

**International Economics**

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**OCCUPATIONAL SHIFTS  
IN POLAND TILL 2022 –  
TOWARDS LABOUR  
MARKET POLARISATION?**

**Abstract**

The paper focuses on changes in the occupational and skills structure of the employment in Poland. It elaborates on the drivers of these changes – from technical change and educational upgrading to institutional reforms – putting much attention to the hypothesis of labour market polarisation. The paper presents the future developments in labour demand, based on the employment forecast by occupational groups and skills till 2022. It comments on new challenges and possible tensions that may have place within some segments of the Polish labour market, resulting from the mismatch between skills demand and supply.

**Key words:**

Occupational structure, skills, labour market polarisation, forecasting.

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## Introduction

Modern labour markets face multidimensional challenges. One of such challenge is related to changes in the employment structure – in recent years we witnessed perceptible shifts in labour demand towards more and more (highly) skilled labour force, especially in highly developed countries. This trend has been also identified in emerging economies, which would suggest that these countries follow similar development trajectory. Poland is an interesting example of post-socialist country, that took advantage of transition processes that begun in the early 1990ties, and has been able to develop relatively strong economy. Since 1990 we saw perceptible changes on the Polish labour market – including market stabilisation (outstanding decrease of the registered unemployment rate from 20% in 2003 to around 10% at the end of 2015), institutional reforms (leading to relatively high flexibility on the market, but simultaneously to one of the highest share of temporary employment in EU Member States), and shifts in employment by skill level, accommodating the global trends. The main drivers of shifts in labour demand are related to the following major forces: globalisation, migration processes, technical progress (with recent profound influence of Information and Communication Technologies), educational upgrading, and reforms of labour market institutions. In the paper we reflect on changes in the occupational and skills structure of the employment in Poland, trying to capture the influence of these drivers. Although much attention is put on the issues of technical change on the labour market, it is not our intention to implement the quantitative framework of skill-biased technical change or polarisation hypothesis, as the analysis does not take into account changes in wages. Finally, we try to shed some light on the future developments as for labour demand in Poland, describing the employment forecast by occupational groups and skills till 2022.

## **SBTC vs. labour market polarisation – a synthetic review**

Until recently, the most popular, and widely accepted (in developed countries), explanation of changing patterns in skills demand was based on the Skill-Biased Technical Change (SBTC) hypothesis<sup>1</sup>. In this approach, it is argued that technical progress favours highly qualified labour. Thus, it was possible to explain growing wage inequalities between skilled and low-skilled labour in the situation of long-lasting increase in demand for skilled workers – it seemed that the demand growth was so dynamic, that even high skill upgrading did not result in decrease of relative wages of skilled labour. And although SBTC hypothesis focused mainly on skilled labour, the version of endogenous SBTC hypothesis seemed convincing enough to explain even past technology-driven labour market developments favouring low-skilled labour<sup>2</sup> (Acemoglu, 2002).

However, it appeared recent trends in demand for skills in developed economies have not been consistent with SBTC hypothesis, and many research studies argued that we witnessed labour market polarisation in terms of labour demand and wages (see Autor et al. 2006, Goos, Manning 2007, Goos et al. 2009, Cedefop 2011) – employment has been polarising in favour of high and low-skilled jobs (Jung, Mercenier, 2014).

The theoretical explanation of this phenomenon is based on the model presented in seminal paper by Autor et al. (2003). The model analyses the relationship between technology (ICT) and skills/tasks performed in different jobs, arguing that ICT capital substitutes routine tasks and complements non-routine tasks<sup>3</sup>. According to Autor et al. (2003), a task is routine if can be performed by the machine on the basis of explicit programmable rules, while non-routine task is the one to which rules are not understood sufficiently in order to define them in the form of commands executed by the machine. The examples of non-routine tasks presented by Autor et al. (2003) included, among others, deciphering scrawled hand-written notes or driving a car through city traffic. However, in 2011

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<sup>1</sup> Acemoglu (2002) argued that «The past sixty years must have been characterised by skill-biased technical change» in the U.S.

