CHARLES UNIVERSITY IN PRAGUE
FACULTY OF EDUCATION
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Country case study
Czech Republic

In part delivery of Framework Agreement on Forecasting skill supply and demand in Europe (in response to open invitation to tender No AO/RPA/AZU-TODUN/European-skills-forecasts/009/08).
Task 6

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CEDEFOP
European Centre for the Development of Vocational Training

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1. History of forecasting employment in the Czech Republic

Projections of employment by sector, occupation or by qualification requirements have not a very long tradition in the Czech Republic. One of the reasons for it was a lack of consistent and continuous databases of information on development of occupations, as the valid classification of occupation was often and most inconsistently changed[1].

In connection with the fall of Communism in 1989, the Czech Republic went through a dramatic economic reform in the transition from a centrally planned economy to a market economy. In 1993, Czechoslovakia split into the Czech Republic and Slovakia. Relevant historical data is therefore available for the CR from 1993 on, i.e. for the past 18 years as of this writing. Only after the societal changes in the country, the Czech Statistical Office (CZSO) began to use in 1993 classifications used in Western Europe, for example the classification of occupations ISCO, the industry classification ISIC, and the classification of education ISCED. After a short trial period, since 1995 Czech data have been statistically reliable and relatively consistent over time.

At the present time, however, no institution exists in the Czech Republic which would perform regular, medium-term forecasting for developments on the labour market on a long-term basis. The basic problem with creating forecasts in the CR is that there are no official medium-term forecasts for developments in the number of jobs by individual economic sectors. Such forecasts are not available even from the Czech Statistical Office (CZSO) or the Czech National Bank. The main government organizations attempting to introduce a permanent and repeated prognosis system in the CR are the Ministry of Education, Youth and Sports (MoEYS) and Ministry of Labour and Social Affairs. These two government branches have commissioned several projects dedicated to labour market forecasts in the last 10 years. The projects were organized by Education Policy Centre, Charles University in Prague (EPC), National Training Found and Research Institute for Labour and social Affairs.

In 1999-2001 took place in the CR project *Regular Forecasting of Training Needs: Comparative Analysis, Elaboration and Application of Methodology (LABOURatory)*[2] as a two-year survey and analysis project funded by the European Commission under the Leonardo da Vinci programme. The aim of the project was to investigate labour market information system and methods used for forecasting education and training needs in four EU member states (France, Germany, Ireland and the Netherlands), and to compare them with the data availability and the methods applicable in three pre-accession countries (Czech Republic, Poland and Slovenia). This project was organized by The Czech National Observatory of Vocational Education and Labour Market (National Training Found).

The EPC put together the information on developments on the labour market in the CR from 1995 to 2006 and development forecasts through 2016. The results of the project are available on the EPC website[3] (only in Czech). The outcome of the project was the publication of *Medium-Term Forecast of Qualification Requirements on the Labour Market in Europe* (available only in Czech, *Střednědobá projekce kvalifikačních potřeb trhu práce v Evropě*).

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[1] Symptomatic is, for example, that regular post-war Population Censuses, carried in former Czechoslovakia every ten years between 1950-1990, used every time different and absolutely not comparable classifications of occupations.

[2] http://old.nvf.cz/publikace/pdf_publikace/observator/eng/forecast_methodol.pdf

[3] http://www.strediskovzdelavacipolitiky.info/default.asp?page=svp&KID=78

The Czech Future skills! portal[4] also engages in labour market forecasts. This website contains a section on forecasting labour market trends, including three industry studies and links to some forecast practices abroad.

The most significant and most widely used is the output from the *Information System regarding the Position of School Leavers on the Labour Market* (available only in Czech, *Informační systém o uplatnění absolventů škol na trhu práce, ISA*). The project output is available on the website[5], which has been online since September 2007. Anyone interested can find not just available schools and fields of education, but also professionally prepared analyses regarding the needs of the labour market and sample real working environments, which can aid them in choosing a course of study.

A summary publication from the project is also available[6], containing the most important findings and results of the research and analyses. It was published in 2008 and provides information regarding the industry and educational structure of students, the opinions of high school leavers regarding the choice and quality of their studies, the transition of school leavers from high schools, secondary vocational schools with a high school leaving exam, and colleges and the situation of such individuals on the labour market. It also provides a summary of employers' requirements in relation to the readiness of school leavers and detailed information regarding the development of the industry, occupational and educational structure of employment in the CR and in comparison with other EU countries. Publication *Development of Qualification Requirements on the Labour Market in the CR and Abroad* (available only in Czech, *Vývoj kvalifikačních požadavků na pracovním trhu v ČR a v zahraničí*)[7], which is entirely concentrated on the issue of analysing past development and forecasts for the labour market in the CR, was also published in 2008. Unfortunately, the website and both publications are available in Czech only.

The CR also had or still has regional information systems (RISA). As with ISA, the main goal of RISA is to create a (regional) information system regarding the position of school leavers on the labour market in the given region. The information system is available online and intended for school leavers, applicants for study programs, and unemployed people, but also for employers, schools, advisory systems, employment offices and municipal up through regional offices. It aids applicants for study programs in choosing a course of study.

This type of project took place in the Moravian-Silesian region between 2002 and 2004. However, at the present time it is no longer active. A RISA website has been available for the Liberec region since June 2007 and is still online[8] (only in Czech).

Since 2011, Education Policy Centre, Charles University in Prague has been conducting a project entitled *Analysis of the Development of Job Structure in the CR* (Analýza vývoje struktury pracovních míst v ČR). The project was commissioned by National Institution of Technical and Vocational Education (Národní ústav pro vzdělávání, školské poradenské zařízení a zařízení pro další vzdělávání pedagogických pracovníků, NUOV) and the results will be incorporated into the new version of the ISA website. The goal of the project is to prepare updated methodology for analysing qualification requirements on the labour market and methodology for forecasting qualification requirements on the labour market. On the

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4 http://www.budoucnostprofesi.cz/en/index.html

5 www.infoabsolvent.cz

6 http://www.nuov.cz/uplatneni-absolventu-skol-na-trhu-prace-2008

7 http://www.strediskovzdelavacipolitiky.info/download/Kvalifikacni_pozadavky_Final.pdf

8 http://www.risa-lbc.cz/novinky.do?chR=1

basis of the classifications, methodology and information in the database, it will then analyse the changing qualification and educational demands in the CR and selected EU countries between 1995 and 2010 and make a forecast for further development of qualification requirements on the labour market in the CR through 2020. The output of the project will also serve as background material for the ISA website.

