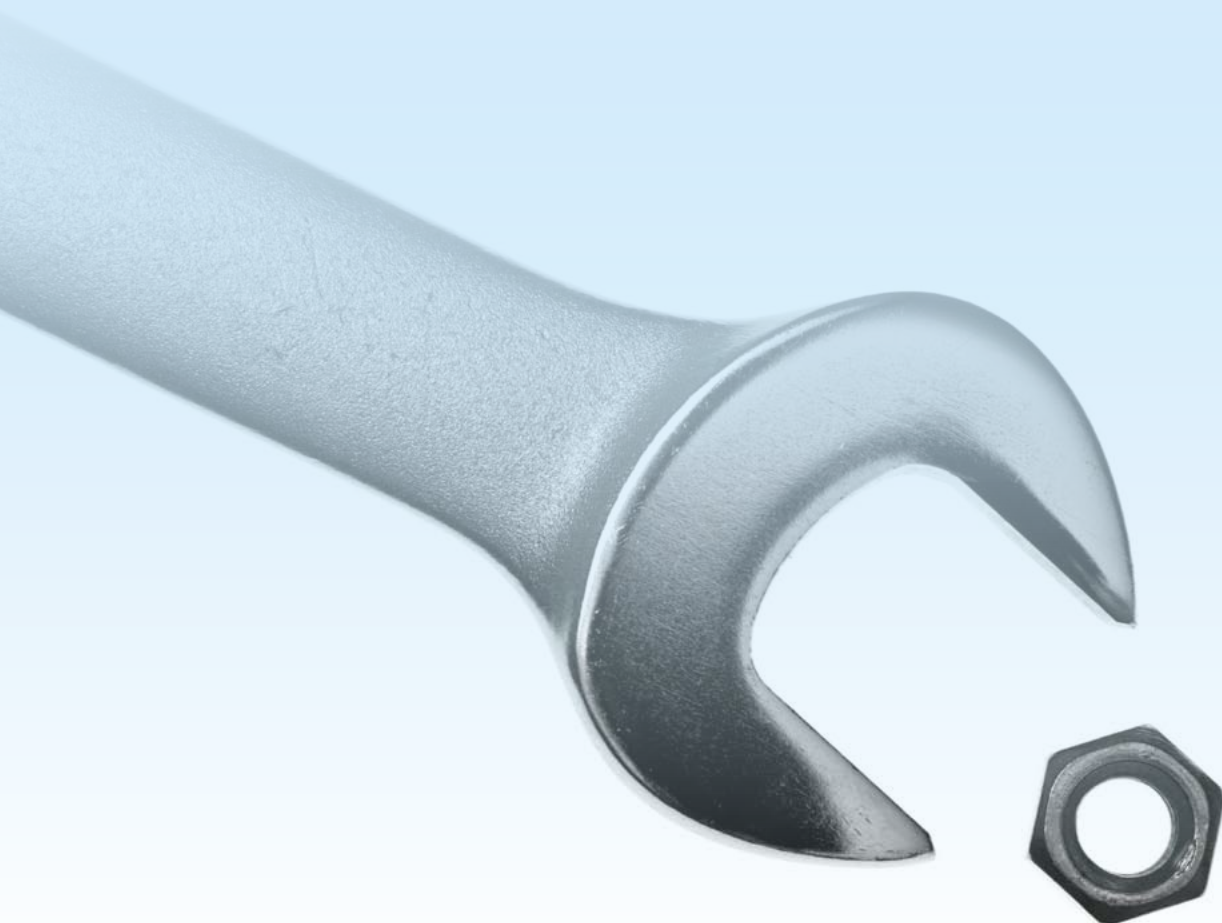


MEASURING SKILLS AND EDUCATION MISMATCH IN ESTONIA ON THE BASIS OF PIAAC DATA

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Since 1989 notable changes have occurred in the structure of workplaces in Estonia: by 2014, the share of skills-intensive jobs rose from 35% to 42.7% and the share of semi-skilled white-collar workers from 12.4% to 20.2%. On the contrary, the share of semi-skilled blue-collar workers has fallen from 44.6% to 36.8% and the share of low-skilled workers has remained relatively unchanged. In other words, a trend towards the creation of more sophisticated workplaces can be noticed in the employment structure. Statistics Estonia's data show similar changes in the relative shares of people with different education levels. Nevertheless, the actual situation in the labour market indicates a mismatch between skills and workplace requirements. Estonian entrepreneurs and foreign investors consider the scarcity of adequately trained labour as one of the main impediments to economic growth in Estonia.

