What can existing overeducation tell us about the situation in supply and demand of tertiary educated?\textsuperscript{3,4}

Miroslav ŠTEFÁNIK\textsuperscript{5}

Abstract

The submitted article deals with the problem of overeducation. It offers a brief overview of existing explanations and introduces a method of overeducation measurement based on internationally used classifications ISCO and ISCED. It also brings some evidence on overeducation measured by this method, using data mostly from the National level census and European Community Household Panel. The analysis is focused on the overeducation of workers with tertiary degrees, which becomes especially interesting in the light of tertiary education expansion. The question is, in what sense does overeducation refer to the supply-demand relations on the labour market? International comparisons of overeducation in European countries offer some answers.

Keywords: overeducation, labour supply, labour demand, schooling

JEL Classification: I21, I22, I24

Introduction

The concept of knowledge society is an important part of priorities and strategies on the national, as well as European level. In line with this effort, most European countries have been witnessing the expansion of higher education. Despite this movement, tertiary educated workers are enjoying benefits from education, which are higher than ever before. Gains from education, measured as educational wage gap or unemployment rate, increased in most developed countries.

Even in the situation of increasing gains from education, recent strong increase in numbers of graduates from tertiary education draws attention to the problem of overeducation. Overeducation would become a problem for the society in case, if wider groups of workers would be constrained to work in positions, which require lower level of education than the workers actually possess. Education in general can be seen as an investment, which in case of overeducation is not utilised properly. The question, whether overeducation is a problem for the society, is not only about the sensibility to this kind of underutilisation, but also about the character of existing overeducation.

The central question of this article is: What can existing overeducation tell us about the situation in supply and demand of tertiary educated? This question emerged in the context of knowledge society transition idea. One important pillar of

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\textsuperscript{5} The author is a researcher at the Institute of Economic Research, Slovak Academy of Sciences: miroslav.stefanik(at)savba.com
knowledge society transition is the expansion of tertiary education. Many social scientists have questioned this expansion in their countries\(^6\). A rich discussion was dedicated to this issue. The presented article has the ambition to explore whether overeducation can tell us something relevant and useful to enrich this discussion. The following chapter speaks about some basic assumptions and shortly introduces the four basic ways of explaining overeducation. Second part describes the measurement method and mentions used datasets. The third part brings results of performed measurements and some conclusions. The discussion opens several points for further inquiry.

**Articol I. Theoretical Framework**

Overeducation is not a central problem for economy neither sociology. The marginality of this problem can be caused also by a lack in reliable evidence for this field. English written literature makes only a little distinction between “overqualification” and “overeducation”. They both refer to some kind of skills mismatch, but education is not the only way to acquire skills. Qualification is therefore a wider concept than education. The following text apparently deals with overeducation, because it uses evidence on educational attainment. But educational attainment can be used as an indicator for the qualification of an individual, therefore “overeducation” and “overqualification” will stay related. The analysis is focused on tertiary education and tertiary educated workers. A worker with a tertiary degree is considered to be overeducated, if he works in a position which requires lower than tertiary education.

Let us assume a relatively autonomous segment with tertiary educated workers as a part of the labour market. The supply in this segment is to a wide extent dependent on the output of tertiary education. This is determined, besides the existing capacity of schooling, also by the demand for tertiary education. Demand for tertiary education evolves also according to the skills premium on the labour market. Assuming a rational individual actor, the labour market and the educational market are in this way interconnected.

A simple supply-demand analysis offers a basis for further study of overeducation, but this basis needs to be supplemented with a moment of increasing demand for skills. The cause may be technological change, or simply an increase in capital intensity, but the effect, in changing compensations of tertiary educated relative to other educational groups, is apparent (Goldin, et al., 2008). The skill premium is rising, therefore we can assume that the demand for skilled grows. This can be seen in the majority of most developed countries (Atkinson, 2007). On the other side, if the skill premium grows, it stimulates the demand for education, thus the supply of tertiary educated grows consequently. Expansion of tertiary education can be arranged by increasing existing capacities in tertiary schooling.

