (2016): Bevölkerung und Erwerbstätigkeit. Wanderungen 2014.

<sup>18</sup> Cf. Bretz, Manfred (2001): Zur Treffsicherheit von Bevölkerungsvorausberechnungen, p. 907.

## Migration balances hard to predict

Migration balance, actual development and assumptions  
(in thousands)



Sources: Federal Statistical Office of Germany, Bretz, Manfred (1986 and 2001) and Pöttsch, Olga (2016).

The forecast taking 1962 as a basis had also been characterized to a considerable degree by the situation prevailing at the time. Surprises were in store not just in terms of the dramatic slump in the birth rate at the end of the 1960s, but also in terms of the sustained high level of migration. "Even taking an optimistic view, it was assumed that net migration would fall from 252,000 in 1962 to 100,000 in 1965 and that it would have fallen to zero by 1970."<sup>19</sup> In actual fact, net migration, which fluctuated significantly during the entire forecast period, averaged 240,000 people.<sup>20</sup> In the fourth and fifth coordinated forecasts based on 1971 and 1974, net migration was on the decline, and a downward net migration trend was assumed for the respective forecast period, i.e. for the periods leading up to 2000/1990.<sup>21</sup>

In the seventh population forecast based on 1989,<sup>22</sup> the first after German reunification, rising net migration was reflected accordingly in the assumptions, with net migration predicted to come to 720,000 in 1990 and then to average 341,000 people a year in the period from 1991 to 1995. In actual fact, however, the number of people moving to Germany exceeded those leaving the country by 511,925 a year during this period, meaning that the net migration figures subsequently proved to be too low for the period leading up to 2010 as well.

By contrast, in the eighth coordinated population forecast that followed, taking 1992 as a basis, the level of net migration predicted by the Federal Statistical Office of Germany in its "medium scenario", presumably motivated by the wave of migration in the early 1990s, proved to be too high. It had assumed net migration of more than 600,000 people for 1993, a figure that was then tipped to drop to 200,000 in the long term. Compared with the actual development, this forecast had overestimated the actual population level.<sup>23</sup>

This explains the gap of 7.4 million between the seventh and eight population forecast: in

<sup>19</sup> Bretz, Manfred (2001): Zur Treffsicherheit von Bevölkerungsvorausberechnungen, p. 909.

<sup>20</sup> Cf. Federal Statistical Office of Germany (2016): Bevölkerung und Erwerbstätigkeit. Wanderungen 2014.

<sup>21</sup> Cf. Bretz, Manfred (2001): Zur Treffsicherheit von Bevölkerungsvorausberechnungen, pp. 917 et seq.

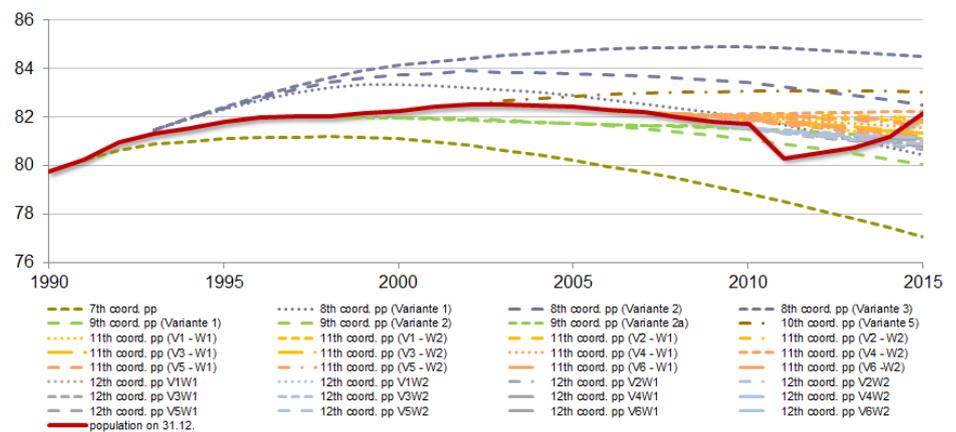
<sup>22</sup> The sixth coordinated population forecast was not published due to German reunification.