2. Required Input data and external forecasts

Many data sources can be used to create forecasts for occupational groups in the CR. The main source is the **Labour Force Survey** (Výběrové šetření pracovních sil, LFS). The Labour Force Survey used by the CZSO is a source of information on the labour market. The survey provides information collected in households of respondents. The methodology of indicators measured by the LFS is in line with the definitions and recommendations of the International Labour Organisation (ILO) adopted in October 1982 as a basis for direct international comparability of labour market characteristics in various countries. At the same time, the implementing methodology of Eurostat, which explains the contents of particular labour market characteristics, is respected in full. The LFS is a continuous survey, results of which are evaluated and published quarterly. In each quarter of 2011 the sample contained more than 25 thousand dwellings on average on the territory of the whole Czech Republic (over 0.6% of all permanently occupied dwellings), in which almost 58 thousand respondents of all age groups are surveyed. Almost 50 thousand of them are aged 15+ years. All persons usually living in the sampled dwellings, irrespective of the type of their residence, are subject of the LFS. Since the research pertains only to persons living in households, it does not apply to persons living long-term in group accommodation facilities. For this reason, the data for certain segments of the population, in particular foreign nationals living and working in the CR, is available only to a limited degree. In certain economic sectors (particularly in construction), this can lead to underestimating the number of employees. This shows up in the data, and subsequently in the forecasts regarding the number of employees by sector as well as by occupation.

Another source is **data from employment offices.** Employment offices register the current numbers, sector and occupation of unemployed people. They also have information regarding whether a company is intending to recruit or, on the contrary, make redundant a large number of employees in the near future. This data is useful primarily for regional analysis and also for creating short-term forecasts. The disadvantage of this data is that not all unemployed people are registered with the employment office. For example, unemployed managers or doctors rarely look for new employment via the employment office.

Another data source is **employer surveys.** Employers state in the surveys how they see the current situation in their sector of business as well as what trends they expect to come. This source is also useful mainly for short-term predictions and more for regional than national forecasts.

Job advertisements can also be used as a supplementary information source. They mainly give an idea of what employers require for individual jobs. They also provide data regarding salaries for individual occupational groups. The disadvantage of this data source is that, as with data from employment offices, they do not include all occupational groups. They are typically aimed at the less educated. People with a tertiary education, such as those in the highest management positions, usually do not seek employment through the employment office or through advertisements, but rather use their contacts or are targeted by “head hunters” from recruitment agencies.

Sector studies are another valuable source of information. Each sector study is a detailed investigation of the situation in a selected sector of the economy. They include qualitative as well as quantitative data. They contain expert predictions regarding development in the given sector and detailed outlines of possible development scenarios in the sector in the coming years. Three sector studies focused directly on the CR resulted from the NVF project (see above). They were created for the Energy, Electrical Industry and ICT Services sectors, although there is also a set of sector studies focused on development in the entire EU. As part of the New Skills for New Jobs initiative, the Commission has published a series of 18 sector-based studies (two of them – *Automotive sector* and *Defence industry* as a pilot studies) that look at emerging and future skill needs up to 2020[9]. The results of these studies have been discussed and validated by panels of experts from industry, academia and sector organisations including workers and employers' representatives with expertise in the sector and in skills. All sector studies were published as part of a series of forward-looking sector studies on New Skills and New Jobs in the frame of the project Comprehensive Sector Analysis of Emerging Competences and Economic Activities in the European Union. Each report is part of a series of future-oriented sector studies on innovation, skills and jobs under the same heading, commissioned by the European Commission (DG Employment, Social Affairs and Equal Opportunities). Eleven of these studies were executed by a core consortium led by TNO (Netherlands Organization for Applied Scientific Research), two by Economix, one by Alphametrics, one by IKEI and one by Oxford Research. Sector studies therefore offer a lot of very helpful and interesting information about the past as well as the expected future development of each sector. However, it must be pointed out that there are certain major **drawbacks** and **limitations** as regards the use of sector studies. These are, above all, the following:

- **Incompleteness.** Not even an aggregate of all sector studies can provide a basis for drawing specific conclusions as to what changes will take place in the European economy as a whole.
- **Inappropriate definition.** Another problem related to the use of sector studies as a support source of high quality information for forecasts lies in the insufficient specification of the occupational groups analysed as part of the sector studies. It is very difficult and practically unfeasible to define selected occupational groups from the relevant EC sector study using ISCO classification. Some occupations in the sector studies correspond to the 4th ISCO level (e.g. *Locomotive engine drivers* (ISCO 8311) in the *Transport* sector), whereas in other cases the 1st ISCO level is used, for example *Managers*. Moreover, their number in individual sector studies varies – e.g. there are only 5 groups defined in *Other Services*, while in *Computer, Electronic and Optical Product* for example, there are 15 groups identified.
- **Lack of specification concerning development of occupations.** In the analyses of the changes in the number of employed the sector studies only state for each occupational group (and each scenario) whether the number will increase, decrease or remain the same in the period until 2020. However, it is no clear how large this change in the number of employed in the given sector will be. It is therefore impossible to compare the development within the same occupational group as presented in two different sector studies.

Other international surveys and projects – such as the International Social Survey Programme (ISSP), the OECD International Adult Literacy Survey (IALS) from the nineties,

[9] http://ec.europa.eu/social/main.jsp?catId=784&langId=en

or the new OECD Programme for International Assessment of Adult Competencies (PIAAC) just under way in many OECD countries – should been analysed and taken into account as well.

