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Replacement Migration from a Labour Market Perspective: Germany's Long-Term Potential Labour Force and Immigration from Non-EU Member Countries

Due to demographic change, the number of potential workers is declining while the number of retirement-age people is rising considerably. We quantify the development of the potential labour force in Germany up to and including the year 2050 and pose the question as to which extent migration will be able to compensate for this decline. The mean overall results of this long period of time show that while immigration may mitigate this trend to some extent, it cannot fully compensate for it, depending on the development of domestic labour participation.

Demographic change will have a lasting impact on the German labour market which will become evident in many different ways (Schneider 2011). One conceivable trend concerns the potential labour force, which will decline substantially in the next few decades if the status quo remains unchanged. The reasons are, firstly, that the baby-boom generation is gradually reaching retirement age and, secondly, the low birth rates among the subsequent cohorts. The magnitude of the problem becomes clear when we think about the fact that in 2014, only half as many children were born (715,000) than in 1964, the peak of baby boomers in post-war Germany.

As labour supply is one of the determinants of an economy's growth potential, a declining labour force potential alone could result in weaker economic growth (SVR 2014).[2] It also puts the financial foundation of social security systems into jeopardy, because the shrinking labour supply finds itself opposite an increasing number of retirees. In addition, studies warn against substantial shortages of skilled workers (e.g. McKinsey 2011, Prognos 2012), even though a declining potential labour force could lead to a reduced demand for labour. These apprehensions lead one to conclude that measures to counteract the trend towards a shrinking potential labour force at a socially reasonable cost are a pressing economic requirement (Federal Employment Agency 2011). With that in mind, this article will look at immigration as a possible adjusting factor that helps us to stem the declining potential labour force in the German economy. Before that, however, the shrinkage in question must be quantified using different scenarios of future labour participation.

Besides, with regard to immigration it must be distinguished between EU mobility, which can hardly be politically controlled, and migration from non-EU member states (third countries). Currently, the economic effects of the declining birth rate are being cushioned by strong immigration. The article at hand draws on that fact and shows that the current level of EU immigration will not last in the long run. Hence, migrants from EU member states will hardly be available as a source of sustainable stabilisation of the German labour market and the social

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1 This article is based on up-dated results of a study financed by the Bertelsmann Foundation; see Fuchs/Kubis/Schneider (2015. The views and opinions expressed in this article are solely those of the authors and do not necessarily reflect the views of the Bertelsmann Foundation.

2 Of course, this growth inhibitor could be met with an accordingly high *acceleration* of labour productivity growth, so that the increase of per-capita income with population figures continually declining would be even greater. But it is questionable whether such an increase in innovation speed is realistic in an ageing economy (Schneider 2011).

security systems. Therefore, this article also discusses migration from third countries as an alternative reservoir of additional workers.

Method of Forecasting the Potential Labour Force

"Potential labour force" is used in the following to mean the sum of the currently employed, the unemployed, and the hidden labour force. It nearly constitutes the upper limit of labour supply. The potential labour force is restricted to individuals between 15 and 74 years of age, which means that it also includes workers older than 64 years. Due to the inclusion of the hidden labour force, the scope of the potential labour force does not depend as strongly on the economic situation as the number of gainfully employed persons does. That makes it better suited for long-term projections. Our forecast of labour supply until 2050 links a population projection with a projection of labour participation. Accordingly, the labour force participation rates are structured by age and gender and multiplied by the corresponding population figure of the year in question. Apart from the two factors age and gender, the model also distinguishes between German nationals and foreigners. This accounts above all for well-known differences in labour participation of German and foreign women.

We use the cohort-component methodology in projecting the population (e.g. Rowland 2003). The population model used here was developed by the Institute for Employment Research (IAB) and then updated and adjusted in accordance with the research question (see Fuchs/Söhnlein 2005 and 2013). Our calculation refers to the population as of 31 December 2014 as the base population. The full further development then results from the age-, gender- and nationality-specific changes due to births, deaths, and migration.[3] A total fertility rate of 1.42 children per German mother and 1.86 children per foreign mother is assumed for the forecast period. Regarding mortality, it is assumed that life expectancy continues to grow, resulting in an increase for new-borns to 83.9 years for boys and 88.3 years for girls by 2050. Concerning migration, a number of scenarios with different migration flows are examined, including a scenario without any migration.[4] The data of the official migration statistic (emigration and immigration by age and gender and differentiated by German and foreign nationals) were also available for 2014. These distributions were held constant over the forecast period.

The information on labour participation is based on the updated data and forecasts by Fuchs/Söhnlein/Weber (2011). Data version is as of 2014. The labour force participation rates used are actually potential labour force participation rates: the gainfully employed plus the unemployed plus the hidden labour force with reference to the according demographic group. In this paper the term labour participation rates refers to potential labour force rates.