<sup>2</sup> Acemoglu used endogenous SBTC hypothesis to explain changes in labour demand that took place in the Great Britain in 19<sup>th</sup> century, and was triggered by the industrial revolution. At that time technical change was of skill-replacing nature – high supply of low-skilled labour force that migrated from rural to urban areas (English cities) made profitable to introduce new, skills-complementary technologies (based on steam engine technology). These technologies made craftsmen and artisan (high) skills redundant and replaced artisan shop by the factory and, finally, assembly line.

<sup>3</sup> SBTC hypothesis assumed that ICT complement highly-skilled labour and substitute low-skilled employees.

Brynjolfson and McAfee (2011, p. 14) commented on the Google car experiment, pointing out that Levy and Murnane (2004) were right that automated driving on public roads is extremely difficult task, not easy to be described by binary code, but not impossible. It appeared that driving a car is not anymore a non-routine task, at least in line with Autor et al. (2003) definition, and can be performed by the computer.

As a result, the Routinisation-Biased Technical Change (RBTC) concept<sup>4</sup> evolved, which shifts emphasis from skills to the type of tasks (routine vs. non-routine) performed by the employees. As routine tasks tend to be concentrated in the middle of the skills distribution (covering mainly clerical and manufacturing/assembly line jobs), we shall see relatively high share of high- and low-paid jobs (high-skilled and elementary jobs).

### **Occupational and skill change on the Polish labour market**

Although employment in Poland was initially declining after 1995 (which was a result of dynamic and deep transition processes that took place at that time), since 2003 continuous growth has been observed. Due to this growth, number of employed increased by over 8% between 1995 and 2014. Since 2005 employment in Poland has followed similar pattern to changes in the European Union (EU28), however the magnitude was much higher – employment in Poland grew by 11.5% between 2005 and 2014, while the EU28 it amounted to less than 3% (Fig. 1).

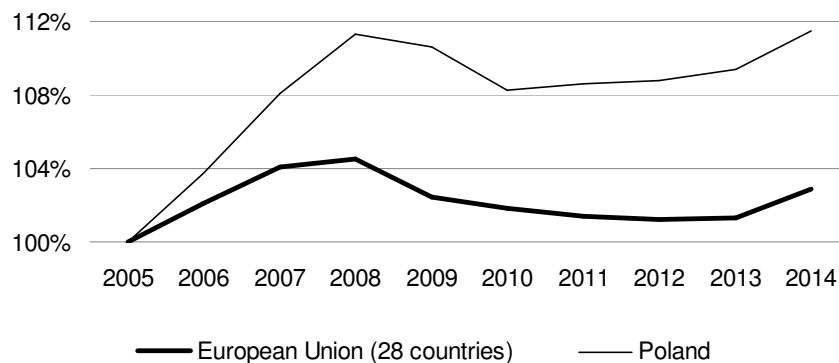
As it might be predicted, changes within many occupational groups did not reflect the average dynamics of the Polish labour market, which resulted in significant changes in the occupational structure. The number of Professionals, Technicians, Service Workers, and Operators was constantly above the 1995 levels in the years 1996-2014, and growing for most of the period. The opposite situation was seen in case of Agricultural workers and Craftworkers. The occupational groups which followed the average dynamics of the market include Managers, Clerical workers, and Elementary occupations workers.

The causes of these occupational shifts are multidimensional. Globalisation through offshoring and migration processes has played important role as for changes on the Polish labour market. It is argued that «Central Europe offers a mature industry and highly skilled players. While relatively expensive compared to offshore locations in other regions, there is still substantial arbitrage to be had» (AT Kearney 2016, p. 6).

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<sup>4</sup> Less popular, but also used in the literature, is the notion of the Task-Biased Technical Change (TBTC).

Figure 1

**Employment dynamics in EU28 and Poland in years 2005-2014 (2005 = 100)**

Source: own calculation (LFS data).

In fact, labour costs in CEE countries, including Poland, may be still perceived as the competitive advantage – as McKinsey reported, at the end of 2013 the average hourly wage of the core-CEE markets was 75% less than in the EU-15 (Colliers, 2014, p. 2). The other advantages CEE region possesses are: good quality of life, strong infrastructure, stable business environment and proximity to Western Europe (in terms of culture and physical distance)<sup>5</sup> (Kwacz et al. 2013). Poland is one of CEE countries that took advantage of the offshoring opportunities – in the 2016 «Global Services Location Index»; a ranking of top destinations for global offshoring prepared by A. T. Kearney, Poland took 10<sup>th</sup> place (AT Kearney, 2016).