One very important issue in making an occupational forecast is how detailed classification of the occupational groups to choose. There is always a compromise to be made between statistical reliability of the data and validity of the categories used. If too few occupational groups are chosen, the data used will be statistically solid, but the results will be too general to be very useful for interpretation. However, if too many occupational groups are chosen, many of them will consist of only a few individuals. Considering that calculations are usually made using LFS, a sample survey, the probability of various statistical errors in calculation and thus skewed interpretation is too great. The ideal number of occupational groups for the CR is approx. 60-100, so it would be appropriate to use the third level of the ISCO classifications (approximately 105 groups) and possibly merge some smaller groups together. The problem with statistical reliability is even greater in regional forecasts.

Another problem occurs in international comparisons. The same occupations are sometimes understood differently in different countries and are therefore classified differently. One example is *Skilled agricultural and fishery workers* (ISCO 6), which is nearly non-existent in Ireland, where a large number of people (compared to other countries) is employed as General *Managers* (ISCO 13). Varying educational requirements for certain occupations can also cause problems. For example, the group *Nursing and midwifery professionals* (ISCO 223) does not exist in the CR, because nurses in the CR only have a medium level of education, not high. They are thus classified in the group *Nursing and midwifery associate professionals* (ISCO 323). In contrast, in some EU countries (such as Poland or Spain), the group ISCO 323 is empty and all nurses are classified as ISCO 223.

Another unpleasant complication is the change in NACE and ISCO classifications. Both classifications have been modified in the last several years (NACE Rev. 1 to NACE Rev. 2 and ISCO88 to ISCO08). Because there are no clear converters between the old and new versions, it is very difficult to construct consistent time series.

3. Methodology of projection demand side

All projects that are or were engaged in forecasting employment (by occupation and/or by sector) in the Czech Republic use the same basic methodological principle: the top-down approach. Forecasts for the macroeconomic variables influencing the number of employees (GDP, GVA, export, import, R&D expenditure, labour productivity, consumption, investment etc.) are performed first, and the changes in those are used to determine the change in the number of employees in sectors of the CR economy. The next step is creating the occupational and, if appropriate, educational structure of employees (education attainment and fields of study).

As stated above, there is no official macroeconomic forecast in the CR. All research teams have to deal with this problem. In principle, there are only two ways to handle the problem. The research team can either create its own forecast, usually using econometric and mathematical approaches (see the EPC report for the ISA website 2005-2007) or it can use the development forecast for the CR created by a foreign department (as in all other projects stated in chapter 1).

The project currently running in the CR (*Analysis of the Development of Job Structure in the CR*, conducted by EPC) uses a macroeconomic forecast borrowed from the international *Forecasting skill supply and demand in Europe* project initiated by CEDEFOP for 2009-2012.

Their results are therefore very similar to CEDEFOP projection. This is a reason why in this Case study is attention paid only to comparing supply side.