Within this scheme, if overeducation is an indicator of decreasing efficiency of investment in education, it should appear as a systematic failure of the market mechanisms. It should be a long-term overlap of supply above the demand of tertiary educated workers. Therefore there is a need to answer questions about the significance and temporality of existing overeducation. Only a significant and long term phenomenon can serve as the point in the discussion about the relevance and feasibility of tertiary education expansion.

\(^6\) For an overview of this discussion in the UK see: (Elias, et al., 2004)
As regards the temporality, this article answers the question quite intuitively, showing timeline figures viewed from the macro level. The question of significance showed to be more complex, what is supported also by the lack of consensus within existing explanations. Overeducation is a complex phenomenon, which cannot be satisfactorily explained within a simple supply-demand analysis. For better understanding it needs to be put in a broader context, with respect to the situation of an overeducated individual. Theory, based on recent empirical studies offers a variety of explanations, pointing on different aspects of the context of overeducation. These can be grouped into four major explanatory approaches.

**Overeducation as a career strategy**

First and most prominent view on overeducation states that it is a career strategy. Several studies\(^7\) are pointing to the fact that younger individuals in earlier stages of their career are much likely to be overeducated. A university graduate entering an overeducated working position, to compensate the lack of working experience, can be a perfect example. A surplus in education compensates for the deficit in working experience. After some experience was gathered, he will look for a more suitable job. In line with this explanation, any individual can also enter and stay in an overeducated working position, because he believes this will give him attractive job opportunities in the future.

Overeducation as a career strategy is consistent with the idea of functioning supply-demand mechanism. In this context, overeducation is only an epiphenomenon existing besides the market equilibrium. It is just the friction in the process of satisfying the demand for skilled work. Existing evidence on overeducation therefore says nothing about the actual situation in supply and demand for skilled. It only says something about the tendencies of individuals to decide to take a job in the early stages of their careers.

**Education as an insurance**

This approach is practically complementary to the career strategy approach. The disappearance of whole life jobs, undermining of the traditional commitment between employer and employee, but also melting of job security, is a clearly visible trend. For instance the literature\(^8\) related to the psychology of work points at the change of the psychological contract between employers and employees. Existing expectations connected with the working contract are changing dramatically towards lower security and certainty. Also for this reason, individuals more often use education as an insurance (Keller, et al., 2008) against unemployment or other unexpected situations which became more likely recently. Education, as commonly understood, can give advantage against these kinds of threats. When considered from the policymaker’s perspective, this strategy of individuals becomes ineffective; especially in combination with free public schooling.

This can lead to overeducation in the form of supply demand disequilibrium, on the educational market as well as in the labour market. The primary cause can be seen in the irrational behaviour of individuals, as they based their decisions on

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\(^7\) For example: (Sicherman, 1991) (Nicaise, 2000) (Hartog, 2000)

\(^8\) (Sims, 1994) (Robinson, 1996) (Turnley, a ín, 2000)
uncertainty and apprehension. From the systems’ point of view the supply hangs over the demand of tertiary educated workers.

**Upgrading theory**

This explanation points on the increase in productivity within existing jobs; which should increase within job demand for skills. In line with this reasoning, if an employee with a tertiary education works in a position, which does not according to definition, require such education, this does not mean that he is overeducated. On the other hand, it could mean that the requirements on employee’s skills are increasing. The commonly accepted definition of educational requirements linked with this position has to be re-evaluated. Change in requirements can be caused for example by new equipment used at the workplace. According to the economic theory, a combination of new technology and higher education should bring higher productivity to this kind of working positions.

Another assumption of the classical economic theory states that the growth of productivity has to be visible in the rise of wages. Consequently if the upgrading theory is right, the rise in productivity has to be visible in the rise in wages (Borghans, et al., 2000 p. 6). As a result, workers in overqualified positions should receive wages, which are higher than the wages of their colleagues in the same position, with appropriate education. On the other side, their wages should not be significantly lower, than it is common for their educational group.

Upgrading theory states that labour market allocates workers into positions in the way their education gets maximally utilised. The market mechanism works properly and possible evidence on overeducation refers only to a shift in productivity. No other than optimal utilisation of education can be imagined.