There are different types of offshoring centres in Poland. The consolidated and maturing centres provide mid to high complex services (Warsaw, Krakow, Wroclaw, Lodz, and Katowice). However, there are also smaller centres focusing on low complexity services – Olsztyn, Lublin, Bydgoszcz, Szczecin, Tricity<sup>6</sup> – most of them having significant growth potential. Jobs in 5<sup>th</sup> and 6<sup>th</sup> generation offshoring centres are non-routine tasks (analytical and interpersonal) intensive

<sup>5</sup> Because of relatively short geographical distance to most European cities (two-hours flight), CEE region is treated as near-shoring services destination for Western Europe.

<sup>6</sup> Warsaw and Krakow was classified as 6<sup>th</sup> generation offshoring centres, Wroclaw as 5<sup>th</sup> generation, Lodz and Katowice as 4<sup>th</sup> generation, and Olsztyn, Lublin, Bydgoszcz, Szczecin, Tricity as 1-3<sup>rd</sup> generation centres.

and require high skills. This may explain the demand growth for highly skilled employees – e. g. professionals. At the same time, many tasks performed by employees in 1<sup>st</sup>–4<sup>th</sup> generation offshoring centres are of routine cognitive nature. This, in turn, may be a reason why demand for clerical jobs is still relatively high in Poland.

Migrations have had impact not so much on occupational structure, as on the labour market equilibrium. Migrants' outflow (estimated at 2 million people) obviously had positive effect on the unemployment rate, but it created serious tensions in some labour market segments and occupational groups (e.g. medical doctors, nursing professionals, truck and bus drivers, construction workers). It is also symptomatic, that many Polish migrants fill jobs from the bottom tier of the labour market in the host country, while immigrants from eastern countries (e.g. Ukraine) are filling such bottom tier jobs in Poland<sup>7</sup>.

The reforms of labour market institutions in Poland have been rooted in the belief dated to beginning of transition period, that the labour market should be deregulated in order to raise its flexibility, and thus, to provide labour market equilibrium with relatively low unemployment. These institutional changes, combined with other economic factors, resulted in labour market segmentation, which manifested in relatively high share of fix-term employment in total employment compared to other EU Member States. Since Poland joined European Union, this share has been constantly much above the EU and Euro area average<sup>8</sup>. Use of fixed-term contracts is most intensive in case of low-paid jobs (performed often by the youth) – this is important factor for maintaining demand in occupational groups that requires low to mid skills levels.

Finally, shifts in occupational structure may be driven by technical change. New technologies, especially Information and Communication Technologies, play more and more important role in the Polish economy. In 2004-2014 the average growth of ICT-capital accounted to 18.12% (almost 8p.p. more than in the EU-15), and contribution of ICT-capital to the economic growth was estimated at 0.75pp (comparing to 0.48p.p. in the EU-15). Although some authors argued that Skill-Biased Technical Change hypothesis found empirical confirmation in Poland (Bukowski, Zawistowski, 2008), recent analyses have pointed out to the possible polarisation processes – but no conclusive results have been yet provided (Arendt 2015). Regardless of the type of technical change taking place on the Polish labour market, there is no doubt that it is an endogenous change. Since 1990-ties

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<sup>7</sup> The scale of this phenomena is hard to measure because these jobs are often offered and performed in the mode of undeclared work.

<sup>8</sup> The maximum value 28.2% was recorded in 2007, just before the world crisis. This highest share of temporary workers in the EU together with a high in-work poverty rate for temporary workers has been pointed out by the European Commission as an important challenge in Poland. Additionally, in most cases temporary employment is not a choice of the employee but is imposed by the employer.

enormous educational expansion translated into high increase of the educational attainment in Poland. It had to result in changes in the employment structure by education (Fig. 3). Between 2005 and 2014 perceptible decline in the number of employees with primary education was observed both in Poland (by 1/3) and in the European Union (by 1/4). The number of employees with secondary education fluctuated – it was growing till 2008 (in Poland faster than in the European Union), then it fell to reach in 2014 similar level as it was in 2005. At the same time, the dynamic growth in the number of employees with university degree occurred – in the EU28 it rose by 1/3 of the base value, while in Poland by 2/3 (Fig. 2).