The projection in the context of a *status quo* scenario projects the current labour participation rates forward until 2050 without any adjustments. This renders this scenario rather unrealistic, but it allows us to depict those changes in the potential labour force which are solely caused by demographics. In the *realistic* scenario, the past trends are being projected forward, especially the increasing labour participation of women. Moreover, the impact of the

[3] The model also includes an annual naturalisation rate of 1.5 per cent of the foreign population.

[4] Recently, a negative net migration of German nationals of 17,560 people was reported for the year 2015. As for the rest, all migration scenarios assume a net migration of -10,000 for German nationals in 2016 and after that, zero. As the net migration of Germans has always been negative in the past decade, this is an optimistic assumption for our scenarios.

postponement of the statutory retirement age (pension at 67[5]) becomes evident through higher participation rates among older people. The *extreme* scenario takes it one step further and assumes an extreme increase in labour participation rates, consisting mainly of three elements: equalisation of participation rates between German men and women, adjustment of the participation rate of foreign women to the German level, and an even stronger increase in labour participation of older people based on retirement at 70.

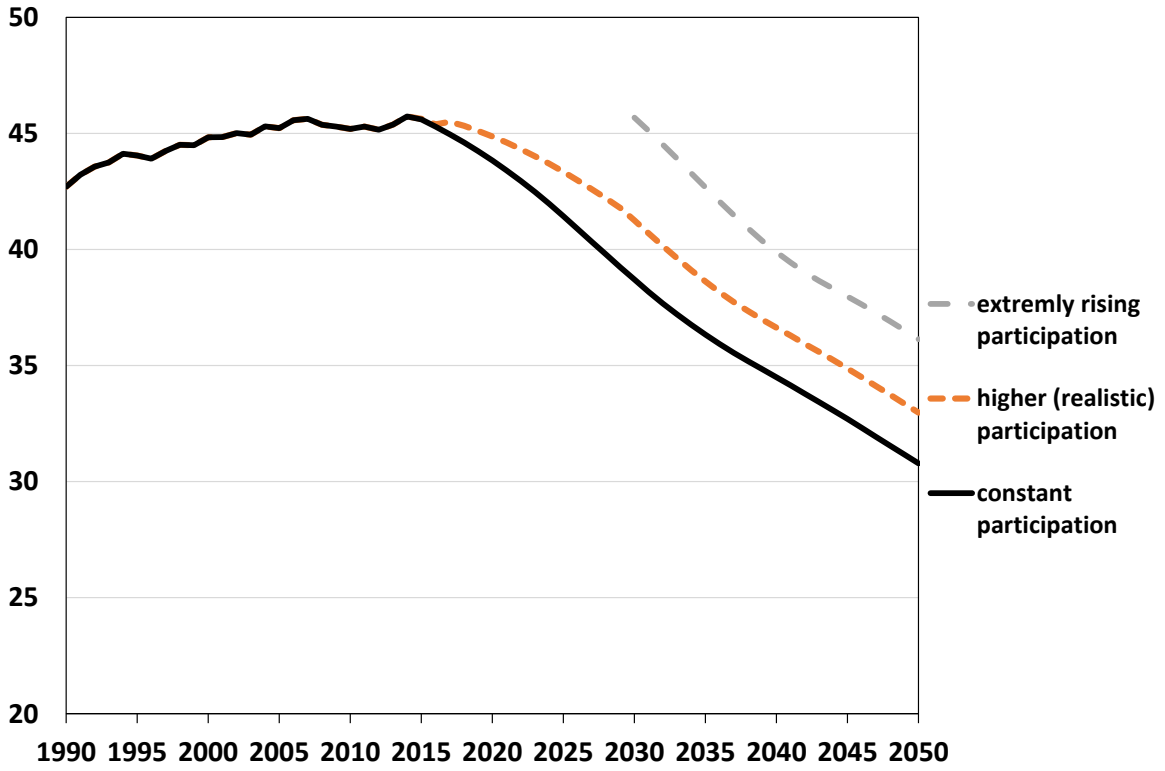
Potential Labour Force: Development without immigration

For comparison purposes, the forecast of the potential labour force is initially done based on demographic development without immigration. Figure 1 shows the effects of demographic development as a function of the assumed development in labour participation (status quo, realistic increase, extreme increase). All scenarios clearly show a downward trend.

Figure 1 **Potential labour force until 2050, without immigration**

Annual averages, in millions

Base year 2014



Source: own calculations.

In the *status quo* scenario, which assumes that the current labour participation rate remains constant and does not continue or adapt any possible trends regarding the labour force behaviour of women and older people, the labour force potential would decline by 14.9 million

[5] Germany has introduced a progressive increase in the statutory retirement age. The scheme will come to an end by 2029. The future legal retirement age will be 67 years of age.

people, based on the assumed, easy-to-forecast demographic development between 2014 and 2050; more precisely, a decline by 32.7 per cent, from 45.7 million to 30.8 million.

