Current and Future Skill Shortages in Germany

Prof. Dr. Herbert Brücker
IAB and University of Bamberg

How Can Immigration Contribute to Solve Skill Shortages in Germany? Perspectives and Success Factors
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“I want to emphasize that to address the shortage of scientists and engineers, we must do both — reform our education system and our immigration policies. If we don’t, American companies will simply not have the talent they need to innovate and compete.”

Bill Gates

Testimony at the Committee for Economics and Technology, House of Representatives of the USA, Mach 12, 2008
If Bill Gates is already concerned …

... how does it look in Germany?

- The share of individuals with a university degree is substantially below the US
- Germany is more severely affected by demographic change and the decline of labor supply in the future
- In the USA reside more than 10 million immigrants with an university degree, in Germany less than 1 million
- More than 1 million Germans with a university degree live in other OECD countries, but only 0.5 million US citizens (Brücker et al., 2012)
Three questions:

- Do we really have skilled labor shortages?
  - Short-term: skilled labor shortages and mismatch
  - Long-term: demographic change and skilled labour shortages

- What is the impact of immigration on the economy and the welfare state under demographic change?
  - Labor market effects
  - Effects on the welfare state

- Is it realistic to expect that immigration will mitigate ageing and the decline in labor supply?
ARE THERE SKILLED LABOR SHORTAGES IN GERMANY?
Do we really have skilled labor shortages?

**Prognos AG:** The skilled labor shortage will number 3.0 million workers in 2025 and 5.2 millions in 2030

Prognos AG: Arbeitslandschaft 2030, Basel 2009

**McKinsey:** The skilled labor shortage will number 2.0 workers in 2020


**DIW Berlin I:** „No short-term labor shortages are in sight.“

Karl Brenke, DIW Wochenbericht 46/2010

**DIW Berlin II:** „Skilled labor shortages (…) will affect Germany broadly.“

Holger Hinte and Klaus F. Zimmermann, DIW Wochenbericht 46/2010
What can we learn from the DIW controversy?

The controversy rests on two findings:

1. Only in few occupations we have a high number of open positions relative to the unemployed.

2. Potential labor supply will dramatically decline in the course of demographic change. By more than 10 per cent until 2025. After that the decline will accelerate.
Skilled labor shortages: Not yet in sight?

- We have about 1.0 million job offers and 3.0 million unemployed and about 4 million underemployed in Germany at present (BA Statistics and EGS of IAB)
  - That are the same relations as in 2012
- The are only few occupations where we have permanently more job offers than unemployed
  - Engineers, electrical installations, chemical workers
  - Doctors, nurses, examined health care occupations
  - Education occupations, selected teachers
  - IT specialists and selected occupations in manufacturing are at the threshold level to skill shortages
„Mismatch“

- Although Germany does not facts a general excess labor demand, in many occupations, regions and firms open positions cannot be filled or only after long vacancy periods

- Labor market theory calls this phenomenon „mismatch“ when we do not find a match between employee seekers and job seekers (Mortensen/Pissarides 1999)

- From the perspective of firms, the „tension“ in the labor market has increased since the 2005 labor market reform in Germany

- Mismatch is costly, estimates range to several billion Euros

- Immigration can mitigate mismatch (Brücker et al., 2012)
Demographic change and skilled labor shortages

The demographic development is characterized by two secular trends in Germany:

1. The birth rate per female is constant at between 1.3 and 1.4 since decades

2. The life expectancy of the population increases linearly

Both trends will result in (i) a substantial decline of the German population and workforce and (ii) in an increase of the average age of the population

The main unknown in all long-term population projections is the immigration rate
Potential labour force, 2010-2025
Natural population movement, constant labor force participation

Source: Johann Fuchs (IAB).
Potential labor force, 2010-2025
Increasing labor force participation, pension age 67, no migrations

Source: Johann Fuchs (IAB).
Potential labor force, 2010-2025
Migration balance +100,000 p.a., constant labor force participation

Source: Johann Fuchs (IAB).
Potential labor force, 2010-2025
Migration balance: 100,000 p.a., increasing participation, pension age 67

Source: Johann Fuchs, (IAB).
Potential labor force, 2010-2025
Migration balance: 200,000 p.a., increasing participation, pension age 67

Source: Johann Fuchs (IAB).
The bottomline (I/II)

Demographic change has increased the age of the workforce, but the labor supply stands at its historical maximum at present.

Thus, the present tension in the German labor market cannot yet be traced back to demographic change.

But the labor supply will certainly decline: with constant labor force participation, unchanged pension age and no migrations the potential labor force will decline by 15% until 2025 and by 40% until 2050.
The bottomline (II/II)

- Even under optimistic assumptions about the labor force participation (Danish rates) will mitigate the decline in the German labour force only by 1.5 millions until 2050

- The large trigger is migration:
  - A net immigration of 100,000 persons p.a. – together with an increasing participation and higher pension age – will reduce the labour force decline from 40 to 28% by 2050
  - A net immigration of 200,000 persons p.a. – together with an increasing participation and higher pension age – will reduce the labour force decline from 40 to 19% by 2050

- Although also migrants age, a permanent influx will reduce the average age of the labor force and population
WHAT ARE THE ECONOMIC CONSEQUENCES OF THE SHRINKING LABOR SUPPLY?
What are the effects of a smaller workforce?