Based on the aforesaid, the 7th thematic report of the PIAAC study analyses whether the education and skills of Estonian workers match their job requirements. First, we examine whether and how such indicators can be measured on the basis of the OECD's Survey of Adult Skills PIAAC. After that we analyse both education and skills mismatch on the basis of chosen methods. The analysis of education mismatch is based on the subjective method, in other words, on the question "If somebody would like to get this job today, what kind of education would s/he need?", and comparing the result with the highest level of education acquired by such person. The analysis of skills mismatch is based on the method proposed by Allen et al.¹, despite its certain shortcomings.

Since in the case of skills mismatch the emphasis is put on numeracy mismatch, this report obviously cannot fully address the problem often cited by employers (the lack of skilled labour), because employers might actually mean the lack of other skills (e.g., different professional skills). Nevertheless, the author hopes that the report will be able to point out at least some new aspects of the issue of skills and education mismatch. In addition to the identification of education and skills mismatch, education demand in the Estonian labour market and education supply are separately addressed. The same has been done for skills – before approaching the skills mismatch issue, the use intensity of various skills in different areas of economic activity in Estonia is analysed. These results are then placed into an international context to get a better overview.

The results of the analysis have shown that:

1. **Over one-third of employed people in Estonia are over-educated, which is the highest percentage among the countries that participated in the PIAAC study. The probability of over-education is greater among older people and people with higher education.**

If we categorise all the people whose highest completed level of education exceeds the level of education required to receive their current job as people with education surplus and all the people whose highest completed level of education is below the level required to receive their current job as people with education deficit, then **education surplus in Estonia is characteristic of 36.9% of the employed persons included into the sample.**

¹ Allen, J., Levels, M., van der Velden, R. (2013). *Skills mismatch and skill use in developed countries: Evidence from the PIAAC study*. ROA Research Memorandum.

Their estimated number is 199,200 people. **Education deficit seems to be a smaller problem that concerns only 12.6% of the employed persons included into the sample – i.e., approximately 67,800 people.**

It should be also noted that **education surplus in Estonia is the largest among all the compared countries.** The share of people with education surplus in France, Japan and Ireland is similar to Estonia's, but the average indicator in the compared countries – 24% of all the hired workers in the 16-65 age group who do not define themselves subjectively as pupils, students or trainees and who do not work as entrepreneurs – is clearly lower than the respective indicator in Estonia. The lowest percentage of people with education surplus is in Italy, the Netherlands, Belgium, Finland and Denmark.

Such results would suggest the availability of people with a high education level in Estonia (the country especially stands out by the large share of people with a master's or equivalent degrees) who might be used at workplaces that really require a higher education level. It is another issue what kind of skills these people have received during their formal education. Since older citizens of Estonia received education in a different economic system, their skills do not necessarily match the actual requirements of workplaces and this might be a cause of the large share of over-educated persons. This is suggested by the result of regression analysis that showed a higher probability of over-education among older people and people with higher education. The percentage of over-educated people in the 45-54 age group in Estonia exceeds the average value for the surveyed countries by 21.9 percentage points (pp) and in the 55-65 age group by 21.8 pp. In younger age groups the differences are smaller and in the youngest age group the percentage of over-educated people in Estonia is actually 3.7 pp below the international average. There is a question, however, of how other countries that have undergone changes similar to Estonia (Slovakia, the Czech Republic and Poland) have managed to achieve a clearly smaller percentage of over-educated people even in the oldest age group. It seems that the relatively higher share of highly educated people among the oldest age group in Estonia might explain some of this finding.

The relative number of over-educated persons is also higher among graduates in certain areas of education. In the comparison of people of the same age, with the same home language, the same gender and the same level of education, **in such areas as social sciences, business and law; engineering, manufacturing and construction; and services and agriculture there are more over-educated graduates than among people with general education.** On the other hand, there are clearly fewer over-educated persons among graduates in such areas as health and welfare. **In terms of areas of economic activity, education surplus is the largest in agriculture, forestry and fishing; manufacturing; construction; and accommodation and food service activities (compared to wholesale and retail trade).** On the other hand, over-education is clearly less of a problem in education; professional, scientific and technical activities; public administration and defence; and human health and social work activities.