<sup>23</sup> Cf. Bretz, Manfred (2001): Zur Treffsicherheit von Bevölkerungsvorausberechnungen, p. 919.

the seventh coordinated population forecast from 1989, the population was expected to have dropped to 77.1 million by 2015. In the subsequent eighth coordinated population forecast based on 1992, on the other hand, the Federal Statistical Office of Germany expected to see the population swell to 84.5 million in its upper, third scenario, to rise to 82.5 million in its medium scenario and to fall to 80.4 million in its lower scenario.<sup>24</sup>

### Latest developments influence population projections

Total population, various projections  
(in million)



Sources: Federal Statistical Office of Germany, Sommer, Bettina (1992 and 1994), Bretz, Manfred (2001), S. 916 ff.; Pätzsch, Olga (2016).

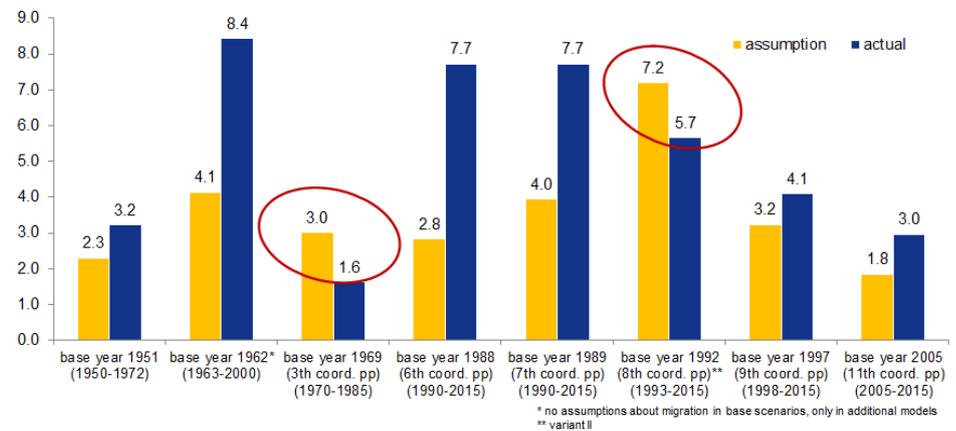
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All in all, however, the net migration levels predicted by the Federal Statistical Office of Germany tended to be too low; the actual figures were, in some cases, more than twice as high as assumed. In the seventh coordinated population forecast based in 1989, for example, net migration of 4.0 million people had been assumed for the period between 1990 and 2015. In actual fact, the number of people arriving in Germany exceeded those leaving by 7.7 million during this period. It was only in those population forecasts based on years with extremely high levels of net migration that the figures were overstated. In the third coordinated population forecast based on 1969, for example, the Federal Statistical Office of Germany predicted net migration of 3.0 million between 1970 and 1985. The actual figure, however, only came to 1.63 million. And while the assumptions included in the eighth coordinated population forecast predicted net migration of 7.2 million people between 1993 and 2015, the actual figure only came to 5.7 million.

<sup>24</sup> Cf. Federal Statistical Office of Germany (1994): Entwicklung der Bevölkerung bis 2040.

## Assumptions about future migration balances often prove to be too conservative

Migration balances, actual developments and assumptions  
(in million)



Sources: Federal Statistical Office of Germany; Bretz, Manfred (2001): Zur Treffsicherheit von Bevölkerungsvorausberechnungen, S. 917 ff.