**Inflation of education**

This approach shows that schooling has besides some manifest functions (preparing for the labour market, dissemination of knowledge) also some latent functions. One of these latent functions is its contribution to the reproduction of the social order. In connection to overeducation, the signalising function of education becomes particularly important. Schooling groups individuals according to several criteria; one of which are intellectual abilities. The achieved educational level of an individual therefore gives information about the “success” in this grouping. A university diploma, in praxis represents the information saying that its owner was able to show the effort, skills and abilities required to complete the university study. The actual knowledge he received during his study is of minor importance in this context.

In a situation of quantitative expansion of tertiary education, the value of the information that education is giving, falls down. With the increased supply of tertiary educated workers employers get more and more picky. Partly because they have more options to choose, partly because the information value of the diploma depreciates. The demand simply adapts to increased supply, but the new equilibrium is less effective from the point of investment into education.
All four presented explanations hint at different aspects of the wider context of overeducation. Each gets its own piece of truth and they can also be used complementary, in combinations. Despite the fact that each draws a different picture of the same issue. Each explanation prescribes overeducation a different character and a different role within the market supply demand mechanisms.

Articol II. Data and measurement

Formal education can be used as an indicator of qualification. Among possible indicators of qualification, this one has the best coverage of available statistics. Literature\(^9\) on overeducation identifies 3 basic ways of measurement:

a) **Objective approach**
   Is based on an objective definition of occupation, which includes the required level of education. Information on required level of education is compared to actually achieved education. An individual who achieved higher level of education as required to perform his job, is considered overeducated.

b) **Subjective approach**
   Uses respondents’ subjective assessment of required skill level, or educational level. Assessments are mostly gathered by a question in a questionnaire. Wording of the question mostly differs among surveys. Overeducated is the one, who assesses himself as overeducated.

c) **Empirical approach**
   Transforms education into a quantitative variable, most often using the number of years spent in education. Average or modus education represents the required education. The usual criterion for distinction is standard deviation. For example an individual who spent in education more years than the average plus one standard deviation, is considered overeducated.

As can be seen, each of these approaches uses a different kind of definition of overeducation. There is no consensus or a domination of one approach in this field. Comparisons between the results of different ways of measurement brought puzzled results (Battu, 2000) (Groot, 2000). Figures, acquired using different methods, showed some correlation, but the relation was weak. One must always bear in mind that the validity and reliability of overeducation measurement are low and that this could affect the results (Sloan, 2004, 18).

**Overeducation measurement using ISCO and ISCED classifications**

This text introduces a specific method of overeducation measurement, which is an example of an objective approach. This method is based on the internationally, widely used occupational classification ISCO, and educational classification ISCED. What is crucial for this purpose is that, thanks to ISCO definitions it is possible to link main occupational

categories with appropriate skill levels. On the other side, skill levels can be, to some extent linked to educational levels defined by ISCED.

ISCO groups jobs into occupational categories according to content of work. Job is defined as a set of tasks and duties which are carried out by a person.\textsuperscript{10} There are ten major occupational groups in ISCO, which can be linked to 4 skill levels, thus to 3 educational levels.

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|}
\hline
ISCO-88 major groups & Skill Level & Educational level \\
\hline
1 – Managers, senior officials and legislators & - & - \\
2 – Professionals & 4 & Tertiary \\
3 – Technicians and associate professionals & 3 & \\
4 – Clerks \\
5 - Service and sales workers \\
6 - Skilled agricultural and fishery workers \\
7 - Craft and related trades workers \\
8 - Plant and machine operators, and assemblers & 2 & Secondary \\
9 - Elementary occupations & 1 & Primary \\
0 – Military occupations & - & - \\
\hline
\end{tabular}
\caption{ISCO main groups, skill and educational levels}
\end{table}

Source: (Elias, 1997, p. 7)

As far as formal education is not the only way how skills can be acquired, the link between occupational category and educational level becomes a little complicated. A worker working in a job, which is classified into one of ISCO 4 - ISCO 8 categories, needs to have a certain level of skills. According to ISCO definition, this level of skills is adequate to secondary education. He acquired these skills either completely through formal education (completing secondary education), or as a combination of primary education with other sources of education.