The *realistic scenario*, which takes increasing labour participation into consideration, results in an additional potential of almost 2.2 million workers by 2050. This shows that the behavioural effect from higher participation rates counteracts the demographic effect only to a very limited extent. It carries a lot of weight that the baby-boom generation – whose labour participation rates should increase, in some cases even dramatically, within the forecast period due to the increase of the statutory retirement age – will start retiring from employment around 2025. This will afterwards weaken the positive influence of increasing labour participation on the labour force potential.

In the *scenario with an extreme increase of labour participation rates* among German women, foreign women, and older people, a tendency to shrink at a similar pace becomes apparent; this one, however, at a significantly lower level. Figure 1 merely illustrates the effects of extremely increased labour participation after 2030. Before that year, the underlying behavioural changes would be so phantasmal that we decided against a depiction.

Table 1 differentiates the effects of extreme behavioural changes for the years 2035 and 2050. If the same labour participation rates applied to women aged 30–59 as to men of the same age bracket, the resulting potential labour force for the year 2035 would be 379,000 people more than in the realistic scenario. By 2050, this difference will shrink to 183,000.[6] When we assume equal labour participation rates for both German and foreign women, this would result in an enhancement of 322,000 female workers by 2035. In 2050, this gain would be less than 266,000 workers.

Table 1 **The impact of extremely increased labour participation rates on the potential labour force in 2035 and 2050 (without immigration)**
Annual averages in 1000s

Year	**Potential labour force in the realistic scenario (in thousands)**	**Potential labour force assuming extremely increased labour participation**		
		Equal labour participation of German men and women (aged 30–59 years)	Equal labour participation of German and foreign women (aged 15-59 years)	Retirement age 70
2014	45,728			
2035	38,621	39,000	38,943	41,972
2050	32,974	33,157	33,157	35,683

Source: own calculations.

The greatest effect is generated by older people remaining in employment longer. A retirement age of 70 leads to a potential labour force which, by 2035, is 3.35 million people more than in the realistic scenario. By 2050, this increase will be reduced to 2.7 million. Besides, at this point in time, almost every second person (45 %) of the labour force would be at least 50 years

[6] The decreasing population of working age will partly offset the effect of the higher participation rates.

old. The results show therefore that even a massive expansion of labour force participation will not be able to stop the demographic effect on the potential labour force in the long run; if anything, it may mitigate the effect for a period of time. This leads us to the question as to which extent immigration is able to counteract this declining labour supply.

EU Immigration Forecast

Even though our perspective might be a little off at the moment due to the current influx of asylum seekers, it can still be stated that the strongly increased immigration to Germany over the past five years is mainly due to migrants from other EU member states. Especially the two EU enlargements in 2004 and 2007 as well as the gradual introduction of free movement of workers made an impact. In addition, the economic crisis in many EU member states caused more of their citizens to emigrate. Even in 2014, 60 % of immigrants to Germany still came from another EU member state. There is evidence, however, that this development will be rather short-term and that migration balances around the European countries will settle once again in the long run (Bertoli/Brücker/Moraga 2016). Firstly, the one-time effect of the eastward enlargement will soon wear off significantly. Secondly, the convergence process on the European level, slow as it may be, is supposed to reduce people's disposition to emigrate from the (South) Eastern European member states and inspire a willingness to return in citizens living abroad. Thirdly, the demographic situation in many EU member states should be an inhibitor to the migration potential.

In order to make a long-term estimate regarding European immigration, we will resort to an econometric migration model, which is based on the most common concepts found in literature (e.g. Brücker/Siliverstovs 2006). That model makes emigration from and immigration to Germany in every EU state a function of variables.[7] These variables stand for demographic change on the one hand, and for the economic situation on the other hand.