As a consequence, share of employees with primary education in total employment was much lower in Poland (5.8%) than in the EU28 (18.7%) in 2014. The opposite situation was observed in case of secondary education (its share in Poland accounted to 61.7%, in the EU28 to 48.5%), while share of highly skilled employees was similar in Poland and EU28, and reached about 33%.

### **Shift in occupational structure in 2022 horizon**

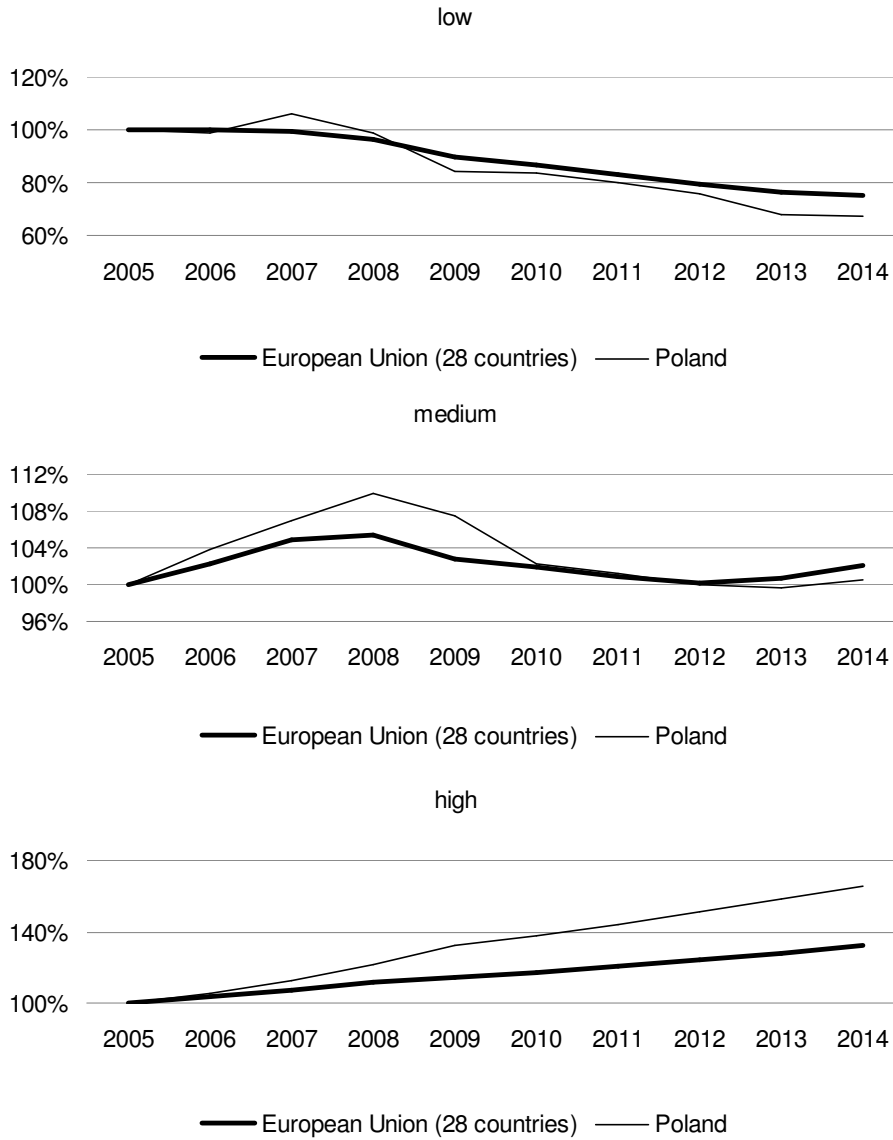
Forecast results show that in the most likely scenario employment in Poland by 2022 should increase to 16228 ths people (1.3% growth between 2014 and 2022)<sup>9</sup>. Moderate growth (2.3-3.4%) of employment is anticipated in the major groups of Managers, Technicians, Service workers, and Operators, while demand for Professionals is going to shot up by 21.5%. At the same time biggest decline will be concentrated in the major group of Agriculture workers, followed by Craft and Clerical workers. Interestingly, demand in the Elementary occupations group should be stable (Fig. 3).

