

Monica Mihaela MAER MATEI
Bucharest University of Economic Studies, Romania
National Scientific Research Institute for Labour and Social Protection (INCSMPS),
Bucharest, Romania

MEASURES OF OCCUPATIONAL MISMATCH

Empirical
study

Keywords

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Abstract

The research developed in this paper is based on micro data available in Programme for the International Assessment of Adult Competencies (PIAAC). The research aimed to estimate the size of both forms of labour market mismatch: education mismatch and skill mismatch. The first measure of job mismatch is based on workers' self-assessment. The second one uses the PIAAC assessment regarding the proficiency for each skill dimension (literacy, numeracy and problem solving in technology rich environments). The labor market mismatch was measured for Spain and Italy datasets for the higher education graduates whose occupations are included in Major Group two Professionals, according to the International Standard Classification of Occupations. The estimation results showed that the two measures of labour market mismatch are not correlated.

Introduction

In the socio- economic context of the last decades, identifying and measuring occupational mismatches has become a major concern. Therefore the European Centre for the Development of Vocational Training CEDEFOP developed the skill forecast by educational level and occupation (CEDEFOP, 2010a,b). Also the efforts of OECD or European commission related to this topic are proved by the research papers and reports published in the last years under their responsibility. These studies focused on identifying causes of labour mismatch, on measuring its consequences in terms of earnings (Desjardins and Rubenson, 2011). The study developed on the 2003-2007 Adult Literacy and Life skills Survey (ALLS) emphasized the need of an accurate measure of mismatch and underlined that policies on skills must to take into account both the supply and the demand side for an optimal utilisation of the existing skills base (Desjardins and Rubenson, 2011). Returns to skills were estimated from PIAAC data, emphasizing that higher cognitive skills – measured across numeracy, literacy, and problem-solving domains – are related to higher wages (Hanushek, *et al.*, 2013) . Another research based on PIAAC showed that education and skill mismatch are not equivalent measures of occupational mismatch (Flisi, Goglio, Meroni, Rodrigues, Toscano, 2014).

Thus in order to deal with the occupational mismatch issue, first we have to find the appropriate measure to quantify the imbalances between supply and demand with respect to skills and qualifications. Previous studies developed on this subject proved that skills or qualifications above those needed for a job, produce negative effects on labor market outcomes like earnings or job satisfaction (Mavromaras, McGuinness, O’Leary, Sloane and Wei, 2013). A review of the skills mismatch in the labour market is provided by the paper of Handel (2003). The author underlined the need for a validated method of measuring job skill demands to better understand skill imbalances.

The research developed in this paper aimed to estimate and compare the two measures of occupational mismatch namely education mismatch and skill mismatch. The analysis is based on PIAAC (Programme for the International Assessment of Adult Competencies) data.

In the literature, there are three methods for identifying educational mismatch: a subjective measure, an objective measure and an empirical method. First is based on workers’ self-assessment, the second is based on job analysis and the last one computes the mean or modal level of education in a occupation. In contrast to education mismatch, skill mismatch is a more direct concept based on whether workers have the actual skills needed to carry out successfully the tasks required by their current job.

Even is more difficult to measure it this concept is more precise and takes into consideration skill gain and skill loss (OECD, 2013).

Previous studies on PIAAC suggested that Italy and Spain show high over-education rates but relatively low rates of over-skilling (Flisi *et al.*, 2014). In this paper we chose to analyze the issues surrounding mismatch phenomenon in these two countries in order to see if situation is different for higher education graduates.

Data

PIAAC is an international survey of adult competencies. This is the most important tool designed for skills assessment. The Survey of Adult Skills involved the direct assessment of literacy, numeracy and problem solving in technology-rich environments. The target population for the study consisted of 16-65 years , residing in the country at the time of data collection adults. The data collection for the Survey of Adult Skills (PIAAC) took place from 1 August 2011 to 31 March 2012 in most participating countries.

Data is collected for 20 OECD countries: Australia, Austria, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Japan, Korea, the Netherlands, Norway, Poland, the Slovak Republic, Spain, Sweden and the United States – and three OECD sub-national entities – Flanders(Belgium), England (United Kingdom), and Northern Ireland (United Kingdom). In addition, two partner countries participated in the survey: Cyprus and the Russian Federation.