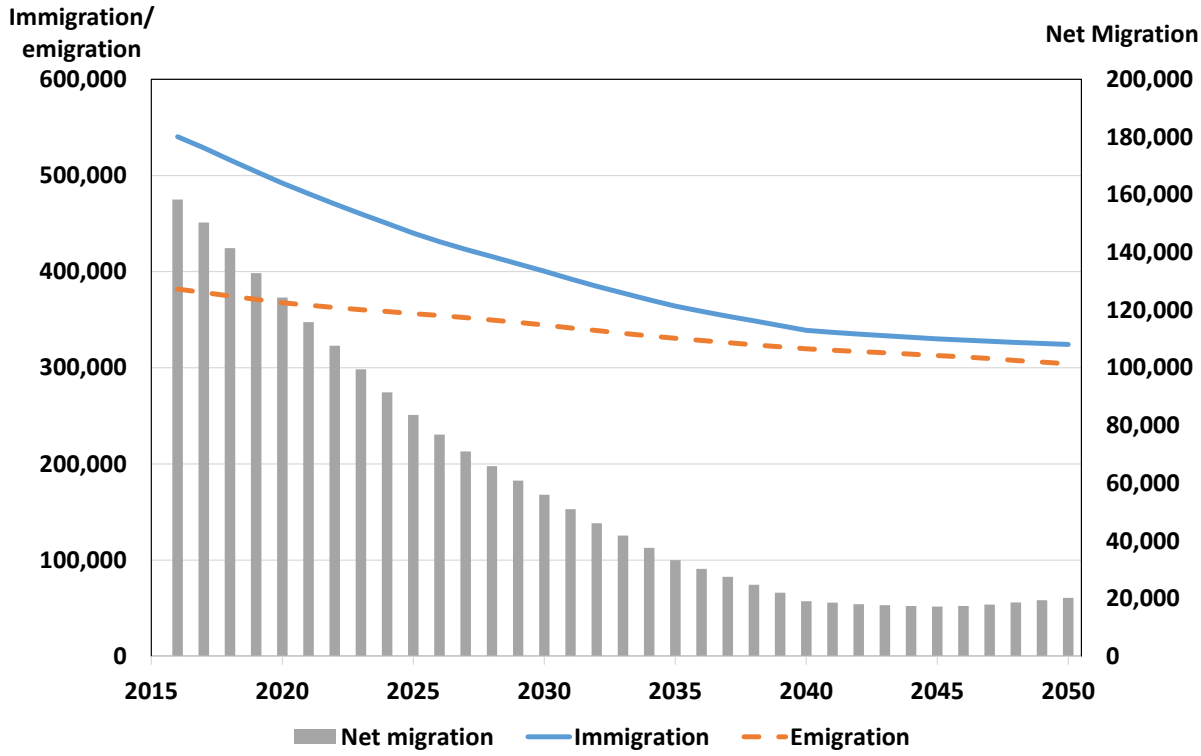
The estimation process involves specifying a panel model of the age-specific migration rates to/from Germany with fixed time and country effects, where immigration to and emigration from Germany are estimated separately. Explanatory variables in use are the relation of per-capita income between the country of origin and the destination as well as the unemployment rate of the countries of origin (immigration) and, respectively, the destinations (emigration). Moreover, indicator variables are added, showing whether the respective country of origin/destination was already a member of the EU in the corresponding year and whether free movement has already been granted. The data basis is the migration data of the Federal Statistical Office. For data reasons, the model is estimated for the EU-27. The sample used covers the period 2004 to 2013. The data concerning the economic prosperity level as well as unemployment in the EU member states, population development, and age structure is taken from Eurostat.

Based on the estimated model and both demographic and economic long-term projections by Eurostat (2013) and the European Commission (2012), the EU-related migration movements to and from Germany can be quantified until 2050. Figure 2 illustrates the projected immigration and emigration movements for Germany across the 2016–2050 period and the resulting net migration.

[7] For a more detailed description of the model specification and the data basis, see Fuchs/Kubis/Schneider (2015), p. 52 et seq.

According to the figure, immigration in the forecast period decreases clearly while emigration remains rather stable. On balance, this results in a strongly falling migration gain from roughly 160,000 at the start of the forecast horizon to approx. 20,000 from the year 2040 onwards. The mean annual net migration across the entire period is approx. 59,000 people. In other words, the immigration potential from the other EU member states will run out in the medium and long term.

Figure 2 Estimate of migration between Germany and the EU until 2050



Source: own calculations.

Our model clearly underestimates the present immigration flows from the EU, not least because the restrictive sample period, which ends already in 2012, thus not sufficiently reflecting the full effect of the free movement regulations. However, this disadvantage should not carry any more weight in the medium and long term. On the contrary: too much weight on the estimate of the current EU immigration figures would unduly perpetuate the current one-time effect of the EU enlargement.[8]

According to our projection, the immigration potential from the other EU member states will thus run out almost completely in the medium and long term. What this means for the development of the potential labour force in Germany becomes clear when we start by omitting immigration from third countries from our realistic scenario projections, i.e. we calculate the forecast without taking into consideration any immigration from countries outside of the EU (Figure 3). Net immigration would therefore be a little lower than in the past and also