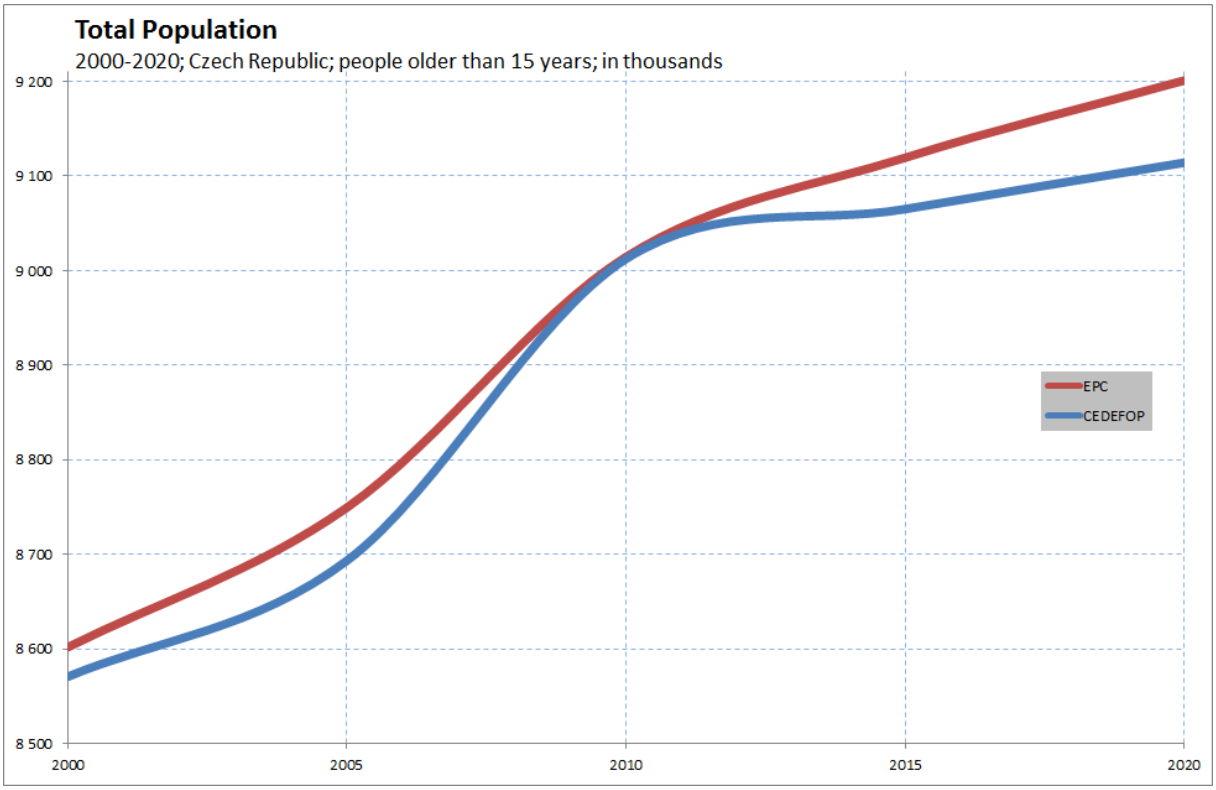
4. Forecast of supply side

The Institute for Information on Education (Ústav pro informace ve vzdělávání, UIV) was established in the CR in 1991 as a semi-budgetary organization directly managed by the MoEYS. Its mission was to provide reliable information regarding the school system and education to the ministry, regions and municipalities, schools and teachers, students and their parents, journalists, the Czech Statistical Office, the public and international institutions. The Institute organized statistics on schools, gathers and processes data from various statistical surveys and comparative studies of education, and works with foreign partners. The UIV processed analyses, surveys and predictions of the state and development of the educational system and educational policies, participates in international studies and represented the CR in international information systems in the area of education. The UIV was to be terminated as of January 1, 2012 pursuant to a decision of the MoEYS. The MoEYS should take over its agenda related to data collection and processing. Data should be collected in the same manner and data from previous years is still available. As of January 1, 2012, the MoEYS should also carry out forecasts regarding the number of school leavers from individual schools.

In 2012, the EPC is completing project for the Ministry of Education Analysis and projections of education and qualification of the workforce in the Czech Republic up to year 2020, with an emphasis on higher education by level and field of study (in fact supply side projection 2010-2020). Results from this project are in next text compared with CEDEFOP supply side projection (published in October 2012).

5. Total trends

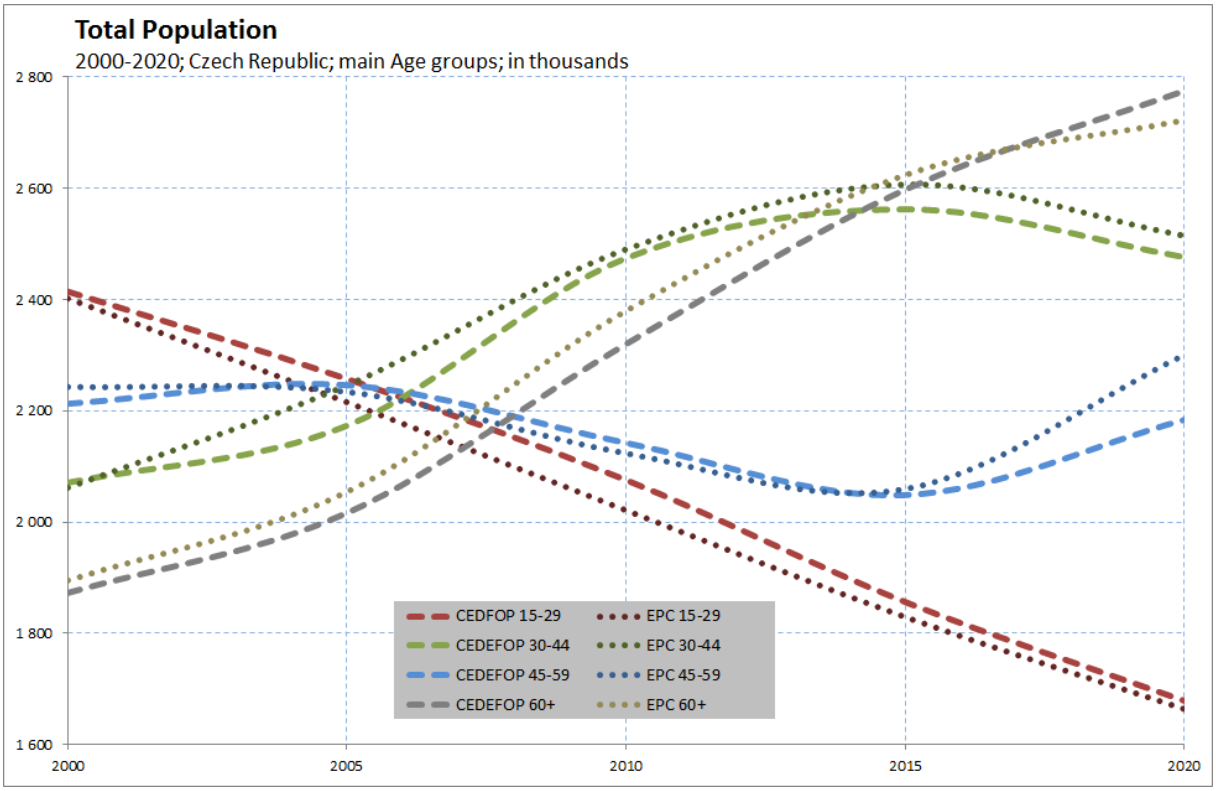
CEDEFOP's forecast expects to increase number of people in the Czech Republic (older than 15 years) by 102 thousands by 2020. It means increase by 1.1 %. Forecast made by EPC expects much higher increase of number of people (15+) in the Czech Republic in next 10 years. This forecast expects more than 9.2 million people (15+) in the Czech Republic in 2020. It means by 186 more (2.1 %) than in 2000.