## Migration balance dominated by immigration

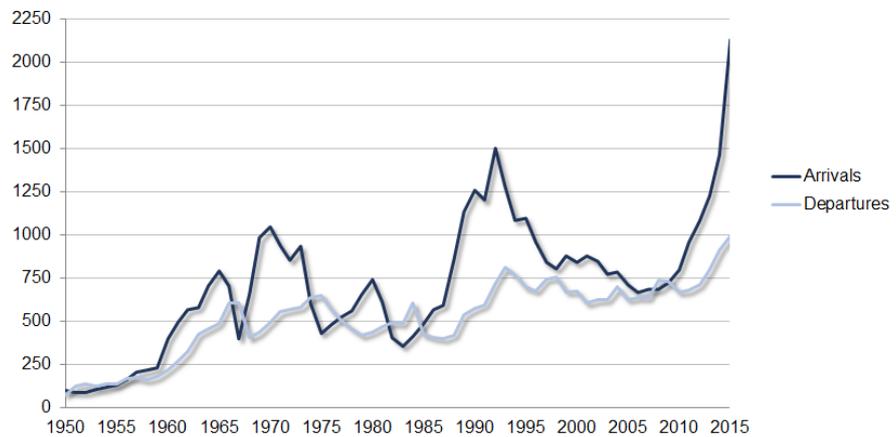
Immigration development played a decisive role in shaping Germany's migration balance. Whereas migration remained relatively stable at around 500,000 people a year between 1965 and 1990, before fluctuating at around the 600,000 mark in the period leading up to 2013, immigration to Germany came in waves, with peaks being reached in 1970, 1992 and - at least provisionally - in 2015.

The Federal Republic of Germany witnessed the first wave of immigration after the first recruitment agreement was signed with Italy in 1955 as a result of the German economic miracle. The number of people moving to Germany rose continuously in the years that followed, a trend that was promoted not just by recruitment agreements with other countries, but also by a wave of East Germans moving to the West following the construction of the Berlin Wall in 1961;<sup>25</sup> 791,737 people moved to Germany in 1965. The upward trend was only interrupted by the recession of 1966/67, which slashed immigration to 398,403 people in 1967. A year later, however, the trend turned back around, with the immigration figure topping the 1 million mark for the first time in 1970.

<sup>25</sup> Agreements were concluded with Spain and Greece in 1960, Turkey in 1961, Morocco in 1963, Portugal in 1964, Tunisia in 1965 and Yugoslavia in 1967. Cf. Seifert, Wolfgang (2012): Geschichte der Zuwanderung nach Deutschland nach 1950, p. 1.

## Arrivals fluctuated wildly in the past

Arrivals and departures  
(in thousands)



Source: Federal Statistical Office of Germany.

This first wave of migration came to an end when the first oil crisis reared its head. After the recruitment stop of 1973, the number of people moving to Germany fell to 429,064 in 1975, with most of these new arrivals reuniting with family members who had already moved to Germany.<sup>26</sup> Immigration then rose again up until 1980, although at 736,362, it fell short of the record values seen ten years previously. The rise in unemployment as a result of the second oil crisis in the years that followed pushed immigration levels down further to 354,496 in 1983 - the lowest value witnessed since 1959. This year also, however, marked a turning point.

Whereas the first wave of immigration had been fueled largely by economic factors, the second wave was driven by political motivations. From the end of the 1980s onwards, the collapse of the Soviet Union and the fall of the Iron Curtain prompted a wave of immigration to Germany largely among ethnic Germans who had previously been living in the former Soviet states. They were joined by refugees fleeing the war in the Balkans. In the years between 1989 and 1995, the immigration figures exceeded the 1 million mark, with 1992 marking the peak in that particular wave: in 1992 alone, more than 1.5 million people moved to Germany, with the total figure for this six-year period coming in at over 8.5 million. After that, the immigration figures fell up until 2006, although at 661,855, they remained much higher than the low witnessed two decades earlier.

The most recent wave of immigration started in 2007; since 2012, more than one million people have been moving to Germany every year. It is still uncertain whether the record year of 2015, when more than 2.1 million people moved to Germany, will in fact prove to mark the turning point in this wave of immigration. One thing that is certain, however, is that there has been a structural shift in terms of the countries of origin.