\textsuperscript{10} For more information on ISCO definitions see: \url{http://www.ilo.org/public/english/bureau/statISCO88/anc1.htm}
skills, as for instance on job training or praxis. If this person has completed tertiary education, we could say that he or she is overeducated. The measurement method used in this analysis is based on this distinction. It is focused only on the overeducated with a degree. Managers, senior officials and legislators (ISCO 1) and Military occupations (ISCO 0) are excluded from the analysis, because ISCO definitions do not link these categories with a particular skill level. In summary, a definition of an overeducated can be restricted to working individual of ISCO4 - ISCO8 with tertiary education.

10 occupational categories, 4 skill levels and 3 educational levels allow creating only a vague recognition of overeducation. Its dominant advantage is the availability of data classified according to ISCO and ISCED. Only rough information can be dug out, but this method can be widely used to compare it in time, and between countries.

International comparisons are the major purpose of the ISCO-ISCED measure. But several complications appear in this context. It is not only the roughness of acquired information which is limiting the results. Despite the fact that ISCOs main goal is to offer internationally comparable data, unfortunately a significant bias is often caused also by the international differences in ISCO coding. Reliability research in the 90ties brought agreement rates from occupational recoding over 85 per cent, when considered on the 1-digit ISCO level. (Elias, 1997 s. 10) The problem of reliability showed not to be the fundamental one. This probably is the lack of common understanding and interpretation of the conceptual basis between countries. (Elias, 1997 s. 15)

Another source of bias can be identified in the fact that ISCO-ISCED measure excludes the ISCO 1 group of Managers, senior officials and legislators. While Military occupations are only a slim proportion of the occupational structure, without any significant international differences, managers, senior officials and legislators represent a more substantial number. International differences in the proportion of ISCO 1 group are also significant.

Application of ISCED brings similar problems, but the ISCO-ISCED is using only the distinction between tertiary and other educational levels. This distinction is fairly clear also when comparing European countries.

**Used datasets**

Thanks to the wider usage of ISCO and ISCED, the overeducation variable can be constructed in various datasets. The most prominent is the data from the Census in 2001. These data are available in the public database of Eurostat. No individual data was needed, only aggregated data grouped according to ISCO and ISCED.
Except for these data, computations were applied also on European Community Household Panel (ECHP) datasets. It offers the opportunity to construct timelines (from 1994-2001) and also surveys some information on wider context of overqualified workers.

A pre-analysis was done also on data from European Working Condition Survey\textsuperscript{11}, European Social Survey\textsuperscript{12} and International Social Survey Programme\textsuperscript{13}. These surveys offered data of lower reliability and validity. Any results presented latter will therefore come either from the Census 2001, or from the European Community Household Panel.

All analysis was done only on tertiary educated workers classified in ISCO 2 – ISCO 9 categories, using the ISCO-ISCED method to identify those who are overeducated.

**Articol III. Results of overeducation measurement**

After introducing the explanations of overeducation and the method of measurement, the attention can be drawn back to the question, raised at the beginning. What can overeducation tell us about the situation in supply and demand for tertiary educated? Is overeducation a result of an overlap in supply of tertiary educated workers? Let us see what existing evidence tells us. The use of the ISCO-ISCED allows to make international comparisons. Despite their increasing interconnection, the labour markets of the European countries are still relatively autonomous; as well as educational or labour market policies. The following graph can help to answer the question about the incidence of overeducation in European countries. It is based on data from the Census in 2001.

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\textsuperscript{11} http://www.issp.org/
\textsuperscript{12} http://ess.nsd.uib.no/ess/
\textsuperscript{13} http://www.issp.org/
The Graph displays European countries in dimensions of overeducation and the proportion of tertiary educated in total population. Vertical position tells about the incidence of overeducation in each country. Data on educational attainment from Germany were described by Eurostat as “extremely unreliable”. Horizontal position of Germany seems to be unreliable, but this does not pay for the vertical position. Post communist countries of the Central and Eastern Europe, together with Italy are clustering in the left and low end of the field. The biggest group of countries is located in the middle, with figures between 20 and 30 percent of overeducated workers and from 10 to 20 percent of tertiary educated population. This group includes EU 15 countries as well as Bulgaria, Latvia, Lithuania. We can expect Germany would join this group, if the data on educational attainment would be correct. Cyprus, Estonia and Ireland showed overeducation numbers higher than 30 per cent. The Netherlands and Spain are standing out of the groups. Spain is a country with relatively low proportion of tertiary educated and relatively high overeducation. The Netherlands is in opposite position.