Education deficit is clearly a smaller problem among graduates and people with higher education in agriculture; engineering, manufacturing and construction; and services. **In terms of areas of economic activity, the probability of experiencing education deficit compared to wholesale and retail trade is the largest for workers in more skills-intensive**

areas: information and communication; financial and insurance activities; professional, scientific and technical activities; education; public administration and defence.

2. All in all, workplaces in Estonia require lower skills: secondary or lower education is sufficient in more than half of all workplaces. Estonia stands out in international comparison for the fact that areas of economic activity with a supposedly greater number of skills-intensive occupations have education demand similar to other countries. Predominantly blue-collar areas of economic activities tend to demand lower education levels.

As already mentioned above, submitted background information is worth analysing separately from the education mismatch analysis. Namely, it has been found that workplaces in Estonia require rather low skills in the opinion of employed persons – **secondary or lower education is sufficient to get 55.2% of jobs and people employed at workplaces with lower education requirements have a larger proportion of those who think that an even lower level of education would be actually sufficient for such workplaces.** The last observation indicates a certain over-dimensioning of the role of education requirements in getting such jobs in people's opinion. Moreover, on the basis of the sample of employed persons under 35 it has been shown that at least one-year professional work experience is required to get approximately half or more jobs that require applied higher education or a bachelor's, master's or Ph.D. degree. It emphasises **the importance of acquiring work experience in parallel with (full-time) studies.**

It has been also found that a majority of people employed at positions with presumably simpler work tasks have a low level of education, but it is believed that, in the whole, a low level of education would be sufficient for an even larger number of jobs. When people are asked to assess how many people with a high level of education would be necessary in their areas of activity, their assessments are clearly below the indicators showing the actual percentage of people with a high level of education in the corresponding areas of activity. These results indicate education surplus among people employed in areas of activity requiring less skills-intensive work.

Differences in education demand between the selected areas of activity show that education demand in the areas of activity with a presumably higher number of skills-intensive jobs is rather similar to the other countries. **Predominantly blue-collar areas of activity tend to demonstrate demand for lower levels of education,** indicating a possibility that work performed in such areas of activity is too simple compared to the same areas of activity in the other countries. **On the other hand, predominantly white-collar areas of activity tend to demonstrate demand for relatively higher levels of education.** It may be due to the fact that these areas of activity are indeed more sophisticated in Estonia compared to the other countries or it is possible that unnecessarily high education requirements for hired workers have been set without good reason, leading to skills and education surplus in these areas of activity.

3. The mismatch of information processing skills is a smaller problem in Estonia than education mismatch. Moreover, education and skills mismatch in Estonia usually do not coincide.

The analysis of skills mismatch is based on the method proposed by Allen et al.², despite its certain shortcomings. According to this method, the ratio of the average frequency of skill use to the level of skills is used as an indicator of skills mismatch (by statistical method). The frequency of skill use is considered as matching the level of skills if the frequency of skill use does not deviate from the average frequency of skill use for people with such level of skills by more than 1.5 standard deviation.

According to this approach, in Estonia **7.4% of people included in the sample had numeracy surplus** (the international average is 9%), i.e. approximately 40,100 people. **Numeracy deficit was demonstrated by 9.9%** of those employed who were not entrepreneurs and who did not define themselves subjectively as students or trainees (the international average is 10.2%). In other words, we are talking about approximately 54,000 people. **10.9% of people have literacy surplus** (59,100 people) **and 11% have a deficit** (59,400 people); the international average is 10% and 9.4%, respectively. The USA stands out as a country with the lowest numeracy surplus (4.5%) and the highest deficit (25%).

The analysis has shown that **skills and education mismatch mostly do not coincide (in the same direction)**. Thus, the percentage of persons in Estonia in this sample with a surplus of both education and skills is just 3.7% and the percentage of persons with both education and skills deficit is just 1.9%. Since the percentage of persons in Estonia whose education and skills match their work requirements is among the lowest in the international comparison (42.2%), Estonia stands out as a country with a huge number of people who have a mismatch in only one aspect or, e.g., have education surplus and skills deficit at the same time.