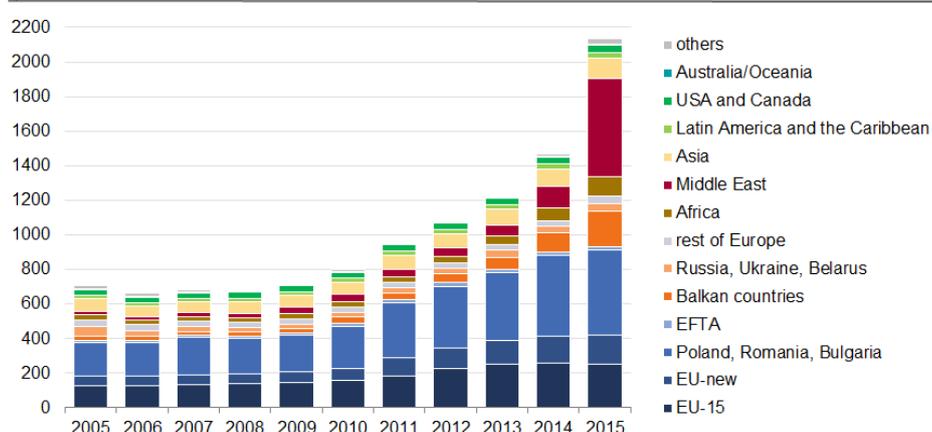
Up until 2014, the countries of origin of the immigrants arriving in Germany reflected the EU expansion phases and the development of freedom of movement within the EU. In particular, this trend was driven by the sharp increase in immigration from the new member states joining the EU as part of its eastward enlargement. One in three immigrants during this period came from Poland, Romania or Bulgaria. But while the increase

<sup>26</sup> Cf. Seifert, Wolfgang (2012): *Geschichte der Zuwanderung nach Deutschland nach 1950*, p. 1.

in the number of immigrants arriving from EU member states slowed considerably last year to only 3.7%, the number of civil war refugees from the Near and Middle East<sup>27</sup> seeking asylum in Germany increased fivefold to just under 560,000 people, with 326,379 coming from Syria alone. This means that in 2015, one in four immigrants came from one of the crisis-torn countries in this region. One in ten immigrants, or 205,078 people in total, came from the Balkans<sup>28</sup>, with most of them, namely 68,982, from Albania. So although the images of the immigrants arriving in 2015 are dominated by images of civil war refugees from Syria and economic migrants from the Balkans, the lion's share of immigrants, namely 43%, continued to come from EU member states, mainly from Poland, Romania or Bulgaria. 6% of immigrants were from Asia, 5% were African citizens and around 3% hailed from non-EU European countries.

### Record number of arrivals in the history of the Federal Republic of Germany in 2015

Arrivals, by region of origin  
(in thousands)



Source: Statistical Office of the Federal Republic of Germany.

### New record number of emigrants

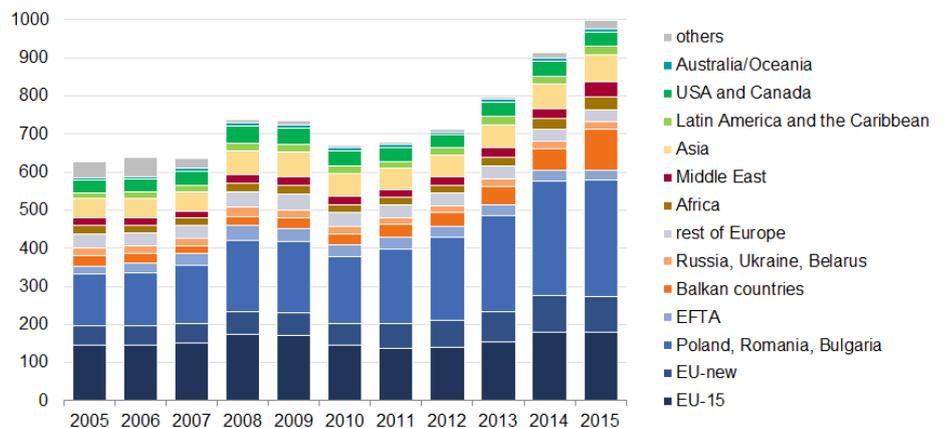
2015 did not just mark a record year for Germany in terms of immigration. Migration reached a new all-time high as well. 2015 saw 997,551 people turn their backs on Germany, with 138,273 of them German citizens. As with the countries of origin, the most popular destination countries specified tended to be other European countries and, in particular, EU member states: three out of four people who left Germany were bound for another European country. As in the previous year, around 600,000 of the emigrants were headed for an EU or EFTA member state. But whereas in the previous year, these emigrants accounted for 66% of the total, this figure dipped to "only" 61% in 2015 due to an above-average increase in the number of people moving to the Balkans. This figure virtually doubled within the space of a year, mirroring the increase in the number of immigrants in the previous year with a time lag: in 2014, 56,250 people left Germany for the Balkans, compared with 107,746 in 2015; this corresponded to a share of 11%.

