Education and labour market in the age of globalisation: some evidence for EU-27

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Abstract

In the age of globalisation, particularly since the current crisis erupted, the labour market is in a constant and rapid state of change. This requires, in turn, a skilled workforce capable of responding flexibly to the market needs. A country’s ability to compete internationally, thus, rests on a working relationship between education and employment, as this allows more responsiveness of the education system to the labour market requirements. These issues are being addressed in this paper with reference to the 27 member states of the European Union. In such a respect, a multidimensional approach is used to examine the connections between educational output and employment conditions. The research is conducted by combining quantitative and qualitative measures to understand and capture the processes and outcomes of schooling systems and labour markets in Europe. All the evidence suggests that countries that perform well across educational standards do often provide higher employment chances and better labour market conditions, while the contrary holds for countries scoring poorly in terms of educational attainment.

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1. Introduction

The linkage between education and labour market has been studied extensively by economists over the last decades, motivated mainly by a search for the causes of disparities between differently skilled individuals and the patterns of wage differentials. It is undoubtedly true that formal education and the professional skills acquired during training processes are the main determinants of good labor market outcomes for individuals. Though one needs to bear in mind that employment conditions depend on a myriad of factors – household labor supply decisions, the investment climate in a given country, growth and productivity, FDI, to name a few – education has to be regarded as a necessary means for acquiring the knowledge and competencies potentially relevant for employment and work. In this connection, education plays a twofold role in creating favourable employment conditions: on the one hand, schooling prepares individuals to enter the labour force; on the other hand, lifelong learning experiences and knowledge upgrading processes equip them with the skills necessary to make career improvements or career change.

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It is clear, then, that the processes and effects of the interactions between education and labour market are multiple and need to be thoroughly assessed to ensure high responsiveness of education to job market needs. The present article aims at providing a preliminary but comprehensive picture of these linkages within the European Union. After a brief review of the main theoretical underpinnings and empirical evidence on the subject, a multimodal scaling is performed to show similarities and differences among the EU’s 27 member states in terms of schooling outcomes and labour market conditions.

2. The linkage between education and labour

This paper is related to several strands of the literature. A first well-established line of research examines the interactions between education, workers’ productivity and earnings. This literature, known as standard human capital theory, suggests that education and training raise the productivity of workers by imparting useful knowledge and skills, and hence positively affect workers’ lifetime earnings. Laying the foundations for the modern studies on human capital, Becker (1964) develops his well-known model by assuming that individuals choose their optimal level of education so as to equalize marginal returns and marginal costs. Further seminal contributions are made by Mincer (1962; 1974), whose famous wage regression is meant to determine the statistical relationship between market wages, education and on-the-job training. By the early 1970s, hundreds of studies have been conducted to estimate the rates of return to schooling using Mincerian wage regressions. Most such researches show that different levels of education (primary, secondary, tertiary) and different types of education (general and vocational) can explain variations of wages across individuals (see, for a review, Psacharopoulos, 1994; Psacharopoulos & Patrinos, 2004; Heckman et al., 2006).

A second topic which has been given wide coverage in the literature is the linkage between education and job opportunities. The main findings of the model developed by McKenna (1996) are that schooling expands employment opportunities since educated workers are productive in all jobs whereas unskilled workers are productive in only some jobs. Furthermore, there is a large body of empirical evidence indicating that individuals with a high level of education face a relatively low unemployment risk. Indeed, a two-way relationship between schooling and unemployment has been found: on the one hand, education reduces the incidence and the duration of unemployment for an individual (Devine & Kiefer, 1991); on the other hand, unemployment increases the demand for schooling, thus tending to distort the decision of individuals to invest in education (Kodde, 1988).

The latter remark leads to a more general issue largely debated by economists, which is generally known as skills mismatch (Allen & van der Velden, 2001). This is the case when information asymmetries in labor markets send the wrong signals to firms and individuals seeking employment, thus giving rise to three possible effects. First, as mentioned above, unemployment may induce overinvestment in education ("overeducation"), which may, in turn, result in unemployment or underemployment of an educated labour force (Sloane, 2003). Second, differences between the demand for education by households and by firms can also lead to the so-called undereducation, i.e. a shortage of skilled labor resulting from inadequate education (Sloane et al., 1999). Finally, skill mismatches are often associated with migration, whereby educated workers leave their home country to move abroad where they face better employment opportunities (Chau & Stark, 1998).

A number of recent papers have focused on a variety of additional issues concerning the relationship between schooling and labour market. Albrecht and Vroman (2002) argue that skill-biased technical change, by shifting demand in favor of high-skill workers, may cause a strong increase in unemployment among the remaining low-skilled individuals. Other contributions are concerned with the effectiveness of active labour market programmes based on labour market training on the participants; the evidence produced is rather mixed and mostly suggests that labour market programs have at best a modest impact on participants’ employment prospects (Heckman et al., 1999).
3. Methodology and results

Multidimensional scaling (MDS) is a descriptive method for representing the structure of a system on the basis of pairwise measures of similarity. In this paper, this multivariate technique is used as the clustering technique to produce a graphical representation of a pattern of elements, in this case the 27 EU member countries, which are subjectively analyzed to see if any empirical patterning may be identified across them. The goal is to provide a representative map that best approximates the distances observed between countries, in terms of educational level and labour market conditions. The resulting multidimensional spatial configuration embodies (in its proximity relationships) the comparative similarities.

The present analysis includes 10 indicators (see Table 2) to reflect the multi-faceted dimensions of education and job market. Choosing a two-dimensional solution for the reasons specified below, the model’s goodness of fit, evaluated via the RSQ (0.92), is high. This result is further enhanced by the S-Stress values, whose results are reported in Table 1.