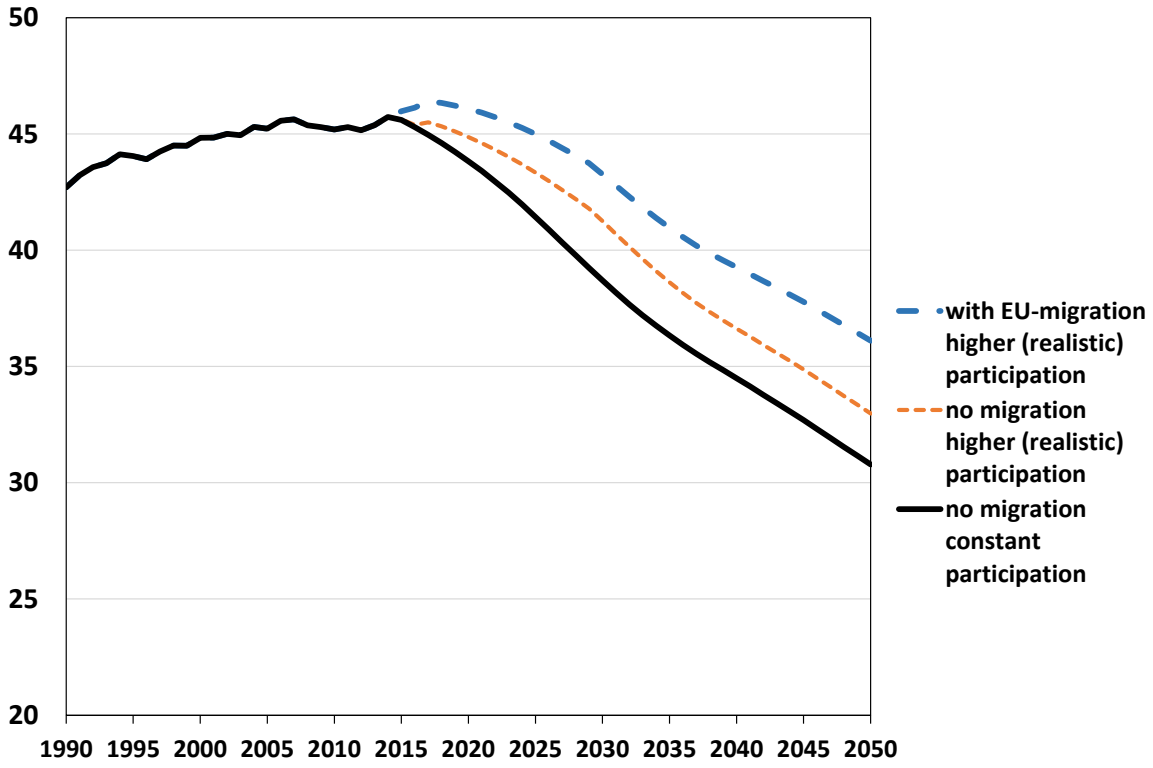
[8] The Federal Statistical Office recently published migration data for 2015. The statistic show that the high net migration inflow from other EU countries to Germany has been continuing.

considerably lower than it is at the moment. If only citizens of EU member states moved to Germany, this would result in a declining potential labour force in Germany which would only be slightly milder than in the realistic scenario without immigration.

Figure 3 **Potential labour force until 2050, without immigration from third countries**

Annual averages, in millions

Base year 2014



Source: own calculations.

Scenarios for Third-Country Immigration

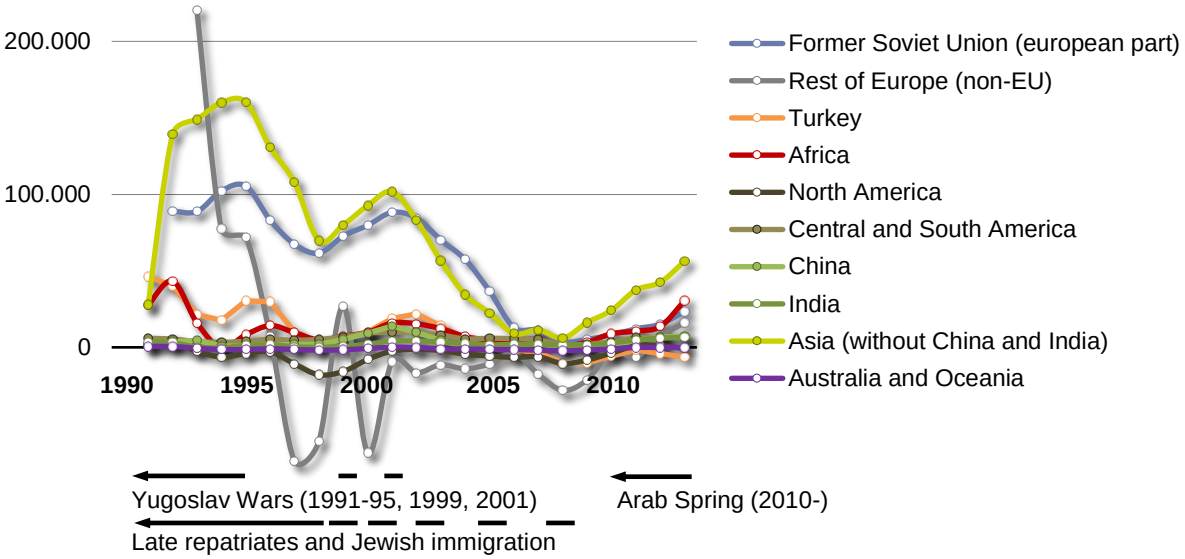
Apart from the recently dominating immigration from EU member states, there are also people coming to Germany from countries which are not part of the European Union (third countries). They, too, can help to offset the decline in the potential labour force caused by demographic change. Immigration from third countries has been front and centre in recent debate (e.g. Brücker 2015).