<sup>27</sup> In this case: Afghanistan, Bahrain, Iraq, Iran, Israel, Jordan, Qatar, Kuwait, Lebanon, Oman, Pakistan, Saudi Arabia, Syria, the United Arab Emirates and Yemen,

<sup>28</sup> In this case: Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro and Serbia.

## Departures reached new record high

Departures, by world region  
(in thousands)



Source: Federal Statistical Office of Germany.

## Future migration balance depends not least on immigration policy

It is not certain whether the current developments can actually already be assumed to mark the start of a sustained trend, especially after the German Federal Ministry of the Interior made a downward revision to its information on the number of asylum seekers in 2015, which has been reduced by around 200,000 to 890,000<sup>29</sup>, and after the number of asylum seekers coming to Germany fell to 280,000 in 2016.<sup>30</sup> This means that it will remain virtually impossible for future population forecasts to predict net migration based on past experience, as a number of factors have an impact on this trend. Migration flows can be triggered by war, social unrest or economic crises in immigrants' home countries, or quite simply by the hope of a better standard of living abroad. The choice of the destination country is influenced by a number of decisive factors, such as the standard of living there, hopes regarding the prospects for integration and advancement, geographical proximity to an immigrant's home country, whether there is a network of compatriots at the destination and, last but not least, the destination country's immigration regulations. Given the intention expressed by policymakers to be more systematic in implementing the applicable laws in the future, the latter factor is likely to have an impact on the further development in the number of asylum seekers and migrant workers in Germany, too. It is also impossible to forecast how many of the refugees who came to Germany in 2015 and 2016 will remain in the long term. The situation could prove similar to that seen after 1990 if some of the refugees return to their home countries at a later date, resulting in a long-term increase in the number of emigrants.

Another factor that is difficult to forecast is how net migration from the eastern European EU member states will develop. Demographic change will start to leave more of a mark on the labor markets in these countries in the coming years. By 2035, the number of people of working age, i.e. aged between 20 and 64, will have dropped by around 15% in Poland and Romania and by more than 20% in Bulgaria.<sup>31</sup> This means that the influx of immigrants from these countries could fall in the medium to long term.

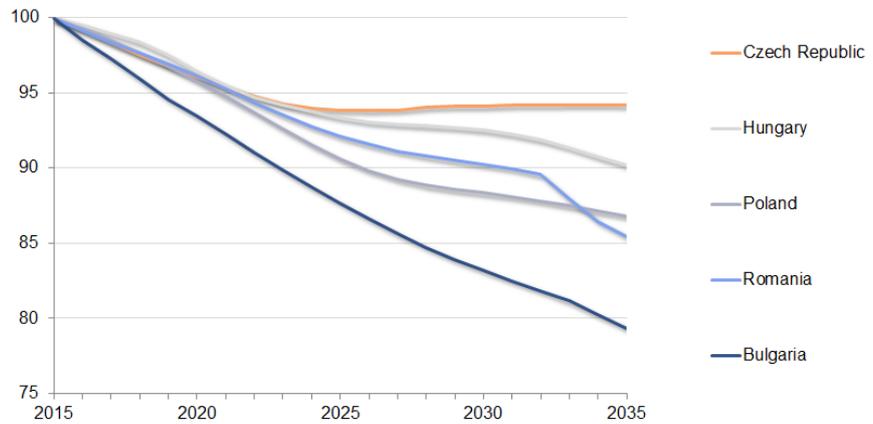
<sup>29</sup> Cf. German Federal Ministry of the Interior (2016): 890.000 Asylsuchende im Jahr 2015.

<sup>30</sup> Cf. German Federal Ministry of the Interior (2017): 280.000 Asylsuchende im Jahr 2016.