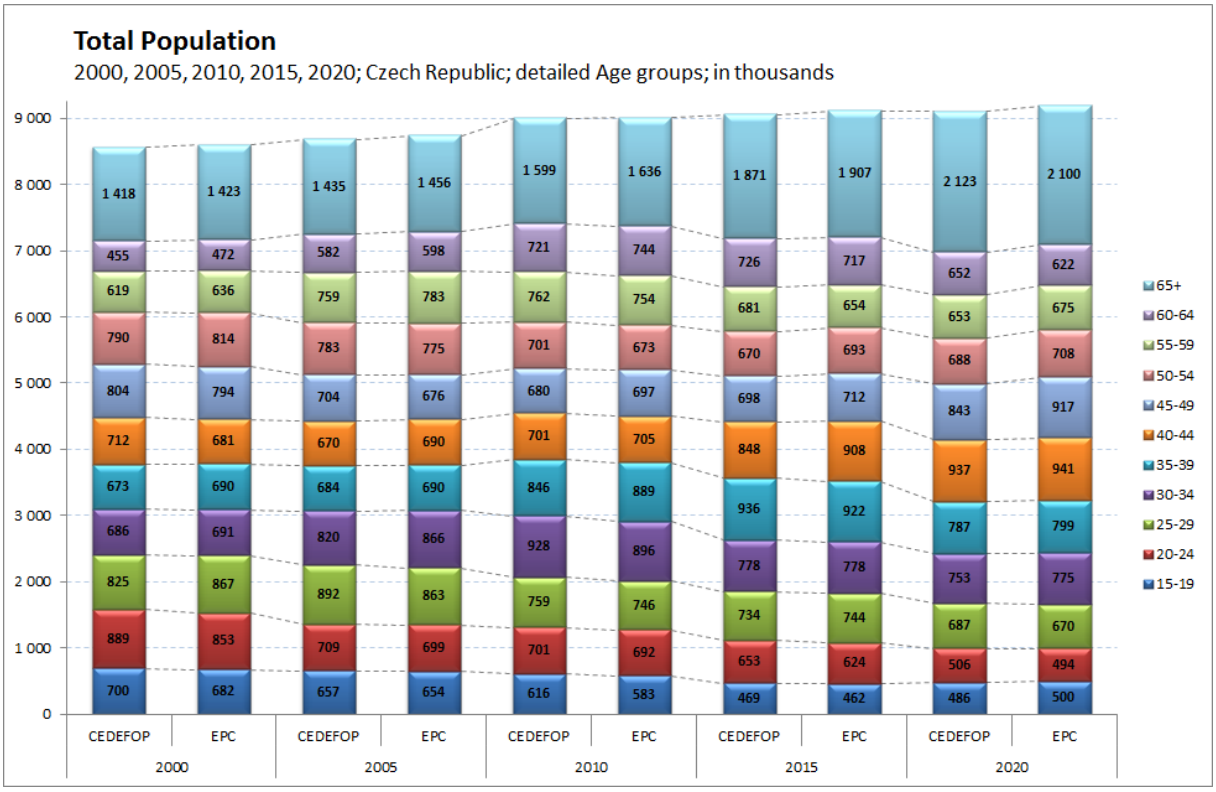
The difference between CEDEFOP and EPC forecast is almost 90 thousand (people 15+) in 2020. This difference is perhaps mainly due to different inclusion of migration. It is the immigration of new people from abroad (mainly from Eastern Europe and Asia) that causes an increase a number of people in the Czech Republic in 2020.

6. Comparing by Age groups

Detailed analysis can show differences between both forecasts. Next picture shows main age groups and their development as it is forecast by CEDEFOP and by EPC projection. It is obvious that the main difference between the two projections is the expected number of persons aged 45-59 years. While the EPC projection expects 2.3 million people in this age group in the Czech Republic in 2020, CEDEFOP projection about 116 thousand less. By contrast, in the oldest group (60+) CEDEFOP projection expects nearly 2.78 million people, about 50 thousand more than is expected by EPC.



The next picture shows population (15+) in the Czech Republic divided into detailed age groups.

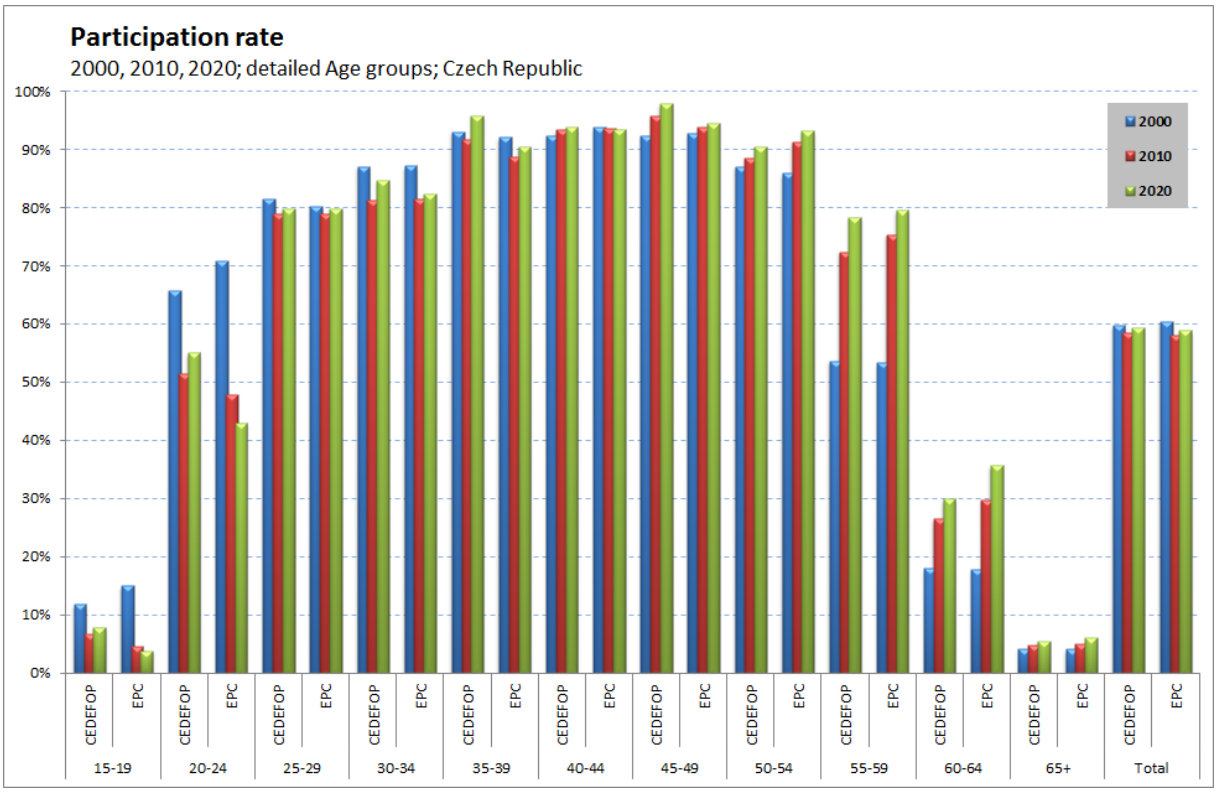


The biggest difference between EPC and CEDEFOP projection is shown in 2020 for age group 45-49, where EPC expects about 75 thousand more people in the Czech Republic than CEDEFOP forecast. For age groups 30-34, 55-59 and 55-59 the difference is about 20 thousands.