These forecasted shifts seem to follow the trajectory that is specific to developed countries. Firstly, changes in the sectoral structure of the Polish economy have led to decline of the role of agriculture and growing importance of services and manufacturing sectors. This, in turn, had affected the employment structure, which is going to be more and more modern – that means higher employment in service sector and shrinking number of employees in the agriculture. Secondly, technical change is going to favour highly skilled professionals – technology will be replacing human resources in simple, routine operations that may be automated.

<sup>9</sup> In the optimistic scenario employment will rise to 16313 ths (1.8% growth compared to 2014), while in the pessimistic scenario slight decline of employment is forecasted (to 15972 ths, -0.3%). We intentionally use employment forecast prepared within the project «*Analysis of the processes on the Polish labour market and in the area of social integration in the context of conducted economic policy*», because of higher level of disaggregation in comparison with forecasts provided by the CEDEFOP.

Figure 2

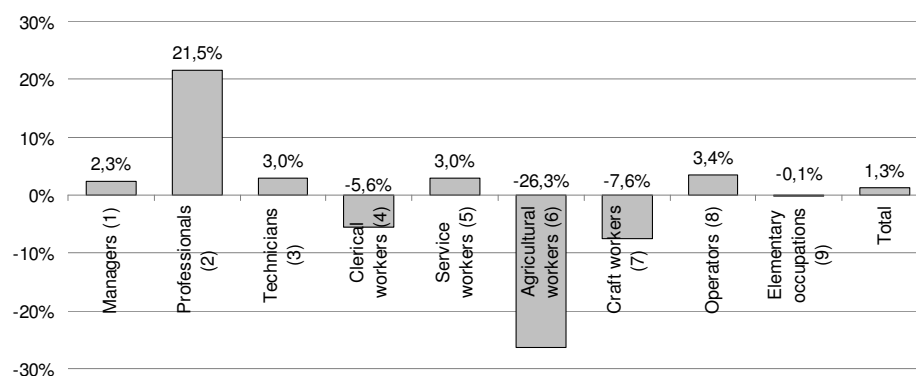
**Employment dynamics by level of education in EU28 and Poland  
in years 2005–2014 (2005 = 100)**



Source: own calculation (LFS data).



Figure 3

**Forecast of employment dynamics by major occupational groups in Poland in years 2014–2022 (2014 = 100)**

Source: own calculation (LFS data).

However, Polish economy will still need many employees to perform relatively simple manual tasks that will not be automated. Thirdly, it seems that jobs concentrated in the middle of the skills distribution (covering mainly clerical and manufacturing/assembly line jobs) will be shrinking. This observation leads to two conclusions:

- offshoring centres in Poland will be moving towards the model of high complexity services (5<sup>th</sup> and 6<sup>th</sup> generation centres) – this implies a decline in number of clerical jobs,
- it is reasonable to assume, that technical change in Poland will cause polarisation of the labour market.

In order to test this last conclusion/hypothesis we applied the ILO concept of the ISCO skill levels (ILO 2012). This methodology combines skill requirements (described within the framework of ISCED-97 classification) with ISCO-08 major groups, defining four skill levels<sup>10</sup>. The first level involves occupations consisting of