<sup>31</sup> Cf. Eurostat (2013): EUROPOP 2013, main scenario.

## Working age population set to decline in most EU member countries

Working age population (aged between 20 and 64 years)  
(index, 2015 = 100)



Source: Eurostat.

## Net migration as a key factor influencing future population development

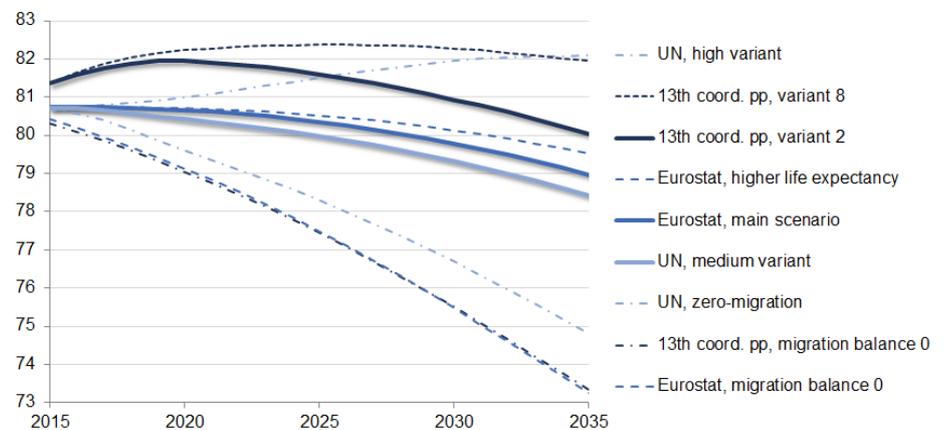
The current population forecasts and estimates of the UN, Eurostat and the Federal Statistical Office of Germany highlight the decisive role that immigration will play in future population development in Germany.

In the medium scenario, the three institutions expect to see the population shrink by between 1.3 and 2.3 million over the next 20 years, depending on the assumptions regarding the development in birth rates, life expectancy and net migration. In a scenario that is more hypothetical from today's perspective, namely in which the number of immigrants merely offsets the number of people leaving the country in the future, i.e. net migration of zero, the drop in the population would be much more pronounced, namely coming to 5.7 million according to the UN's calculations and around 7 million according to Eurostat and the Federal Statistical Office of Germany.<sup>32</sup> This sort of environment makes targeted immigration policy more important.

<sup>32</sup> Cf. Eurostat (2013): EUROPOP 2013, UN Population Division (2015): World Population Prospects, The 2015 Revision, Federal Statistical Office of Germany (2015): Bevölkerung Deutschlands bis 2060. Ergebnisse der 13. koordinierten Bevölkerungsvorausberechnung.

## Net migration is crucial for future demographic development

Total population, scenarios  
(in million)



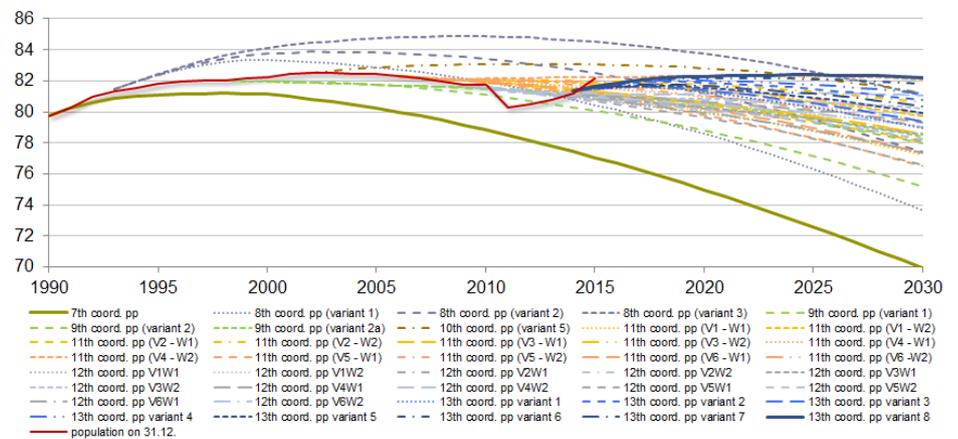
Sources: Federal Statistical Office of Germany, Eurostat and UN Population Division, World Population Prospects, The 2015 Revision.