The immigration flow from third countries can be divided into three major blocks: direct immigration to the labour market, immigration for study or vocational training purposes, and the group of asylum seekers and refugees, which has recently grown substantially. Within the current institutional framework, however, only some of these migrants will be available to the labour market.

Third-country immigration over the last 25 years shows extreme fluctuation (Figure 4). This applies to both time and the countries these people come from. Singular events such as the fall of the Iron Curtain and the resulting immigration of late repatriates, the Yugoslav Wars in

the early 1990s, or the current crises and conflicts in the Arab and African worlds dominate immigration during certain periods. Against this backdrop, a reliable model-based projection of immigration flows is problematic at best. Moreover, the influx strength is also influenced by the respective immigration law stipulations.

Figure 4 **Net immigration from third countries by region of origin, 1991 to 2013**



Source: own depiction based on data by the Federal Statistical Office.

In order to illustrate the effect which the expected immigration from third countries has on the potential labour force, we drew up two scenarios based on the immigration flows of the last 20 years (Table 2). As a rule, approaching the question of expected future immigration from third countries always involves a great degree of uncertainty. Therefore, the scenarios 1 and 2 at hand are to be understood as a thought experiment rather than a forecast (see Figure 5).

Table 2 **Immigration of foreigners from third countries**

	Immigration	Emigration	Net migration
1996	393,775	271,912	121,864
2000	361,719	316,368	45,351
2005	259,296	224,523	34,773
2010	279,070	224,155	54,915
2015*	1,151,258	335,710	815,545
1996–2015	373,735	265594	108141
2013–2015	704,634	301,878	402,756

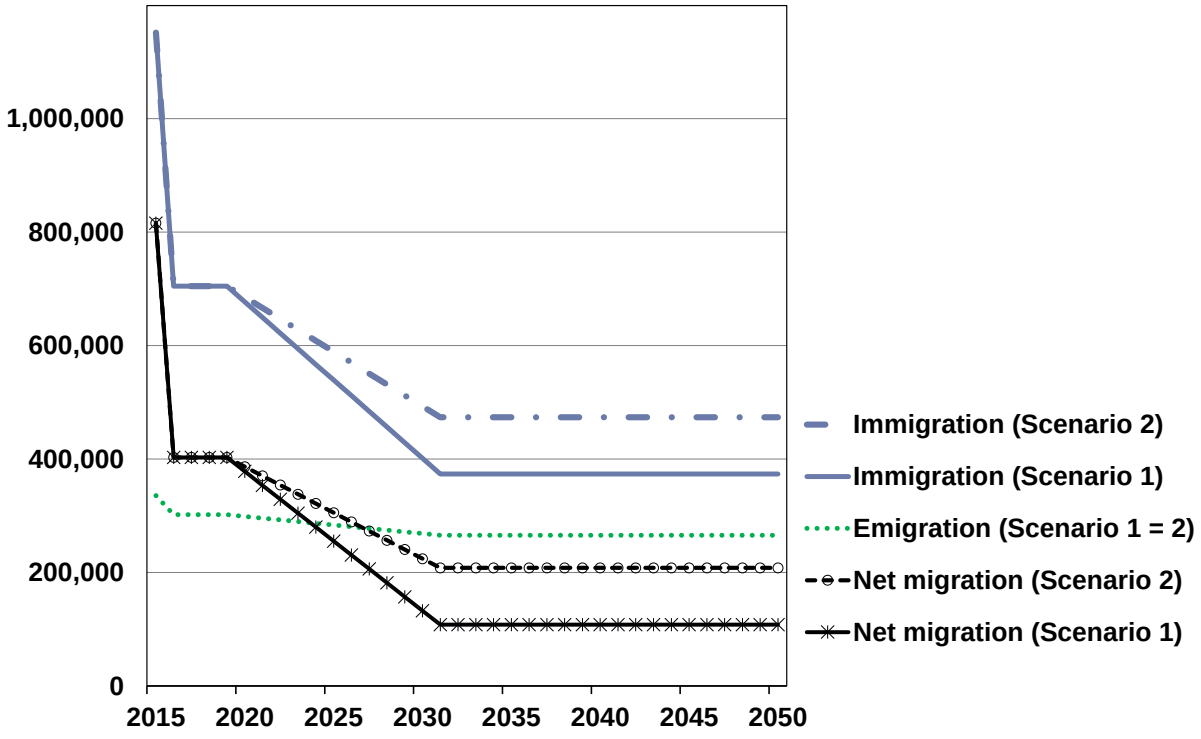
Note: 2015 preliminary (as of July 2016).