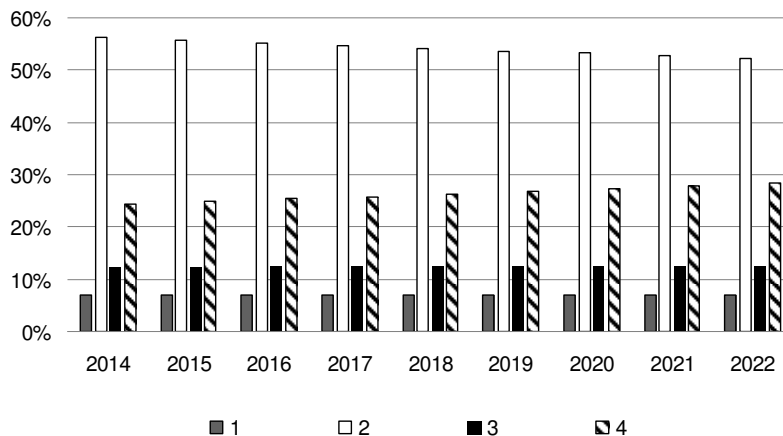
<sup>10</sup> We are aware that the ILO concept considers level of skill required for entry-level jobs in certain occupational group. As a result, some individuals classified in particular group may possess higher or lower skills, which may influence the validity of conclusions stemming from analysis of employment forecast by four skill levels. However, there is no method to avoid this issue, especially in case of forecasting procedures.

simple and routine physical or manual tasks, while the fourth one encompasses tasks requiring complex problem-solving, and decision making skills<sup>11</sup>.

Forecast results show that demand for skill level 1 employees is going to be stable within 2014-2022 period. Number of skill level 2 workers shall decline by 6%, while in occupations classified to the skill level 3 and 4 increase of employment is anticipated (by 2.5% and 17.6% respectively). As a consequence, we shall see a drop of skill level 2 occupations (by 4p.p. to 52.2% in 2022) and similar growth (by 3.9p.p. to 28.3% in 2022) of skill level 4 occupations in the employment structure (Fig. 4). These shifts in employment structure by skill levels seem to be in line with the polarisation hypothesis<sup>12</sup>, as they favour high skills (and to some extent low skills), while disfavouring medium skills (in this case skill level 2 occupations). Thus, Poland is going to follow the trajectory characteristic to developed countries, which will surely bring some positive outcomes, but will also create new challenges.

Figure 4

**Forecasted employment structure by skill levels in Poland (2014–2022)**



Source: own elaboration.

<sup>11</sup> In the analysis we omitted Armed Forces Occupations (0). As a result, in our approach Skill level 1 includes Elementary occupations (9); skill level 2: Clerical support workers (4), Service and sales workers (5), Skilled agricultural, forestry and fishery workers (6), Craft and related trades workers (7), and Plant and machine operator and assemblers (8); skill level 3: Technicians and associate professionals (3), and occupations in sub-major group 14 – Hospitality, retail and other services managers; skill level 4: Professionals (2), Managers (1) excluding in sub-major group 14.

<sup>12</sup> Unfortunately we are not able to combine structural changes in employment with wages, as there is no wages forecast available.

Growing tensions in some labour market segments will be one of these challenges. From the one hand, there will be need for more retraining activities, as individuals working in low(er) skilled jobs will be moving to high-skilled jobs. This surely will require a strong support within Active Labour Market Policies. From the other hand, high and continuously increasing demand for professionals, especially in the skill level 4 occupational groups, may lead to market imbalance resulting from labour supply shortage. Educating and training of such large number of specialists within couple of years (till 2022) is a really difficult task, having in mind the processes of society ageing, which will have negative impact on the Polish labour market in the nearest future. CEDEFOP argues, that employment perspectives in Poland in the next decade may be hampered not by slow economic growth but by the lack of adequately (highly) skilled individuals (CEDEFOP 2015). Even at present, demand for specialists in some occupations is much higher than available supply – so further employment shift towards these occupations will make the things worse. Information and Communication Technologies specialists are one of the best examples. Deficit in this group is so troublesome at some local and regional labour markets in Poland, that initiatives aimed at opening the labour market for migrants from the non-EU countries in this occupational group were undertaken. At the same time, the highest demand growth within sub-major and minor groups is forecasted in the group of Information and communication technology professionals (Fig. 5 and Fig. 6).

We may expect, that tensions in the other sub-major groups with relative high employment growth – Science and engineering professionals, Business and administration professionals, and Legal, social and cultural professionals, will be not so severe as in case of IT specialists<sup>13</sup>, but still, the magnitude of forecasted changes may cause problems<sup>14</sup>. In the EU Member States, including Poland, a lot of attention has been paid to initiatives aimed at strengthening the potential of Human Resources for Science and Technology – especially development and modernisation of the infrastructure of higher education institutions. Unfortunately, the inflow of graduates in the group of Science and engineering professionals will be insufficient to meet growing demand for this category of employees<sup>15</sup> (Arendt, Rzenca, 2014). Smaller mismatch may be anticipated for Business and administration professionals, and Legal, social and cultural professionals, as the supply of graduates in these fields has been quite high and stable. In spite of demographic decline, resulting in shrinking number of pupils, the growth of demand for teaching professionals is forecasted.