The Survey of adult skills measures the essential competencies for information- processing in three domains: literacy, numeracy and problem solving in technology rich environments. These competencies are considered important pillars for the knowledge-based economies, necessary for fully integrating in the labour market. When measuring the competencies levels for each adult the complexity of the information-processing tasks are taken into consideration. For example, at the lower level of the measurement scale are simple mathematical operations like counting or ordering meanwhile at the highest level adults could work with complex mathematical models. Thus an important advantage of the PIAAC is coming from the measurement procedure. Hence the measure of the proficiency of each skill depends on the type of cognitive operations required by the task, the presence of distracting information, and the nature of information and knowledge required to successfully complete a task. In consequence, the information regarding the adults competencies will not consist only in showing if he/she possess a certain skill or not but will reveal the level of proficiency. These are represented on a 500-point scale (OECD, 2013).

Method

Data collection in PIAAC is based on a complex sample design. Thus replicate weights assigned to each individual and plausible values had to be taken into consideration. The labor market mismatch was measured for Spain and Italy datasets for the higher education graduates whose occupations are included in Major Group one and two (Managers and Professionals), according to the International Standard Classification of Occupations.

In order to estimate the size of education mismatch, a subjective measure based on workers' self-assessment was used. Respondents were asked about the level of qualification necessary for doing their job satisfactorily. Those who said that a lower level (compared to their own) would be sufficient were classified as overeducated.

In order to identify the skill mismatch, the procedure indicated in the *The survey of adult skills: Readers companion (OECD 2013)* was used. Hence first were identified the workers who self-report being well-matched using the answer to the following questions "Do you feel that you have the skills to cope with more demanding duties than those you are required to perform in your current job?" and "Do you feel that you need further training in order to cope well with your present duties?". Those individuals with negative answers to both questions were considered well matched. After that, the competency scores (plausible values), representing the distribution of a respondent's proficiency in each field, were used to compute the *minimum* and the *maximum* proficiency by each 1 digit ISCO code. Hence for each skill dimension (literacy, numeracy, problem solving) the 5th percentile and 95th percentile of the proficiency scores of the individuals considered well matched were computed. In the end, for each dimension and occupation, those cases for which the proficiency level exceeds the *maximum* were classified as over-skilled.

After estimating the size of the labor market mismatch, the research focused on analyzing the correlation between skill mismatch and education mismatch.

Results

The skill mismatch analysis was developed for literacy and numeracy skills dimensions. We dropped the problem solving dimension given that Spain and Italy did not participate in the problem solving in technology-rich environments assessment.

For the Italy data set, approximately 5% of the higher education graduates whose occupations are included in Major Group one and two (Managers and Professionals), according to the International Standard Classification of Occupations declared that they don't have the

skills to cope with more demanding duties than those they are required to perform in their current job and also they don't feel they need further training in order to cope well with their present duties. So in the first step of our analysis this group of adults were considered well matched. The competency scores of this subset, measured by ten plausible values were used to compute a minimum (5th percentile) and a maximum (95th percentile) proficiency level. Table 1 presents these values for each skill dimension.

In order to identify over-skilled workers, we compared their proficiency level given by the first plausible value with the minimum and maximum levels computed before. If the proficiency level exceeds the *maximum* then that individual is classified as over-skilled.

According to our approach, the respondents declaring that their actual qualification level is the one necessary for doing their job satisfactorily are considered well matched in terms of education matching. Those who feel that a lower/ higher level would be sufficient are classified as over / under-skilled.

Table 2 shows the job mismatch rates obtained for the two measures. According to our results, about 78% of the Italian adults we analyzed are well matched with respect to qualification level. Even if approximately 9.5 % of the workers consider themselves as being overeducated, according to the skill mismatch measure, almost 17% of the higher education graduates (from the Managers or Professionals group) have higher proficiency levels in literacy than the *maximum* value. On the contrary, in numeracy, the over-skilling rate is under the over-education rate by 3.5 percentage points. But these comparisons are pointless unless the two measures of mismatch are approximately equivalent. The correlation analysis revealed that the two variables are not very similar. This statement is supported by the results emphasized in Figure 1 and Figure 2. Therefore, only 17% of the under-educated workers are also included in the under-skilled group. Even worse, 6.6% of them are over-skilled. Another discrepancy we found is related to the fact that almost 11% of the over-educated adults are actually under-skilled and only 8.7% are over-skilled.

In terms of numeracy skills, the two measures are still different. In this case, over 80% of the over skilled or under skilled adults are well matched according to the qualification level.

For the data collected in Spain, 4% of the workers with tertiary education belonging to Managers or Professionals Group were used to estimate the lower and upper limit of proficiency. This time, the over-education rate (6.22%) is below the over-skilling rate in both cases. According to our results, 10.6% of the higher education graduates employed as Managers or Professionals

have literacy skills that would allow them to cope with more demanding duties than those required to perform their current job tasks.