The presented graph also shows the relation between overeducation of tertiary educated and the proportion of tertiary educated in the total population. This relation seems to be linear and positively correlated. If more people in the country are tertiary educated, the proportion of overeducated among those tertiary educated

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Graph 1: Overeducation\(^{14}\) in European countries related to the proportion of tertiary educated in population

Source: Eurostat, Calculated using data from National level census 2001 round

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\(^{14}\) Overeducation index is counted applying the ISCO-ISCED as the share of overeducated among all workers with degree classified into ISCO 2 - ISCO 9.
grows. The Pearson’s correlation coefficient for this relation is 0.581 at the 0.01 significance level. This kind of national level analysis, offers the opportunity to explore similar macro relations. A correlation analysis was done also to test the relation between overeducation and:

- total unemployment
- unemployment of tertiary educated
- number of graduates among the total population
- numbers of students in tertiary education as a share of total population
- expenditures on tertiary schooling as a % of GDP

None of these relations showed any significance. Unemployment, as an indicator of the demand side and numbers on tertiary schooling, as an indicator of the supply side, showed no preliminary relation. This suggests that overeducation presents a complicated issue, which cannot be closed exclusively into a supply-demand conceptual scheme. Other factors need to be included into the analysis.

3.1 Temporality of overeducation

Another question, which is interesting in this context, is the temporality of overeducation. In this respect, individual and macro level of overeducation need to be distinguished clearly. There is no distinct consensus on the temporality of overeducation on the individual level. Some studies suggest that it is only a short-term problem (Elias, et al., 2004) (Duncan, et al., 1981), what is complementary to the “career strategy explanation”. Some have found out that overeducation is a long-term problem for certain groups of workers (Dolton, et al., 2000). The following graph shows overeducation, perceived from the macroperspective for selected countries during an eight years long period. These data come from the European Community Household Panel.
Graph 2: Overeducation timelines for selected European countries

Source: Calculated using data from European Community Household Panel, all rounds

As can be seen from the graph, the strongest group of European countries stays constantly between 20 and 30 per cent of overqualified among all workers with tertiary education. Portugal lies under this main group, showing the tendency to converge. On the other side, Greece stayed above the group with higher numbers of overeducation until 1998, when it joined the main group. Presented timelines are mostly stable and continuous. This suggests that, if it is seen from the macro level, overeducation can be considered as an endurable and ever-present phenomenon; and this pattern seems to be international.

3.2 The character of overeducation

The question about the character of overeducation is the question about its significance and role within the labour market supply-demand mechanisms. Which of the above-mentioned explanations of overqualification fits the best to existing evidence from European countries? Is there any uniform pattern, which can be identified as common for overeducation in European countries? What are the differences? The next table refers to four explanations of overeducation and link them with indicators and criteria for their testing. As it was mentioned before, none of the presented explanations clarifies the problem. A combination of explanations would be more suitable. Following testing has a character of a pre-analysis. Identified indicators, criteria, as well as the whole testing are very simple. It is supposed to give a rough idea about the differences in character of overeducation across European countries, focusing on the context of overeducated.
Table 2: Explanations, indicators and criteria

<table>
<thead>
<tr>
<th>Explanations</th>
<th>Indicators</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career strategy</td>
<td>Age</td>
<td>Young people are more likely to be overeducated.</td>
</tr>
<tr>
<td>Education as insurance</td>
<td>Unemployment experience(^{15})</td>
<td>Experienced unemployment increases the likelihood of overeducation.</td>
</tr>
<tr>
<td>Upgrading theory</td>
<td>Wage</td>
<td>Overeducated does not earn less than the rest of their educational group.(^{16})</td>
</tr>
<tr>
<td>Inflation of education</td>
<td>Wage</td>
<td>Overeducated earn less than the rest of their educational group.(^{17})</td>
</tr>
</tbody>
</table>