As a result, the accuracy of population estimates is likely to suffer primarily from the volatility of migration patterns in the future, too. A comparison of the predictions set out in the population forecasts since reunification for 2030 reveals a range of around 12 million. In the seventh coordinated forecast, for example, the Federal Statistical Office of Germany predicted that the population would have fallen to just under 70 million by 2030, whereas in the 13th coordinated population forecast, it expects to see a population of between 78.9 million and 82.2 million, depending on the assumptions applied. By contrast, the Institute of the German Economy in Cologne, which assumes higher net migration in its population forecast than the Federal Statistical Office of Germany does, expects Germany to have a population of 83.6 million in 2030 in its medium scenario. In its alternative scenarios, it forecasts a drop to 80.8 million or an increase to 86.5 million.<sup>33</sup>

<sup>33</sup> These are the median values of the simulation, cf. Deschermeier, Philipp (2016): Einfluss der Zuwanderung auf die demografische Entwicklung in Deutschland, p. 10. Net migration is assumed to come to 850,000 people in 2016 and to decline to 218,000 people in the long run. In its 13th coordinated population forecast, on the other hand, the Federal Statistical Office of Germany expects net migration to come to 500,000 people in 2015, a figure that it expects to fall gradually to an average of 100,000/200,000 in 2021, after which it will remain constant. Cf. Federal Statistical Office of Germany (2015): Bevölkerung Deutschlands bis 2060. Ergebnisse der 13. koordinierten Bevölkerungsvorausberechnung.

### 12m difference between 7th and 13th coordinated population projection

Total population, various population projections (in million)



Sources: Federal Statistical Office of Germany, Sommer, Bettina (1992 and 1994), Bretz, Manfred (2001), S. 916 ff.; Pöttsch, Olga (2016).

### All forecasts agree on one thing: the population is aging

All of the forecasts, however, agree on one thing: the increasing trend towards an ageing society is one that cannot be reversed, irrespective of the number of immigrants. This trend might even be underestimated as the assumptions regarding the likely development in life expectancy in the future could turn out to be too conservative, as has been the case in the past.<sup>34</sup> So, despite the current pressing refugee situation in the Near East and the associated migration flows, it is important not to lose sight of the challenges that an ageing society brings. In particular, challenges such as the establishment of a sustainable pension and healthcare system, or the creation of senior-friendly housing as well as urban and rural areas are not things that can be put into practice overnight.

<sup>34</sup> According to a recent publication by the German Institute for Retirement Provision (DIA), the current period mortality tables could underestimate the life expectancy of today's newborns by ten years. Cf. Morgenstern, Klaus (2016): Ein Viertel der 2016 geborenen Mädchen wird 100.

## APPENDIX

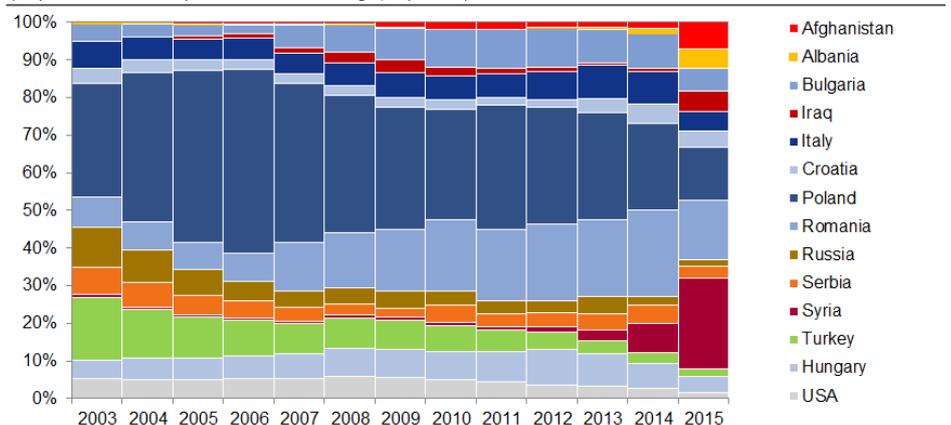
### 2015 marks a turning point

If we look at a breakdown of immigrants by country of origin, then 2015 marks a structural shift. This is evident from the development in the composition of the main countries of origin over the last ten years.