7. Comparing by Participation rate

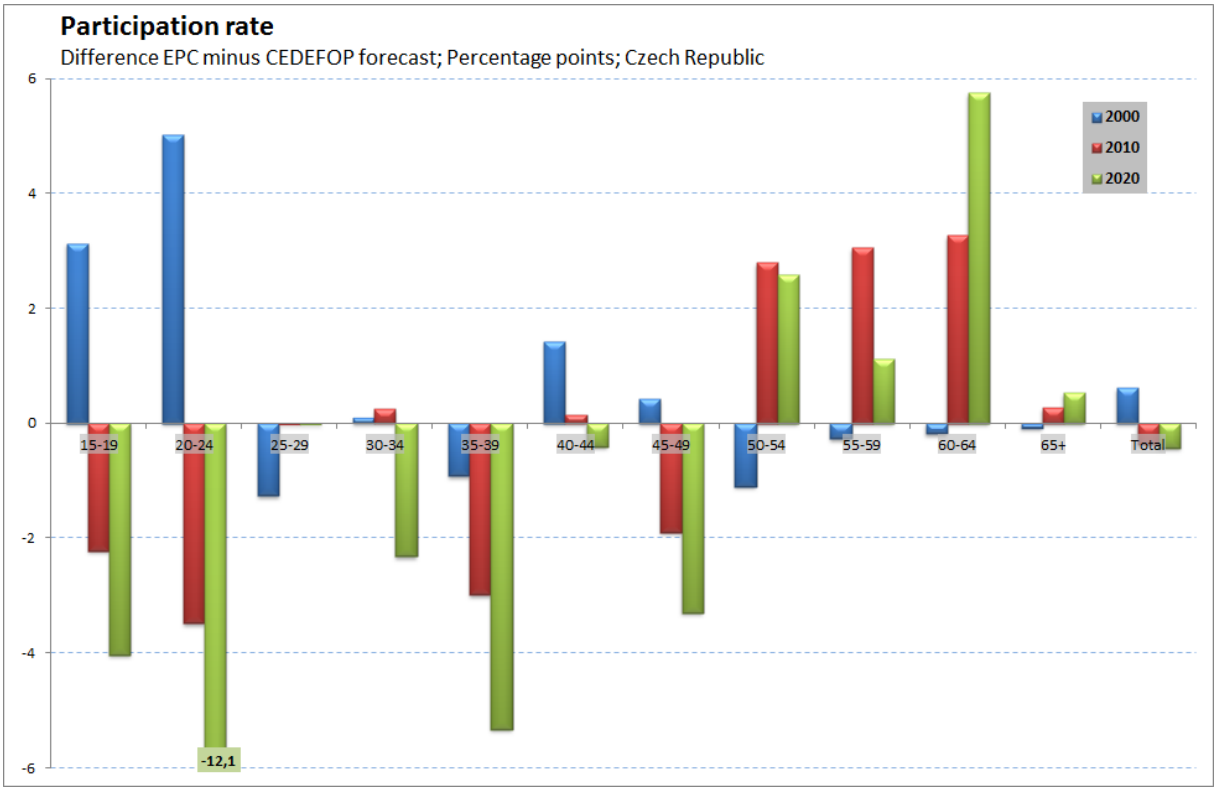
Some differences between both projections are in Participation rate too. The labour force participation rate is the ratio between the labour force and the overall size of their cohort (national population of the same age range).

Next picture shows Participation rate for the Czech Republic for years 2000, 2010 and 2020 as it is forecasted by CEDEFOP and EPC projection.



In 2020 the higher total Participation rate in the Czech Republic is expected by CEDEFOP forecast. There it is 59.3% while in EPC projection it is only 58.9%.