The dissimilarities between the two measures of occupational mismatch are also present for the Spain results (Figure 3 and Figure 4). Analyzing the intersection between them revealed that about 12% of the under-educated workers were over-skilled according to their literacy skills. Also 11% of the well matched adults are over skilled in terms of literacy match. Similar evidence comes from the correlation analysis between education match and numeracy match.

We must point out that the skills mismatch measures (literacy and numeracy) are not so different. For instance, for Spain data, over 30% of the workers are over/under skilled with respect to both dimensions.

Conclusions

In this paper we used PIAAC data to measure occupational mismatch for adults with tertiary education whose occupations are included in Major Group one and two (Managers and Professionals). We measured education mismatch using a subjective method based on respondent self-assessment and skill mismatch using the literacy and numeracy competence assessment from PIAAC. The estimation results showed that the two variables measuring labor market mismatch are not correlated, strengthening the theory that qualifications are not always reflecting the actual skills. Most obvious example is that of Spain, where a high share of under qualification is associated to very low under-skilling shares.

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Appendices

Table 1.
Minimum and Maximum proficiency levels

	Italy		Spain	
	Q0.05	Q0.95	Q0.05	Q0.95
Literacy	245.77	323.5	195.73	338.24
Numeracy	214.90	352.43	204.75	341.10

Table 2
Occupation mismatch rates

Country	Category	Education	Skill Mismatch	
		Match	Literacy	Numeracy
Italy	Under	12.43%	13.70%	6.55%
	Match	78.12%	69.44%	87.49%
	Over	9.45%	16.86%	5.96%
Spain	Under	10.76%	0.60%	1.38%
	Match	83.02%	88.82%	90.46%
	Over	6.22%	10.59%	8.16%

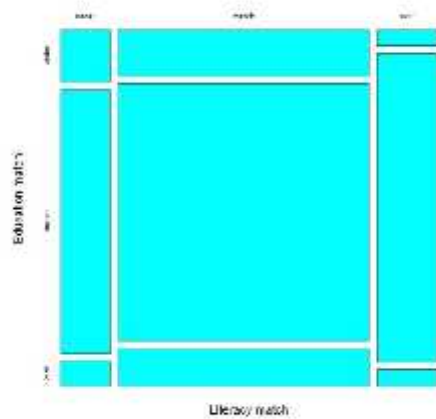


Figure 1. Relationship between education mismatch and skill mismatch (literacy dimension) - Italy data set

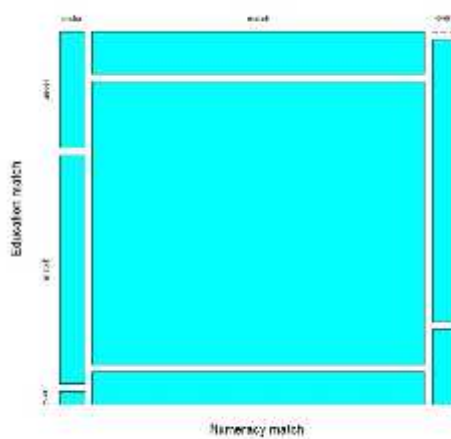


Figure 2. Relationship between education mismatch and skill mismatch (numeracy dimension) - Italy data set

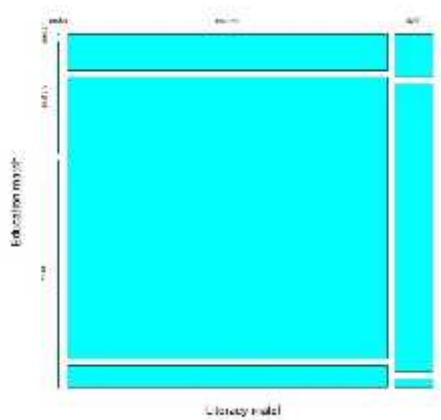


Figure 3. Relationship between education mismatch and skill mismatch (literacy dimension) - Spain data set

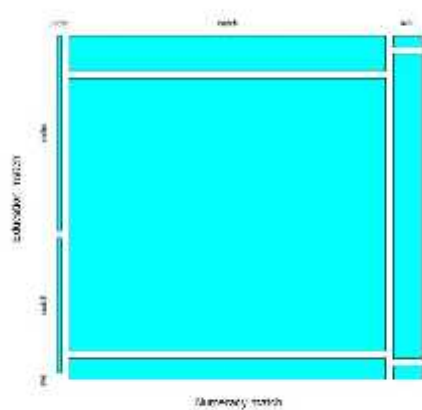


Figure 4. Relationship between education mismatch and skill mismatch (numeracy dimension) –Spain data set