The probability of skills mismatch with work requirements tends to relate to work being done rather than people's background. Thus, it has been determined that **the probability of numeracy surplus is the highest among people in the youngest age group (16-24)** and the smallest among graduates in the field of education compared to general education graduates. In addition, an important factor is the area of activity where a person is employed. This could actually be expected, because the frequency of skill use at work depending on the skills-intensity of the workplace has been a component in the creation of the skills mismatch indicator. **The analysis has shown that numeracy surplus (as compared to wholesale and retail trade) is the largest in such areas as information and communication; public administration and defence; administrative and support service activities; and education, human health and social work activities.** There is a smaller probability of numeracy deficit in these areas of activity compared to the comparison group. It is also smaller in such areas of activity as the manufacturing and agriculture.

4. In international comparison, skills are used to a large extent in transportation and storage and to a relatively large extent in accommodation and food services, public administration and defence. Manufacturing, education and agriculture are examples of areas of economic activity where work in Estonia appears to be somewhat simpler.

The analysis of skills required at workplaces has shown that **Estonia positively stands out to the greatest degree in the international comparison by the frequency of different**

2 Allen, J., Levels, M., van der Velden, R. (2013). Skills mismatch and skill use in developed countries: Evidence from the PIAAC study. ROA Research Memorandum.

skill use in transportation and storage, where the use of literacy, numeracy, problem-solving, selling and teaching skills, but also computer use exceeded the average result of the analysed countries. The accommodation and food service activities as well as public administration and defence differ from transportation and storage by the frequency of problem-solving skill use; in these areas of activity this indicator is equal to the average results of all the countries. In wholesale and retail trade, the frequency of selling and persuasion skill use also does not differ from the average result of the other countries. In administrative support service activities; professional, scientific and technical activities; and information and communication, the use frequency of a majority of corresponding skills does not differ from the average result of all the countries. In other words, by the use of skills these areas of activity are very similar to the same areas of activity in the other countries.

Manufacturing, education and agriculture are examples of areas of economic activity in which work performed in Estonia appears to be somewhat simpler. Thus, for example, the average use frequency of literacy, numeracy, problem-solving, selling and persuasion, and teaching and presentation skills as well as computer use in Estonia's manufacturing industry is below the average result of the other countries. This is the only analysed area of activity where workers in Estonia perform more physical work compared to the other countries.

It appears that Estonia is facing a pervasive lack of co-operation skills. The average use frequency of this skill does not exceed the average result of all the countries in any area of activity and remains below the average result for all the countries in such areas of activity as transportation and storage; accommodation and food service activities; wholesale and retail trade; public administration and defence; professional, scientific and technical activities; information and communication; and education and construction. Improvement of this skill might produce a synergy for new developments.

Policy and action recommendations for national authorities and entrepreneurs based on the report are as follows:

- The results of the analysis indicate that education requirements might sometimes be unnecessarily high, especially for white-collar jobs. In the international comparison it is noticeable, for example, that 14.2% of people employed in Estonia's wholesale and retail trade sector believe that lower secondary education or even lower education would be sufficient for their jobs, whereas the average corresponding result in the compared countries is more than twice higher (29.9%). According to workers, an Estonian employer would like to hire for such positions people with applied higher education or a bachelor's degree. The same trend has been noted in the accommodation and food service activities. The readiness of Estonian entrepreneurs to pay for such an expensive indicator of a person's abilities as a diploma of higher education, even if they are unable to offer such people a job that would later require such qualifications, was also demonstrated by Anspal et al.³. To avoid unnecessary costs of acquiring the highest possible level of education instead of acquiring professional skills that are actually needed in the labour market it is important that

3 Anspal, S., Järve, J., Jürgenson, A., Masso, M., Seppo, I. (2014). *Oskuste kasulikkus tööturul: PIAAC uuringu temaatiline aruanne nr 1*. Tartu: Haridus- ja Teadusministeerium.

employers bring their education requirements in line with work requirements, thus contributing to the decrease of over-education.