Source: own calculations.

The past shows that such immigration peaks decline in the medium term. In Scenario 1, we assume an immigration level for the years 2016 to 2019 which corresponds to the average of the years 2013 to 2015. On the one hand, this may be explained by the fact that crises are usually resolved in the short or medium term. On the other hand, however, one may also observe institutional adjustments in the destination country as a direct consequence of a very high immigration flux (like the introduction of the third-country rule in Germany). In the long term, we are expecting further alignment with the long-term average. For the years 2020 to 2030, we are therefore conducting a linear adjustment to the average of the last 20 years (1996–2015).

Since it is possible that we are currently observing a structural change in our immigration regime, a second scenario with higher net migration inflows is examined. In Scenario 2, the already calculated mean benchmark values are therefore raised by 100,000 people.

Figure 5 Two scenarios of future third-country immigration



2015 preliminary (as of July 2016).

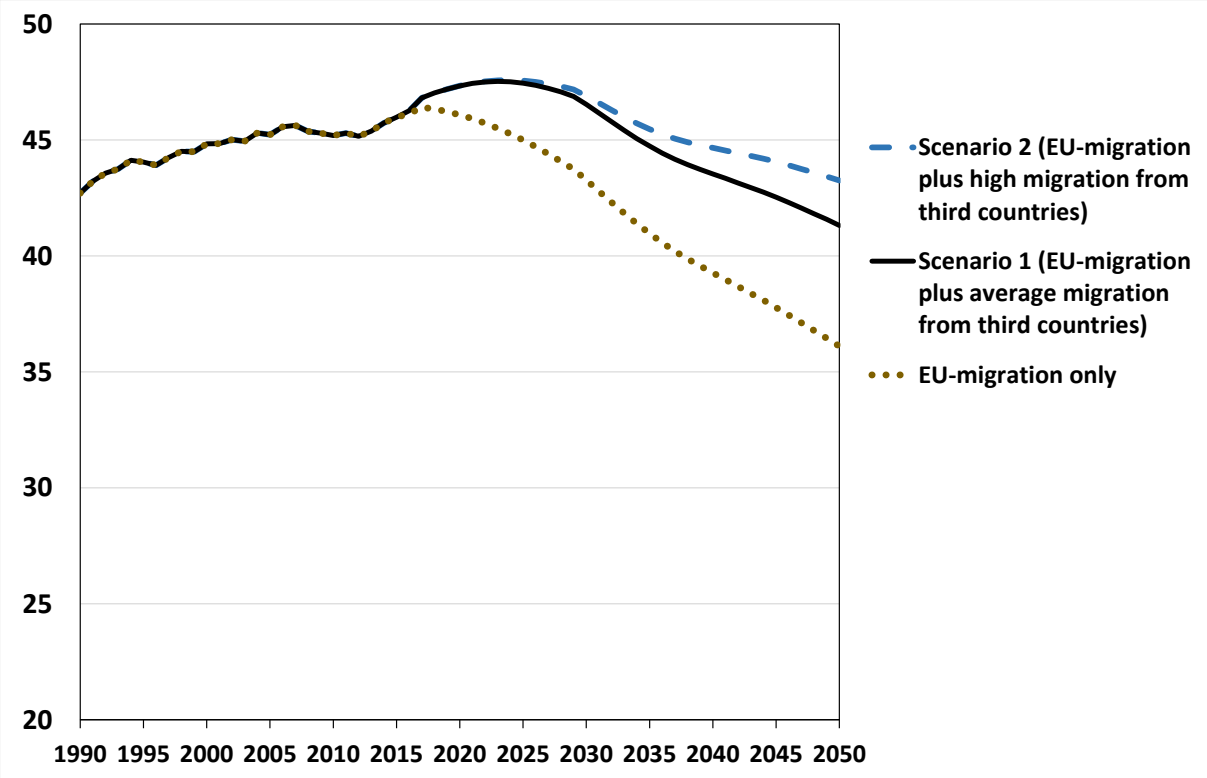
Source: own calculations.

For the development already depicted in Figure 3, third-country immigration is modelled on top of it. In both scenarios, the decline in the potential labour force stated earlier turns out to be less dramatic (Figure 6).

Figure 6 **Potential labour force until 2050 with immigration from third countries**

Annual averages, in millions

Base year 2014



All scenarios are based on realistic rising participation rates and include preliminary total migration in 2015

Source: own calculations.