The role of wage as an indicator is a little more complicated then the role of age and unemployment experience. A dominant pool of overeducation studies confirmed that overeducated earn less than the rest of their educational group. On the other side, they earn more than the rest of their occupational colleagues. This evidence finds the truth somewhere in the middle between upgrading theory and inflation of education explanation. Therefore, wage as an indicator, with criteria formulated above offers only informative testing of presented explanations. The advantage of this testing is the possibility of international comparisons.

The introduced criteria will be used in one binary logistic equation; with a binary dependent variable of being overeducated. The equation examines the effect of independent variables on the likelihood of overeducation. Besides age, experienced unemployment and wage, the equation includes also some other independent variables. It is job security satisfaction to complement the experienced unemployment with a subjective measure. Gender, as a generally important feature in the realm of work. Sector of employment, as it showed to be universally significant when analysing overeducation, using this method across European countries. The equation in a simplified form was.

\[
z = A + age + experienced\ un\ employment + job\ security + Ln\ wage + gender + sector
\]

\(z\) is a variable referring to the likelihood of overeducation. \(A\) is a constant. The equation uses a natural logarithm of wage.

\(^{15}\) Is the response in a question, whether the respondent was unemployed before entering current job.

\(^{16}\) This criterion is based on the assumption of classical economic theory, when on a perfect market; employer hires employees until the marginal productivity from the next unit of work is higher than additional labour costs, dominantly formed by the wage of the new employee. As an implication of this assumption, labour costs and wages are linked with the productivity. When the productivity rises, thanks to new technology, higher capital intensity, or increased human capital in the form of higher education, the wages have to follow.

\(^{17}\) This criterion argues, that the productivity on the position remains the same and employers employ employees in overeducated positions just because there is enough of them on the market.
The analysis was done on the data from the European Household Panel, 8. round from 2001, for each country separately. Only 10 countries, from the total of 15 were picked up. Five were dropped because of low numbers of responses, differences in questionnaires or in the use of classifications. The following table shows the results of the analysis.

