Jobs for the Low-Educated
Evidence from Norway, Italy and Hungary

János Köllő

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János Köllő
Institute of Economics, Centre for Regional and Economic Studies, Budapest
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János Köllő*

Abstract. Norway and Italy represent essentially different but to some extent successful models of providing the low-educated population with work. By contrast, Hungarians with primary school background face an extremely high risk of social exclusion, similar to their counterparts in most other post-communist countries. Using data from the Adult Literacy and Life Skills Survey, the paper identifies two factors providing part of the explanation for this failure. On the one hand, low-educated Hungarians lack a series of basic competencies, which allow unskilled Norwegians to work in skill-intensive jobs. The data hint at a dramatic degree of social isolation that further deteriorates their skills and jobs prospects. On the other hand, while skills deficiencies occur even more frequently in Italy, the country's sizeable small-firm sector provides a shelter for the unskilled. The double burden of insufficient skills (relative to Norway) and having an undersized and skill-intensive small-firm sector (relative to Italy) significantly contributes to non-employment among low-educated Hungarians.

Keywords: *skills, skill requirements, unemployment, firm size, health*. JEL J21, J24

1 Introduction

The gap between high and low educated people in terms of job prospects is nowhere as wide (within the EU and the OECD) as in the former communist countries of Central and Eastern Europe (CEE). Only in Romania and Slovenia, the top performers in the region in this respect, do the absolute and relative employment rates of the ISCED 0-2 population exceed Belgium's, the laggard within the EU-15. Other countries score worse, with the ratio of unskilled to skilled employment rates falling short of 0.45 in Bulgaria, Estonia, Hungary and Latvia and 0.4 in the Czech Republic, Poland, Lithuania and Slovakia.[1] The new member states' persistent failure to provide their unskilled population with work poses the risk of destructive social fragmentation, erosion of the legal and market institutions and slower growth. (See Easterly, Ritzen & Woolcock 2006 for an exploration of the argument).

This paper wants to contribute to a better understanding of unskilled unemployment by comparing Norway, Italy and Hungary, three countries following characteristically dissimilar and differently successful ways of integrating the low-educated populace. I use data from the Adult Literacy and Life Skills Survey (ALL, 2003-2008) and to a lesser extent the International Adult Literacy Survey (IALS, 1994-1998), in which the three countries participated. Similar to other sources, the two skill surveys point to enormous and persistent employment gaps between skilled and unskilled Hungarians as well as between unskilled Hungarians and their Norwegian and Italian counterparts. They draw attention to a break in the Hungarian education-employment profile at 10 years in school i.e. as we arrive to people with no educational or vocational qualifications.

* Institute of Economics, Budapest and IZA, Bonn. Email kollo@econ.core.hu . This analysis is based on the Statistics Canada Adult Literacy and Life Skills Survey data base acquired in December 2012. All computations, use and interpretation of these data are entirely that of the author.

[1] See the six panels of Figure A1 showing the absolute and relative levels of unskilled employment within the population attached to the labor market. i.e. excluding full-time students and persons older than 35 with no work experience. See Section 3 for a justification of this restriction.

An advantage of using the ALL rather than a standard storehouse of labor market information like the EU LFS is that it provides information on the skill content of jobs, the population's measurable skills and people's engagement in activities, which enhance their employability and/or provide them with alternative ways of social inclusion. The richness of the survey certainly compensates for its smaller size and cross-section nature.

In lack of panel data, the paper cannot aim at exploring causal relationships. This is a descriptive report albeit a description based on variables seldom available for the researcher. I use simple tables, charts and regressions with the aim to characterize the *status quo* in each country, in the hope of arriving at relevant questions for in-depth research.

After a brief discussion of the literature and the data (Sections 2 and 3) I compare the size, measurable cognitive skills, health status and within-country relative wages of the working age population with primary school background. None of these data predict that there should be discontinuity in the Hungarian education-employment profile (Sections 4 and 5). In Section 6, I estimate descriptive logistic regressions to study variations in the share of low-educated workers by sectors, firm size and literacy-related workplace requirements. This is followed by a closer look at how the distribution of jobs by degree of complexity and firms' willingness to hire low educated workers (for jobs of different complexity) contribute to unskilled employment in Norway, on the one hand, and Italy and Hungary, on the other. The section is closed by a study of the role of small firms in Italy versus Hungary and Norway. Section 7 discusses the question of how low educated Norwegians and Italians are capable of doing skill intensive jobs. Section 8 concludes.

In Sections 3 and 4, I use both IALS and ALL for statistics on the size of the low-educated population and employment in 1998 (all countries), 2003 (Norway and Italy) and 2008 (Hungary). A further systematic comparison of IALS and ALL is rendered impossible because of changes in the measurement of workplace literacy requirements, firm size, health status and wages as well as by lack of data on civil activities in IALS. However, the changes in population size and employment over a period of five years in Norway and Italy and ten years in Hungary were small compared to the large cross-country differentials observed in both surveys. Therefore I rely on the ALL data in the rest of the paper with only occasional reference to the IALS.