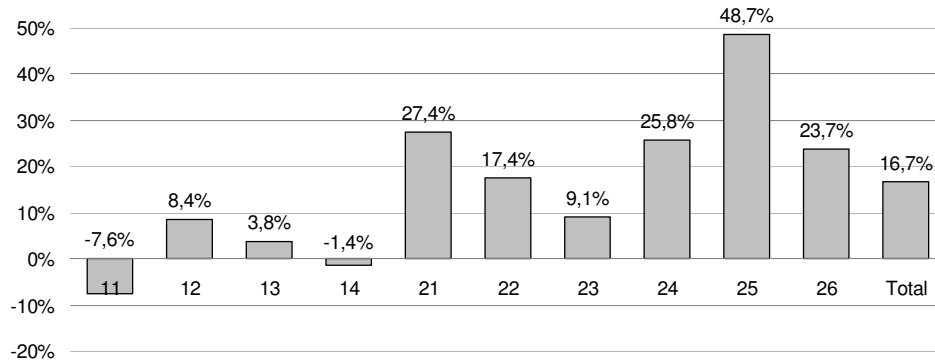
<sup>13</sup> Health professionals will probably be an exception.

<sup>14</sup> The magnitude of changes in the sub-major groups 11-14 is moderate, and shall not cause tensions on the Polish labour market. Because of this we focused on discussion describing reasons and consequences of employment shifts in the 2<sup>nd</sup> major group.

<sup>15</sup> It is worth to mention, that high employment growth is forecasted in all minor groups within the sub-major group Science and engineering professionals, ranging from 22.1% (Physical and earth science professionals, and Mathematicians, actuaries and statisticians) to 28.7% (Engineering professionals – excluding electrotechnology) (Fig. 6).

Figure 5

**Forecast of employment dynamics by sub-major occupational groups within skill levels 3 and 4 in Poland in years 2014–2022 (2014 = 100, in %)**



- 11 – Chief executives, senior officials and legislators
- 12 – Administrative and commercial managers
- 13 – Production and specialised services managers
- 14 – Hospitality, retail and other services managers
- 21 – Science and engineering professionals
- 22 – Health professionals
- 23 – Teaching professionals
- 24 – Business and administration professionals
- 25 – Information and communications technology professionals
- 26 – Legal, social and cultural professionals

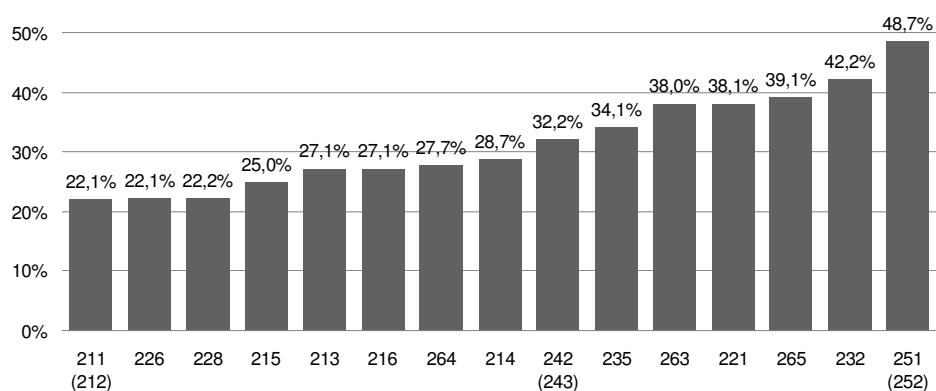
Source: own calculation (LFS data).