Consequences for the Old-Age Dependency Ratio

An undisputed challenge that comes with a shrinking potential labour force and which we have already touched upon concerns the financial feasibility of social security systems (and in principle also other responsibilities of the state, such as infrastructure). When the number of workers decreases, the burden imposed on the individual by taxes and duties would increase accordingly, especially due to demographic ageing. A shrinking potential labour force could therefore seriously jeopardise the social security systems.

A commonly used indicator to illustrate this funding problem is known as the "old-age dependency ratio," which puts the older population (e.g. aged 65+) in relation to the population of working age (e.g. aged 20–64).[9] Since not all people of working age are also "close to the labour market" or, indeed, gainfully employed, it would seem reasonable to use the potential labour force instead, because in case of "full-employment" it corresponds to the number of gainfully employed people.

9 The age limits for the old-age dependency ratio have been set inconsistently. Therefore, the way in which the ratio changes is actually more important than its absolute value (i.e. the level).

The indicator stated in Table 3 may be understood as the old-age dependency ratio modified to fit the purpose, because it is closer to the funding of the systems than it would be to use the working-age population.[10]

The development sketched here indicates in all three scenarios (also in those with significant immigration from third countries) a substantial rise in the modified old-age dependency ratio by the mid-2030s, approximately. This is mainly the consequence of baby boomers reaching retirement age. Without migration or changes in behaviour, however, the increase is strongest. When the projected net immigration flows from the EU are included, the process is merely slowed down. Only in the extreme immigration variant, scenario 2, the modified old-age dependency ratio nearly stabilises at the level reached in about 2035.

People live longer, and that is also true for the baby-boom generation, whose cohorts will start to reach retirement age in just a few years. Even high, if realistic, immigration flows obviously cannot stop demographic ageing and the resulting strain on social security systems altogether, only mitigate the effects.

Table 3 **Modified old-age dependency ratio**

Ratio of the population aged 65 and over to the potential labour force aged 20–64[1)]

Relation in 100

	Constant participation rate	Increasing participation rate			
	without migration	without migration	with EU migration	total migration Scenario 1	total migration Scenario 2
2014			39.8		
2025	50.8	48.7	46.9	44.5	44.4
2030	60.6	57.3	54.6	50.9	50.5
2035	69.7	66.0	62.2	57.3	56.4
2050	80.2	75.1	69.0	62.9	60.5

1) The modified old-age dependency ratio may be interpreted in the same way as the old-age dependency ratio. Example: In 2014, there were almost 40 people aged 65 and older per 100 persons of the potential labour force aged 20–64.
2) The potential labour force was calculated using the respective net migration rate.
3) Increasing labour force participation rates include an increase due to retirement at 67.

Source: own calculations.

Conclusion

Germany is currently experiencing an immigration flow which will probably first lead to a significant expansion of labour supply. The effects described could actually be even higher than described in this article, because the decline in EU immigration predicted in the model used will only happen gradually. In the short term, European immigration will probably stay at its current level. In the long term, however, this will not do much to change the challenge that the potential labour force will shrink, the population will age, and our society will, despite

10 The slightly modified restriction of the potential labour force to the 20–64 age bracket accounts for the fact that part of the younger potential is often still in vocational training (apprentices, students with jobs) and older workers (65+) often work only marginal part-time, therefore making very low social security contributions.

immigration, have to prepare for burdens such as the one that is exemplified by the drastic increase in the old-age dependency ratio.

The modified old-age dependency ratio already hints at the burdens on gainfully employed people regarding the financial security of pension, health, and nursing care insurance which must be expected due to demographic ageing. Just in general, though, one should not forget that a declining number of workers will also have to finance many infrastructure-related tasks, which may even increase due to demographic reasons.

Regarding immigration, the statements made here, which only relate to the potential labour force, must be further qualified. For the challenge of immigration – especially when there is a change of direction, as is happening at the moment, and it is done without recourse to the immigrants being close to the labour market – is to provide the immigrants with a job perspective. Nobody wants migration which ends in unemployment or increases the hidden labour force – not the immigrant nor the state and the social security systems. It would not counteract a potential shortage of skilled workers, either. In this regard, Germany is currently facing a largely unknown migration regime. While immigration in the past (with the exception of the years after the fall of the Iron Curtain) was strongly labour market-oriented and, later, family-oriented, it is currently happening due to humanitarian plight and/or political persecution. But for now it remains unclear how many of these immigrants manage to find gainful employment, how many of them can be (subsequently) qualified at a reasonable effort for the labour market, and how many will be unable to gain a foothold in the short and medium term. Only when the immigrants are successfully integrated into the labour market is the accompanying increase of the potential labour force an economically welcome development.

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