Table 1. S-Stress values for a two-dimensional solution

<table>
<thead>
<tr>
<th>Iteration</th>
<th>S-stress</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.19092</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>0.14170</td>
<td>0.04922</td>
</tr>
<tr>
<td>3</td>
<td>0.13409</td>
<td>0.00761</td>
</tr>
<tr>
<td>4</td>
<td>0.13201</td>
<td>0.00209</td>
</tr>
<tr>
<td>5</td>
<td>0.13125</td>
<td>0.00076</td>
</tr>
</tbody>
</table>

The two-dimensional model is chosen after assessing the values of Kruskal’s Stress index. A common way to decide how many dimensions to use is to plot the stress value against different numbers of dimensions (Figure 1). The “elbow” rule suggests to choose the number of dimensions in correspondence to where the diagram yields an “elbow”, beyond which the broken line flattens (Figure 1).

The resulting positioning map (Figure 2) has the property to plot countries according to similarity/dissimilarity of the values derived from the analysis, so that the degree of association between two countries is maximal if they are close to each other and minimal otherwise.

Correlation values between variables and values for the two-dimensional solution (see Table 2) are useful for assigning titles to the the diagram axes. All the indicators of labour market conditions are positively correlated with the X-axis, which is therefore called “Education/labour mismatch”. This is to be read as follows: the countries located in the right side of the map show significant mismatch between occupation and schooling, while the contrary holds for those situated in the left side.

![Figure 1. Scree plot showing stress values associated with different dimensional configurations](image-url)
Table 2. Correlation between variables and values for the two-dimensional solution

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Dimension 1</th>
<th>Dimension 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita in Purchasing Power Standards (PPS)*</td>
<td>-0.43</td>
<td>0.09</td>
</tr>
<tr>
<td>Graduates (ISCED 5-6) in mathematics, science and technology per 1000 of population aged 20-29*</td>
<td>0.18</td>
<td>-0.41</td>
</tr>
<tr>
<td>Total public expenditure on education as % of GDP, at tertiary level of education (ISCED 5-6)**</td>
<td>-0.27</td>
<td>-0.03</td>
</tr>
<tr>
<td>Average number of foreign languages learned per pupil at ISCED level 3**</td>
<td>-0.70</td>
<td>-0.35</td>
</tr>
<tr>
<td>Percentage of the population aged 25 to 64 having completed at least upper secondary education**</td>
<td>-0.28</td>
<td>-0.78</td>
</tr>
<tr>
<td>Education quality index***</td>
<td>-0.45</td>
<td>-0.66</td>
</tr>
<tr>
<td>Unemployment rates of persons aged 20-34 with tertiary education (ISCED 5-6)**</td>
<td>0.52</td>
<td>0.45</td>
</tr>
<tr>
<td>Education / occupation mismatch (ISCED 5-6) of persons aged 25-34 graduated in science, mathematics and computing - %**</td>
<td>0.81</td>
<td>-0.36</td>
</tr>
<tr>
<td>Education / occupation mismatch (ISCED 5-6) of persons aged 25-34 graduated in engineering, manufacturing and construction - %**</td>
<td>0.71</td>
<td>-0.49</td>
</tr>
<tr>
<td>Education / occupation mismatch (ISCED 5-6) of persons aged 25-34 graduated in services - %**</td>
<td>0.54</td>
<td>-0.10</td>
</tr>
</tbody>
</table>


By the same token, at least two educational indicators (population having completed upper secondary education and Altinok-Murseli’s quality index) are strongly and negatively correlated with the Y-axis. Hence, this can be interpreted as an “Education lag” separating low and high scoring countries: the more in the bottom part of the chart, the better a country’s performance in terms of schooling.

Figure 2. Clusters of countries in a two-dimensional plane
Figure 2 shows the cluster results in a two-dimensional map, obtained by grouping countries according to their mutual proximity in the diagram. The resulting cluster solution consists of five distinct and fairly homogenous clusters, which help in identifying the similarities and differences concerning schooling performance and labour market conditions across European countries.

The largest and most homogeneous grouping is composed of the bulk of European countries (Germany, Sweden, France, Poland, etc.), which are average on the measures of educational level and labour/schooling mismatch. The picture changes somewhat when considering the cluster of Southern Europe (Italy, Greece, Portugal and Cyprus), whose situation both in terms of education and labour market conditions is amongst the worst in the Union. A different pattern emerges in the cluster (comprising Estonia, Lithuania and Ireland) situated in the bottom of the chart: the excellent schooling achievements of these countries do not find correspondence in a labour market demanding different professional qualifications. Quite similarly, the grouping made up of the United Kingdom and Bulgaria exhibits low values on labour market outcomes, in spite of better educated individuals relative to the previous cluster. The best performing cluster contains Hungary, Slovenia, the Netherlands and Czech Republic, whose education outcomes are very much responsive to labour market needs. Close to this last grouping, but doing exceptionally well on both dimensions, Finland is thus considered an outlier. Other outliers include Luxembourg, Spain and Malta, despite their very different performances. In particular, Luxembourg, though quite disappointing in terms of education outcomes, has, perhaps surprisingly, the best matching between schooling and job market.

4. Conclusive remarks

This paper has investigated the relationship between schooling and labour market in Europe, focusing on the responsiveness of its education systems to the labour market requirements. A multidimensional scaling approach, used to test these hypotheses across the 27 European Union member countries, has allowed to identify five clusters of countries showing different outcomes with respect to the educational levels and the mismatch between occupation and schooling. Our findings suggest that there is heterogeneity in the European patterns and that the policies of the Union on education and labour should follow the path adopted by the countries representing virtuous examples such as Finland, the Netherlands and Czech Republic.

References