Table 3: Result of the binary logistic regression

<table>
<thead>
<tr>
<th></th>
<th>BE18 (S.E.)</th>
<th>DE (S.E.)</th>
<th>DK (S.E.)</th>
<th>FI (S.E.)</th>
<th>FR (S.E.)</th>
<th>GR (S.E.)</th>
<th>IRL (S.E.)</th>
<th>IT (S.E.)</th>
<th>PT (S.E.)</th>
<th>ESP (S.E.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.014 (0.013)</td>
<td>0.006 (0.009)</td>
<td>-0.003 (0.014)</td>
<td>-0.016 (0.014)</td>
<td>-0.004 (0.014)</td>
<td>-0.021 (0.016)</td>
<td>-0.020 (0.016)</td>
<td>-0.052* (0.022)</td>
<td>-0.002 (0.024)</td>
<td>-0.027* (0.011)</td>
</tr>
<tr>
<td>Experienced unemployment</td>
<td>0.596* (0.204)</td>
<td>0.537** (0.171)</td>
<td>0.141 (0.268)</td>
<td>0.513 (0.263)</td>
<td>0.182 (0.247)</td>
<td>-0.192 (0.229)</td>
<td>0.113 (0.401)</td>
<td>0.286 (0.254)</td>
<td>0.076 (0.374)</td>
<td>0.523** (0.138)</td>
</tr>
<tr>
<td>Job security satisfaction</td>
<td>0.102 (0.071)</td>
<td>NA19</td>
<td>-0.075 (0.092)</td>
<td>0.123 (0.096)</td>
<td>-0.044 (0.104)</td>
<td>0.129 (0.096)</td>
<td>0.149 (0.123)</td>
<td>0.152 (0.095)</td>
<td>0.464* (0.181)</td>
<td>0.099* (0.049)</td>
</tr>
<tr>
<td>Wage</td>
<td>-0.217 (0.135)</td>
<td>0.654** (0.120)</td>
<td>0.483* * (0.161)</td>
<td>-0.581* * (0.122)</td>
<td>1.382** * (0.266)</td>
<td>-0.571* * (0.175)</td>
<td>-0.338 (0.205)</td>
<td>0.047 (0.203)</td>
<td>-0.683* * (0.238)</td>
<td>-0.702** (0.110)</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.174 (0.189)</td>
<td>0.382* (0.178)</td>
<td>-0.524* (0.267)</td>
<td>-0.069 (0.250)</td>
<td>-0.092 (0.234)</td>
<td>0.043 (0.220)</td>
<td>-0.064 (0.309)</td>
<td>-0.415 (0.258)</td>
<td>-0.371 (0.333)</td>
<td>0.350* (0.138)</td>
</tr>
<tr>
<td>Employed in a private sector</td>
<td>0.998* * (0.201)</td>
<td>1.115** (0.193)</td>
<td>0.603* (0.265)</td>
<td>1.171* * (0.261)</td>
<td>1.042** * (0.263)</td>
<td>1.051** * (0.240)</td>
<td>0.910* * (0.332)</td>
<td>0.513 (0.272)</td>
<td>1.911** * (0.387)</td>
<td>0.725** (0.158)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.402 (1.731)</td>
<td>4.322 (1.241)</td>
<td>4.207* (1.830)</td>
<td>4.504 (1.573)</td>
<td>14.843 (2.915)</td>
<td>7.414 (2.355)</td>
<td>1.626 (1.863)</td>
<td>-0.237 (1.931)</td>
<td>5.084 (3.109)</td>
<td>9.203 (1.476)</td>
</tr>
<tr>
<td>N</td>
<td>622</td>
<td>954</td>
<td>588</td>
<td>545</td>
<td>504</td>
<td>460</td>
<td>252</td>
<td>332</td>
<td>393</td>
<td>1083</td>
</tr>
<tr>
<td>2 Log-Likelihood</td>
<td>735.14</td>
<td>2</td>
<td>997.638</td>
<td>452.72</td>
<td>2</td>
<td>462.21</td>
<td>8</td>
<td>503.95</td>
<td>7</td>
<td>524.77</td>
</tr>
<tr>
<td>Cox and Snell R Square</td>
<td>0.062</td>
<td>0.097</td>
<td>0.037</td>
<td>0.119</td>
<td>0.150</td>
<td>0.097</td>
<td>0.072</td>
<td>0.048</td>
<td>0.119</td>
<td>0.122</td>
</tr>
<tr>
<td>Nagelkerke R Square</td>
<td>0.087</td>
<td>0.143</td>
<td>0.067</td>
<td>0.191</td>
<td>0.218</td>
<td>0.137</td>
<td>0.102</td>
<td>0.069</td>
<td>0.210</td>
<td>0.166</td>
</tr>
</tbody>
</table>

Source: Counted from the 8. round of European Community Household Panel

The presented table displays gathered coefficients for each country. It is surprising that the most prominent explanation of overeducation as a career strategy gets only a low support by the evidence. The fact that only two of the countries brought a significant coefficient can be caused also by the vague method of
measurement. In Italy and Spain, younger tertiary educated workers are more likely to be overeducated than older.

Experienced unemployment showed some significant relation with the likelihood of being overeducated in Belgium, Germany and Spain. Previous experience with unemployment increased the likelihood of being overeducated in both countries. Overeducated workers in Portugal and Spain declare significantly higher job satisfaction than matched tertiary educated workers. Experienced unemployment, as well as job security satisfaction supports the education as insurance explanation. As can be seen from the table, this explanation finds supporting evidence in 4 countries.

In 7 countries, lower wage increases the likelihood of being overeducated. This is in line with existing knowledge on this issue. The most interesting thing on this is that it does not pay for all examined countries.

In Belgium, Italy and Ireland this effect was insignificant.

Gender brought the most confusing results. Its effect on overeducation was significant only in Germany, Spain and Denmark, but the direction of the effect is changing across these countries. A positive coefficient in case of Spain and Germany means, that being a man increases the likelihood of being overeducated. This is not consistent with what is commonly assumed.