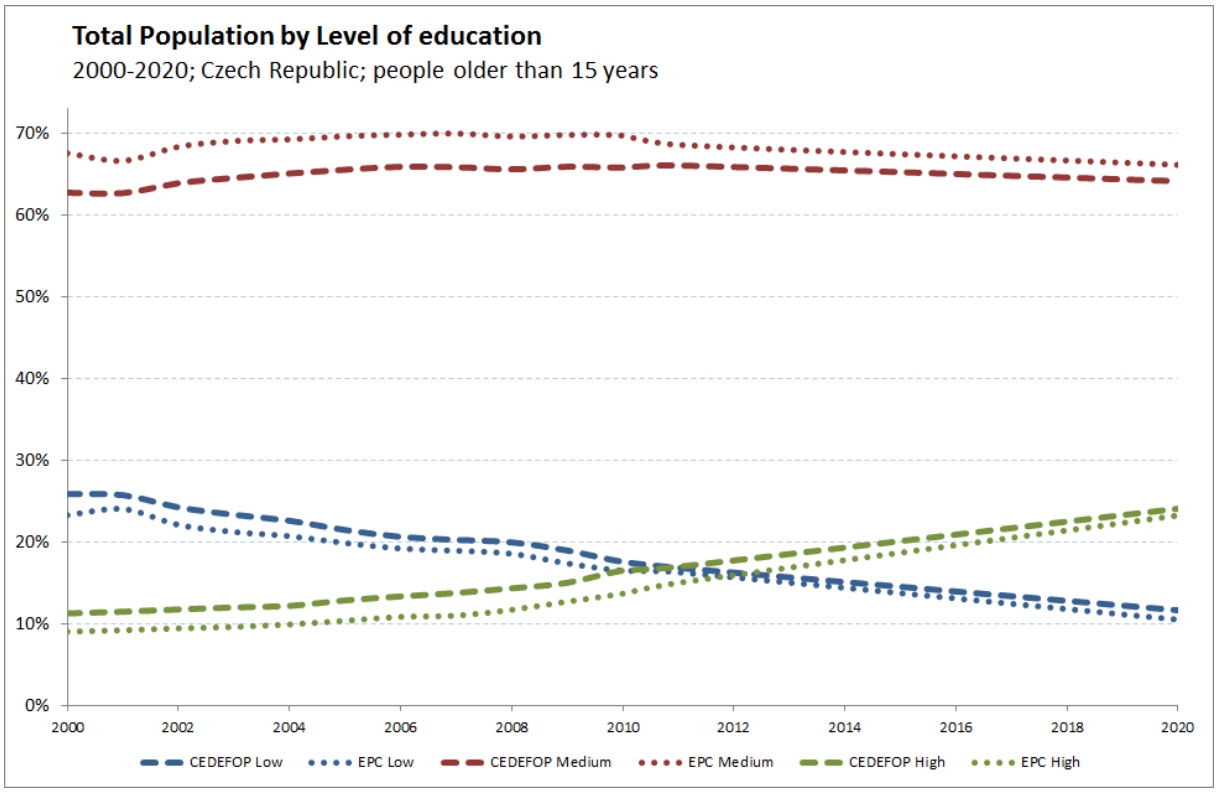
Next picture shows detailed comparison of Participation rate for each age group.

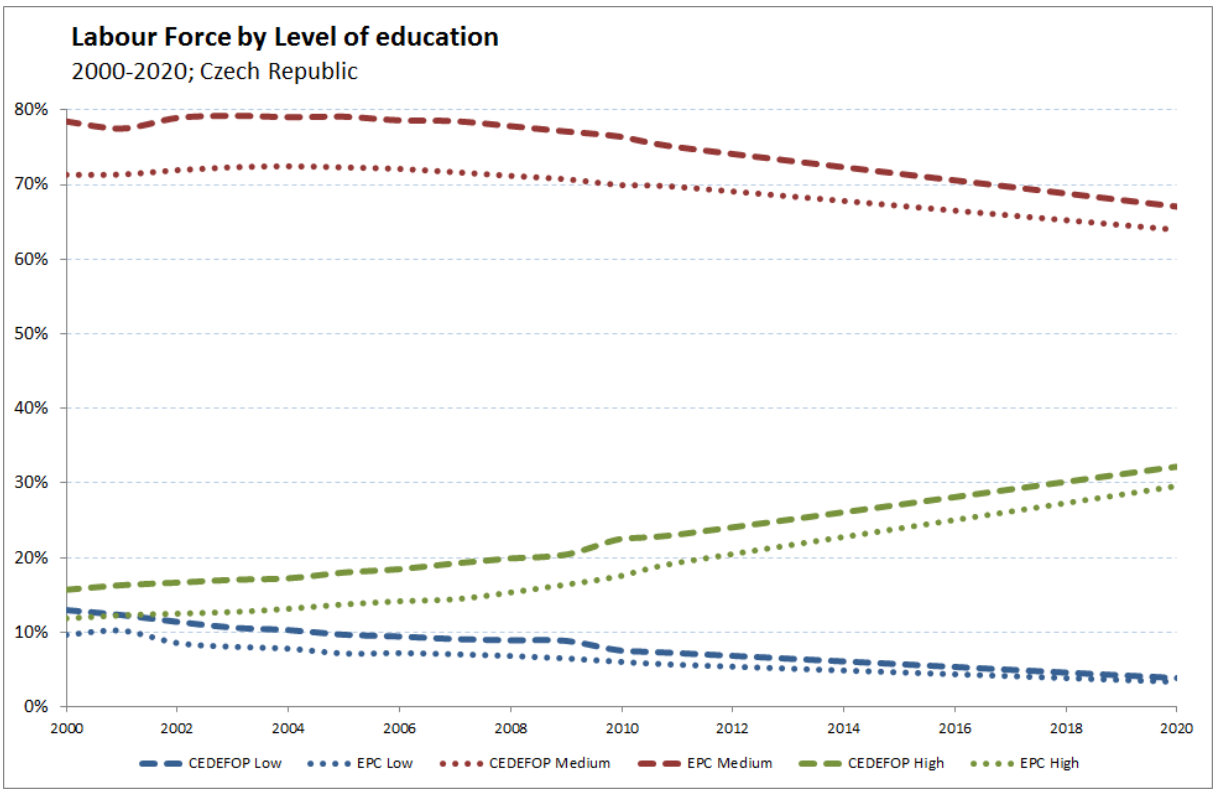


For younger age groups (people younger than 50) CEDEFOP forecast expects higher Participation rate that EPC forecast. For the oldest groups (for people older than 50) it is vice versa, EPC forecasts higher Participation rate than CEDEFOP.

8. Comparing by Level of Education

Next pictures present comparison of Level of education in Total Population as well as in Labour Force. It is evident, that CEDEFOP and EPC projection are in this area very similar.