Between 2003 and 2014, the immigration picture was shaped by the EU's eastward expansion. Up until 2014, immigrants from Poland, Romania and Bulgaria dominated the picture: between 2007 and 2014, one in three immigrants came from one of these countries, with their individual weightings shifting over time. Poland was the main country of origin in the period stretching from its entry into the EU in 2004 until 2013; in 2006, as many as one in four immigrants came from Germany's neighbor to the east. When Romania and Bulgaria joined the EU, however, this proportion started to drop and, despite a further increase in the absolute number of immigrants, 2015 marked the first year in which immigrants arriving in Germany from Romania (213,037 registered relocations) exceeded those from Poland (195,666). If we include the 83,579 immigrants from Bulgaria, then "only" around one in four immigrants came from one of these three countries in 2015. Croatia (57,412 immigrants) and Hungary (56,373 immigrants) complete the ranks of the countries of origin that joined the EU as part of its eastward expansion. These countries each accounted for between 2% and 4% of all immigrants. Only one founding member of the EU was one of the main source of immigrants to Germany in 2015: 74,105 Italians moved across the Alps to Germany last year. All in all, the proportion of immigrants from EU countries came to 43% in 2015 - in previous years, this figure had remained almost constant at over 60%. The civil war refugees from Syria made up what was by far the biggest population group in 2015, with a total of 326,872 people or 15.3% of all immigrants. In addition, the provisional figures suggest that 94,902 people from Afghanistan and 25,161 from Pakistan sought refuge in Germany. As far as immigrants from the Balkans are concerned, immigrants from Albania (68,982) and Serbia (42,594) dominated the picture.

### Arrivals from crisis-torn Middle East countries dominated the picture in 2015

Arrivals, foreigners by nationality  
(respective 10 most important countries of origin, in percent)



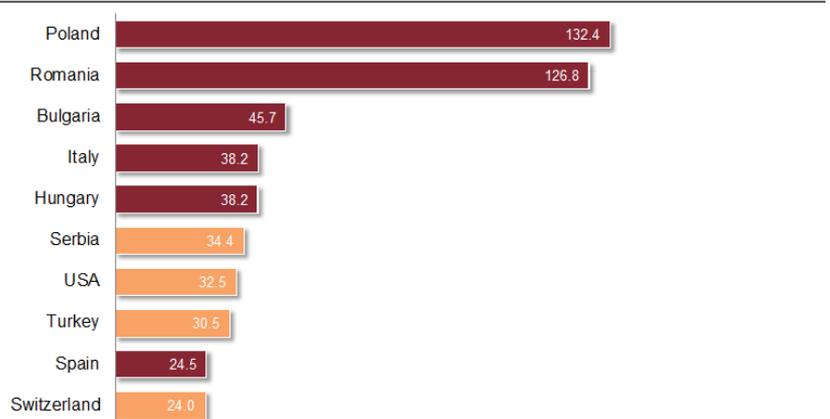
Source: Federal Statistical Office of Germany.

### The most popular destination countries

Emigration from Germany reflects the nationalities of the immigrants. Poland and Romania were by far the most popular destinations, with 132,387 and 126,763 people moving there respectively, followed by Bulgaria with 45,729 people. Italy and Hungary also made it into the top half of the most popular destinations in 2015, each accounting for around 38,200 emigrants. The sixth EU member state Spain was at the lower end of the scale in ninth place ahead of Switzerland, with 24,462 and 24,042 people moving to these countries respectively. The list included one representative of the Balkans: Serbia. With 34,352 people, Serbia was the sixth most frequently cited destination county, ahead of the US, which attracted 32,470 people, and Turkey, which 30,540 emigrants specified as their destination.

### 10 most important destination countries in 2015

Departures, by destination country  
(in thousands)



Source: Federal Statistical Office of Germany.

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