- The Prognos and McKinsey studies claim, that a declining labor supply will result in a persistent labor shortage in the sense of excess labor demand over supply.
- Behind this proposition stands the intuitive, but economically poorly founded idea that labor demand is either given or very rigid.
- This is questionable particularly in the long-run.
Adjustment of factor and goods markets

1. **Labor markets**: Adjustment via wage-price mechanism
   - Exceptions: Government, health sector

2. **Capital markets**: lower returns to capital trigger lower domestic and international investment. Eventually, theory predicts that the capital-labor ratio remains constant. This is backed empirically (Kaldor 1961)

3. **Goods markets**: Adjustment of trade and production structures, such that more capital intensive goods will be exported and less labor intensive goods imported, such that goods prices and, hence, wages remain constant
Capital stock adjustment

- Robust stylized fact, that the capital-output ratio remains constant irrespective of labor supply (Kaldor 1961)
- Empirical evidence for fast adjustment (USA: Ottaviano/Peri NBER WP 2006; DE: Brücker/Jahn IZA DP 2009)
- As a consequence, we should not expect a change in wages and unemployment if the labor supply declines and the structure of the labor force remains constant
- But changes in the skill structure of the labor force can affect wages and unemployment
Capital-output ratio and labor force in Western Germany, 1960-2009

Sources: DESTATIS, OECD, own calculations.
A simulation of the declining labor force in Germany

4 scenarios based on a structural, empirically estimated model of the German economy (Brücker/Jahn ScJE 2011)

Labor demand is derived from an aggregated production function with 64 types of labor

- 4 skill groups
- 8 experience groups
- Natives and immigrants

Consideration of labor market rigidities and unemployment

Consideration of capital stock adjustment
Four scenarios:

Decline of labor force by 10% (~ decline by 2025)
1. No change in structure of labor supply, no capital stock adjustment
2. No change in structure of labor supply, complete capital stock adjustment (constant capital-output ratio)
3. Skill-biased change in structure of labor supply (doubling the share of individuals with a university degree), ageing, no capital stock adjustment
4. Skill-biased change in structure of labor supply (doubling the share of individuals with a university degree), ageing, complete capital stock adjustment

All scenarios are calculated as changes relative to the baseline.
Scenario 1 and 2: Constant structure of labor force
Change in % (unemployment rate: %-points) at labour supply decline of 10%

Source: Own calculations.
Scenarios 3 + 4: Changed qualification and age structure
Change in % (unemployment rate: in %-points) at a 10% decline of labor supply

Source: Own calculations.
Economic consequences: The bottomline

- A shrinking labor supply has only an impact if
  - the skill and age structure of the labor force changes at the same time
  - the capital stock does not completely adjust
  - it affects the development of labor productivity
  - it affects the reservation wage and collective bargaining

- Thus, an excess labor demand and a declining unemployment rate are possible, but not necessary implications of demographic change

- In any case, the decline in the labor force will not translate 1:1 into a skilled labor shortage
THE CONSEQUENCES FOR THE WELFARE STATE
What is then the case for admitting more immigrants?

- The age of the labor force will increase in the course of demographic change, which can reduce productivity if age groups are imperfect substitutes.
- There is however no prima facie evidence that the productivity of older workers is lower than that of younger workers.
- The main point is that the ratio of the non-working age population to the working-age population will substantially increase.
- This generates problems for the fiscal balance of the welfare state, particularly the pension- and health insurance systems.
Impact on the welfare state

- The declining labor force and population increases the financial deficit of the welfare state.

- The immigration of younger working-age persons can generate substantial net contributions to the fiscal balance of the public budget incl. the social security systems.
  - Current net contribution of 2,000 Euros p.a, lifetime contribution of 14,000 Euros.

- These net benefits increase with the skill level of the immigrants (up to 5,000 Euros p.a.).

- The net contribution of immigrants increases in the course of demographic change.
DO WE HAVE THE IMMIGRATION WHICH WE NEED?
The immigration balance in Germany

- Net immigration in Germany has declined from 200,000 persons p.a. in the historical average to 116,000 persons in the period 2000-2009.
- In 2011 and 2012 net immigration in Germany has increased to 278,000 and 389,000 persons p.a., respectively.
- Three quarters of total net migration into Germany stems from the enlarged EU.
- The recent immigration surge is triggered by the EURO crisis and might be not sustainable.
Migration and the EURO crisis

The EURO crisis has two effects on migration to Germany:

1. **Direct effect:** The net immigration from the 4 Southern European crisis countries has increased from zero (2007) to 72,000 persons in 2012

2. **Indirect effect:** The diversion of migration flows away from the crisis countries to Germany has increased net migration from the New EU Member States (incl. Bulgaria and Romania) to 190,000 persons in 2012

Recent evidence proves that 78% of the increase in German migration is triggered by the deterioration in the economic conditions of alternative sending countries and the free movement (Bertoli/Brücker/Fernandez-Huertas Moraga 2013)
The skill structure of German immigration

- New arrivals are better qualified than the German workforce:
  - 43% of the new arrivals in 2009/10 have university degree, compared to 26% in the native population (up from 25% in 2000)
- Immigrants from Southern Europe are particularly well educated
- Immigrants from the EU-8 are well educated, but display a higher concentration on the medium skill groups
- Immigrants from Bulgaria and Romania are not well educated, but display lower unemployment rates and less welfare dependency than all other main immigrant groups
CONCLUSIONS
Conclusions

- Labor supply in Germany achieves its historical maximum at present, but will certainly decline in the future.
- A declining labor supply will not necessarily result into excess labor demand if other markets adjust.
- But Germany certainly needs immigration to mitigate the consequences of ageing and demographic change on the welfare state.
- The benefits for the welfare state increase with the skill level of the immigrant population.
- The recent immigration surge is triggered by the EURO crisis and therefore not sustainable. We need therefore changed immigration policies vis-à-vis third countries.