- Nevertheless, in certain areas of activity the contrary is true – Estonian employers are relatively more willing to hire people with a lower level of education compared to the same areas of activity in the other countries. For example, this factor concerns construction and manufacturing where a large part of the employed believe that lower secondary education or an even lower level of education would be sufficient to get their jobs. In the Nordic countries, the requirement of secondary education in these areas of activity is almost two times more frequent than in Estonia. Since the manufacturing industry stands out in the most negative light both in terms of worker skills and the skills-intensity of work, attention should be paid to workplaces in this area of activity and the skills of workers employed in this sector.
- Analyses have shown that education deficit is experienced by 22.4% of people who acquired their highest level of education in the area of general education. This figure is 2-5 times higher than in other education areas. Nevertheless, this perceived education deficit might be caused by a relatively low education level rather than purely by a lack of professional skills, because the majority of people who acquired their highest education level in the area of general education have only basic or secondary education. Thus, the need to bring people without professional training back to the education system is confirmed.
- Entrepreneurs in such areas as the manufacturing and agriculture; forestry and fishing; and, if we narrow down the results of the analysis, in construction should review whether and where there is a need to make workplaces more sophisticated. The results of the analysis indicate that in these areas relatively simple work is being done which, in its turn, points to a development opportunity in these areas.
- In the whole, co-operation between Estonian workers is relatively poor, limiting the opportunity for synergy. On the one hand, a problem may be caused by poor co-operation skills, and on the other hand – by the excessive individualisation of work. Since employers have put an emphasis on the acquisition of this skill and pointed out that a low level of this skill among school graduates represents a problem⁴, ways of teaching it at school must be considered. Steps in this direction have also been taken in the framework of the Estonian Lifelong Learning Strategy 2020.⁵ This strategy emphasises the need to make an effort in the next few years in the actual implementation of objectives, including the acquisition of problem-solving skills and their implementation in teamwork, which have been focused upon in national formal education curricula approved during the last decade.
- Education mismatch is clearly a bigger problem in Estonia than the mismatch of information processing skills. According to the method used in this report and on the basis of the analysed sample, there are 36.9% of over-educated people and 12.6% of under-educated people in Estonia. 7.4% of all the employed persons demonstrate numeracy surplus and 9.9% have numeracy deficit. Nevertheless, both groups should be addressed. But how can we define these groups? Who are these people?
 - The share of over-educated people whose qualifications would be better

4 See e.g. Järve, J., Lepik, K.-L., Mägi, A. (2014). *Kvantitatiivse tööjõuvajaduse prognoosi andmestiku ja kvalitatiivse tööturu seire ühitamise meetodika väljatöötamine ja piloteerimine. Analüütiline kokkuvõtte kvalitatiivsest tööjõuvajadusest tegevusalade kaupa*. Riigikantselei.

5 Haridus- ja Teadusministeerium (2014). *Elukestva Õppe Strateegia*. Tartu/Tallinn: Haridus- ja Teadusministeerium, Eesti Koostöökogu, Eesti Haridusfoorum.

applied by a change of work or making existing work more sophisticated is bigger among people of 45-65 years of age, people with higher education, graduates in social sciences, business and law; engineering, manufacturing and construction; agriculture (compared to people with general education) as well as workers employed in agriculture, accommodation and food service activities, manufacturing and construction. On the other hand, it should be taken into account that over-education does not necessarily mean a very large skills surplus – older people might be over-educated because they have been forced to work in a profession that does not correspond to the profession that they had graduated in. It would imply re-training to ensure a good performance in a new area of activity.

The existence of a large percentage of over-educated persons is indeed countered by a message from the PIAAC report on lifelong learning (Saar et al.⁶) pointing out that a relatively large share of Estonians believe that they need additional training to improve their job performance. It indicates that if we are unable to offer over-educated people such work that corresponds to their level (and area) of education, we should focus our attention on offering sufficient on-the-job training to such people to enable them to adjust to work in another area of activity.

- Under-educated people tend to work in certain areas of economic activity. Thus, people employed in information and communication; financial and insurance activities; professional, scientific and technical activities; and public administration and education believe that a higher level of education is needed to get their jobs compared to their current level. It might be a signal to the education system that employers in these areas of activity cannot find suitable workers from educational institutions and are thus ready to hire people with a lower level of education and then train them for the job.
- The numeracy surplus is the largest in the 16-24 age group as well as in such areas of activity as information and communication; public administration and defence; education, human health and social work activities; and administrative and support service activities as compared to wholesale and retail trade. It indicates that in these areas of activity there should be room for work requiring the more intensive use of numeracy.
- The numeracy deficit is the largest among the Russophone population and people who acquired their highest level of education in the service sector. These groups need to use numeracy skills in their work more intensively than their skills allow according to the method used in this report. In other words, attention should be paid to raising the level of numeracy skills for these people.

6 Saar, E., Unt, M., Lindemann, K., Reiska, E., Tamm, A. (2014). Oskused ja elukestev õpe: kellelt ja mida on Eestil oskuste parandamiseks õppida? PIAAC uuringu temaatiline aruanne nr 2.