The strongest effect showed to be the sector of employment. If a worker with tertiary degree is working in the private sector, he is more likely to be overeducated than in the public sector. This was confirmed in 9 examined European countries.

The real finding of this analysis is not the verification or falsification of mentioned explanations, but the information that there are serious differences in the character of overeducation. Using the same method on data collected by the same methodology enables to focus on these differences internationally. The context of those who are overeducated seems to play an important role and it varies across countries. In Italy, overeducation can be explained more as a career strategy, in Belgium more as a result of using education as insurance. In case of Spain all of the presented explanations can be useful. Some common patterns can be found, but we can conclude that the overall character of overeducation changes across the European countries.

What does it say about the situation in supply and demand in the labour market? Presented evidence on overeducation, viewed from the macro perspective in several European countries, showed that it is an omnipresent and long-term phenomenon. The level of overeducation of tertiary educated is related to the proportion of tertiary educated among the population. But there is no relation between overeducation and
unemployment rate, tertiary schooling capacities, or investment into tertiary schooling. Omnispreadence, or continuity is not enough to declare overeducation to be a consequence of the labour market disequilibrium. We need to look at the character of existing overeducation. For example in Italy, overeducation has, to a big extent, a shape of a career strategy. Therefore, it can be assumed that it is not caused by the excess in supply of tertiary educated, even if it is a long term phenomenon. On the other side in Spain, Belgium or Germany, previous experience with unemployment seems to play an important role. As an implication it can be concluded that people take overeducated jobs to avoid repeated unemployment, which means they are using education as insurance. This strategy becomes more feasible for individuals acting in the environment of fulfilled demand and excess supply of overeducated. In this situation, overeducation tells something about the situation in supply and demand of tertiary educated workers; it tells that there is an overhang of supply. Further analysis of the character of overeducation, focusing on the context of overeducated is necessary. This is the way to formulate the message, existing evidence on overeducation is telling us.

Discussion
The central question behind this article is whether and what can overeducation tell us about the situation in supply and demand of tertiary educated workers. Using a “low cost” method of overeducation measurement enables to get data from several datasets. Even from the National census of 2001. The used method has several restrictions. Reliability, as well as validity problems, but it offers the opportunity to make international comparisons of overeducation.

The presented reasoning suggests that overeducation could, under certain circumstances, be a consequence of excess in supply of tertiary educated. Overeducation needs to be a long-term, persistent phenomenon, but this is not enough. The character of the phenomenon is also important. For example overeducation as a career strategy is not a consequence of excess in supply of tertiary educated. Therefore the attention needs to be drawn on the wider context of overeducated. Results of the analysis showed, that the character of overeducation changes across European countries. Each country needs therefore a separate attention.

There are countries where overeducation seems to be a consequence of excess in supply of tertiary educated, but this does not mean that any further investment in tertiary education would be inefficient. The reasoning used in this analysis reduces education to an investment, which should be utilised latter, during the working years as higher productivity, wage and lower risk of unemployment. In praxis, education cannot be reduced into exclusively and only the preparation for labour market; in modern societies it serves in various ways. For example schooling occupies young people, presents a way of socialisation, preserves existing values and order, offers an opportunity to build relations, and many others. Therefore any information about the
situation of supply and demand has only partial relevance in the discussion about efficiency of investment in education and schooling.

The concept of skill biased technological change claims that the spreading of new technologies increases the demand for more skilled and more educated workers. In last decades, this trend has created a race between schooling and technology. As technology increases the demand for educated workers, schooling has to adjust to this changed setting. In the modern societies, the most expanding segment of schooling is tertiary schooling. If overeducation is a consequence of excess supply of tertiary educated, it could suggest that schooling is ahead in this race. On the other side, rising returns to education speak in favour of technology.

In most countries, the evidence suggests that overeducation is more likely just a friction than a result of labour market disequilibrium. The attention should be shifted onto lowering this friction, because it also presents a form of inefficiency. In situation of high returns from education and high overeducation, the policy makers should focus their interest on the content of provided education and examine its match with employers’ requirements.

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