However, it should be noted that this rise is going to be generated mostly within the minor group of Vocational education teachers (growth by 42.2%) (Fig. 6). Vocational education and training (VET) system in Poland has been undervalued for many years – insufficient financial support caused that the teaching infrastructure became outdated, and as a result, skills and competences developed in vocational schools were also out of date compared to labour market needs. This had two negative effects. The first one was declining interest in vocational training among the youth, who have preferred more general type of education (and usually continued education at the university level), which drove down number of pupils in vocational school, while demand for vocational skills has been held stable (this caused perceptible skills gap on the labour market). The other effect is related to vocational education teachers – because of the aforementioned processes, this occupation started to be perceived as non-prestigious,

and not providing decent career opportunities. As a consequence, young professionals who could be a good vocational teachers decided to develop their careers in the private sector, which caused a generation gap in VET schools in Poland – most of teachers are in pre-retirement age. These observations give a basis to predict, that also in the minor group of Vocational education teachers quite severe tensions may take place till 2022.

Figure 6

**Forecast of employment dynamics by minor occupational groups in Poland in years 2014–2022 (2014 = 100, in %) – the biggest increase in 1 and 2 major groups**



211 (212) – Physical and earth science professionals (Mathematicians, actuaries and statisticians)

226 – Dentists

228 – Pharmacists

215 – Electrotechnology engineers

213 – Life science professionals

216 – Architects, planners, surveyors and designers

264 – Authors, journalists and linguists

214 – Engineering professionals (excluding electrotechnology)

242 (243) – Administration professionals (Sales, marketing and public relations professionals)

235 – Other teaching professionals

263 – Social and religious professionals

221 – Medical doctors

265 – Creative and performing artists

232 – Vocational education teachers

251 (252) – Software and applications developers and analysts (Database and network professionals)

Source: own calculation (LFS data).

Finally, perceptible employment growth in the Health professionals sub-major group is forecasted (Fig. 5). However, if we take into account the processes of society ageing in Poland, this growth may be insufficient to meet the needs of people in post-working age, who will require more (in terms of quantity and quality) health services. Even high dynamics in the number of Medical doctors<sup>16</sup> (Fig. 6) may be not enough to meet this increasing demand, not to mention the problems connected with insufficient employment in other health occupations (e.g. nursing professionals). Moreover, even nowadays demand for the health professionals is not fully met, so balancing demand and supply in this sub-major and minor groups will be next challenge for the Polish labour market in the 2022 horizon.

## Conclusions

Polish labour market has undergone significant changes since the beginning of transition from the centrally-planned to the market economy. These changes have been driven by many factors—related to the transformation processes, especially in the 1990-ties, and to impact of global megatrends that shape labour markets in developed and emerging economies more recently. One of the most important supply-driven shift was caused by massification of higher education, which has led to dynamic growth of labour force competences (at least formally), resulting in decreasing share of employees with primary and increasing share of university graduates in the employment structure. At the same time demand-driven factors caused growing demand for high skills which has been reflected in occupational shifts towards specialists and managers. The employment forecast till 2022, presented in the paper, suggests that this upward trend will be maintained, however we shall see simultaneous increase of employment in occupations with low skills requirements, and shrinking employment in medium skills jobs. This may point to disclose of polarisation processes on the Polish labour market, strongly related to the influence of technical change, which has been thoroughly analysed mainly in the highly developed countries.

There is no doubt, that these recent changes have brought many positive outcomes for the Polish economy and the labour market—the sectoral structure and employment structure have become more modern and similar to the ones in more developed EU Member States (especially EU-15). However, the anticipated shifts in occupational structure on the Polish labour market in the 2022 horizon are creating new challenges and possible tensions in some labour market segments. These tensions shall arise mainly in these occupational groups in which there have already been recorded dynamic increases of demand, with insufficient

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<sup>16</sup> Unfortunately, forecast does not provide information on the change in the number of medical doctors who completed gerontology specialization.

supply-side adjustments, and growing skills-mismatch. Pro-active attitude of different stakeholders (government, social partners, and non-governmental organisations) will be of great importance to successfully cope with these issues.

Although anticipated changes on the Polish labour market will reveal some weaknesses of this market in the short run, in the long run they shall create a solid basis for sustainable economic growth through modernising the structure of the economy that will take advantage on growing supply of highly qualified labour force (professionals) and will absorb still relatively large group of low-skilled workers.

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