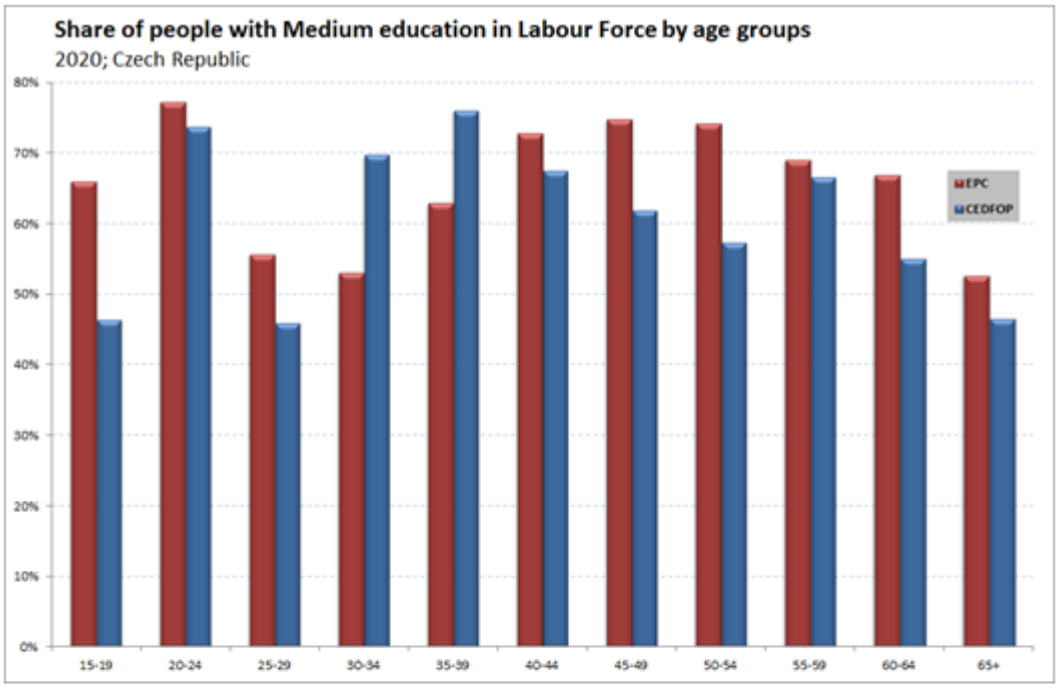


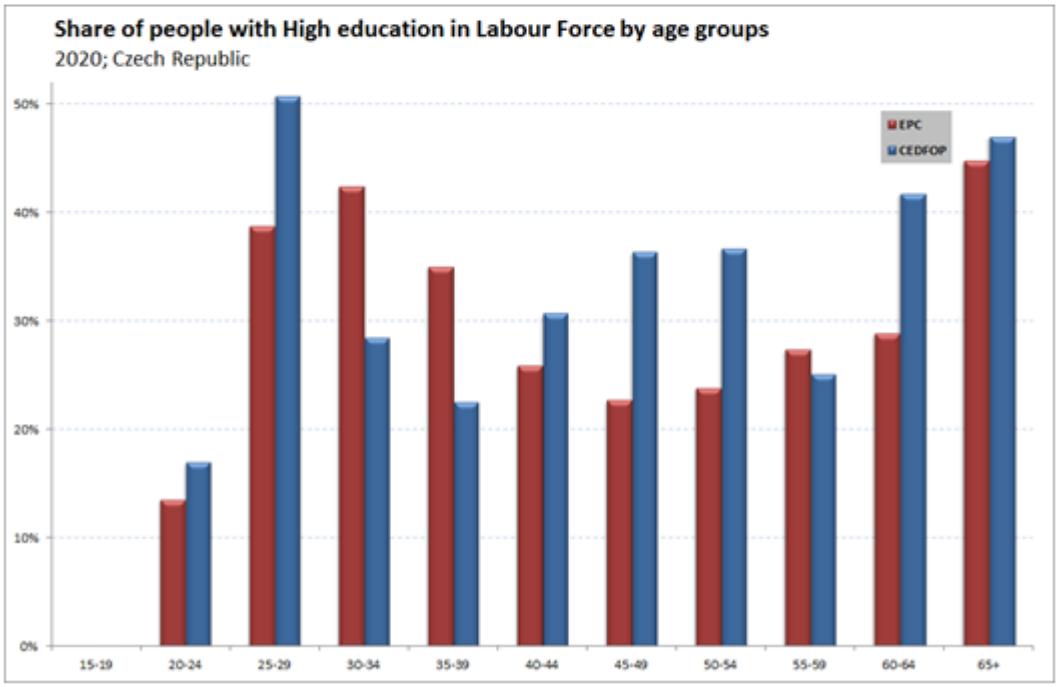


The difference between EPC and CEDEFOP projection in share of persons with the low education in the Total Population in 2020 is only 1.2 percentage points, with the Medium

education the difference is 2.0 percentage points and for high education it is only 0.8 points. In the Labour Force, these differences are only slightly bigger. It is 0.5 percentage point for Low education, 3.1 p.p for Medium education and 2.6 for High education.

Much more bigger are these differences in the detailed view by age groups. Next two pictures present it for share of people with Medium respectively High level of education in Labour Force in the Czech Republic in 2020.





The higher differences are for the youngest groups (for 15-19 for Medium education and for 25-29 for High education). These could be "problematic" groups because a lot of people are still in school and they are entering the labour market gradually.

9. Key results

This chapter summarize in bullet points differences and similarities between EPC and CEDFOP projection of Supply side in the Czech Republic to 2020.

- The difference between CEDEFOP and EPC forecast for Total population (people 15+) is almost 90 thousand in 2020. EPC expect more people in the Czech Republic in 2020.

- The main difference between the two projections is the expected number of persons aged 45-59 years (EPC projection forecast by 116 thousand more in this broad age group).

- In focus to detail age group the biggest difference between EPC and CEDEFOP projection is shown in 2020 for age group 45-49, where EPC expects about 75 thousand more people in the Czech Republic than CEDEFOP forecast.

- In 2020 the higher total Participation rate in the Czech Republic is expected by CEDEFOP forecast. There it is 59.3% while in EPC projection it is only 58.9%.

- Share of people with given Level of education (Low, Medium or High) in Total Population as well as in Labour Force is in both projections in 2020 very similar.

- Share of people with Low education in the whole population (15+) will be in the Czech republic in 2020 about 11 %, share of people with Medium education about 65 % and with High education about 24 %.

- Share of people with Low education in the Labour Force will be in the Czech republic in 2020 about 3.5 %, share of people with Medium education about 65 % and with High education about 31 %.