The data suggest that low-educated workers in Norway are often hired for complex jobs requiring a series of workplace duties, which involve literacy, numeracy and communication skills. Workers' ability to do these jobs is enhanced by their high rates of participation in adult training, informal learning activities, social, political, cultural, sports and religious organizations, community groups and voluntary work. Compared to both Italy and Hungary, Norway exploits the synergies between skills formation, working in skill-intensive jobs and participation in civil activities, which help the country in maintaining a high level of unskilled employment in both absolute and relative terms.

The Italian economy absorbs the country's large low-educated population at a rate that substantially exceeds the Hungarian level for men and roughly equal to it for women. The employment rate for both genders is significantly higher than anywhere in the CEEs, especially if we restrict the attention to the population attached to the labor market. Low-educated Italians have poor measurable skills, even when compared to their Hungarian counterparts, and their participation in skill-enhancing activities is nearly as infrequent in absolute and relative terms

as of Hungarians. The key to high unskilled employment lies elsewhere. On the one hand, the Italian economy operates a large number of very simple jobs. On the other hand, Italy's sizeable small-firm sector has a high propensity to employ low-educated workers in both simple and complex jobs. This, the paper speculates, is presumably explained by the intense interpersonal relationships characteristic of small, family-based businesses, through which they are able to minimize the need for formal literacy-based communication, provide assistance and ensure control, and hence at least partly overcome the skill deficiencies of those involved in the business. The existence of a developed business service sector around the SMEs and the self-employed (banks, lawyers, book-keepers, etc.) also helps to overcome the difficulties arising from low skills.

In Hungary, an economic segment of this type as well as the educational and social institutions promoting social integration are largely missing. First, the low-educated cannot rely on the traditional small-firm sector, which was eliminated under forty years of state socialism. The SME sector that came into being after 1990 is relatively small and skill-intensive, following the North-Western rather than the Southern patterns of entrepreneurship. Second, unlike in Norway, low educated workers lack the proper competencies to attend skill-intensive jobs. Third, there is an extremely wide gap between them and their qualified compatriots in terms of participation in activities that could develop their cognitive and non-cognitive skills. These attributes severely restrict the number of jobs available for them while their exclusion from work limits their links to the rest of the society and both non-employment and social isolation constrain them in skill formation.

Addressing the questions of how such a 'low equilibrium' of social exclusion, skill deficiencies and massive unemployment has come into being, and how to get out of it, is beyond the scope of this paper. The ambition is to provide a picture of the current situation that hopefully brings us closer to understanding the relevant dimensions of the problem.

2 The literature and its suggestions for empirical research

We have a variety of explanations of why unskilled employment probabilities are below the average, all the time, in almost all developed and emerging market economies. Many of them derive the problem from country-specific institutions and policies, with the usual suspects being the minimum wage, generosity of the welfare system, poverty traps created by badly designed tax systems and the lack of active assistance. The analyses addressing these and similar institutions certainly explain part of the variation across CEE countries, all the more as they have been widely differing in their employment and welfare policies since the start of the transition. See several overviews ranging from Burda (1993) to OECD (2007b) on benefits, Cazes and Nesporova (2003) on ALMP, Vaughan-Whitehead (2010, ed.) on minimum wage policies and OECD (2013) on taxation.

All this helps little in explaining why these countries fail *as a group*. The East-West mean differential in the unskilled employment rate is much larger than the within-region variance: for the data in Figure A1, panel A, for instance, the former is 24.5 percentage points while the within-group standard deviation is 8.9 for the CEEs and 9.5 for the non-CEEs. The dominance of the between-region difference is well illustrated by the fact that a *country-level* univariate regression with only a CEE dummy on the right hand explains 61 per cent of the variance in

unskilled employment rates across the Eurostat countries.[2] A similar univariate logit estimated for the pooled European sample of low-educated (ISCED 0-2) *individuals* correctly classifies 72.7 per cent of the males, 54.4 per cent of the females and 59.4 per cent of all observations.[3]

Studies looking at the specifics of the post-communist transition might seem more promising in understanding the region's unskilled unemployment problem. The seminal model of Aghion and Blanchard (1994) demonstrates how the chosen speed of privatization, benefit generosity and the non-wage costs of private job creation can lead to low aggregate equilibrium employment under the special conditions of the transition. Low aggregate employment can induce higher inequalities *per se* through a mechanism put forward in Layard, Nickell & Jackman (1991, 307-312) at least under the assumptions of mark-up pricing, group-specific wage curves and C-D or CES technologies. Balla, Köllő & Simonovits (2008) provide a transition-specific mechanism, in which the degree of inequality during the transition depends on how the government *combines* the speed of job destruction, the level of unemployment benefits and provision of subsidies to low-productivity labor. What these and similar "optimal speed of transition" models fail to explain is why unskilled employment failed to increase *after* the transition, parallel with a remarkable rise of aggregate employment in several CEEs.

The likely explanation for this puzzle is that the post-transition recovery has so far been going hand-in-hand with further job destruction in agriculture, changes in the industrial composition, trade liberalization and the inflows of skill intensive western technologies. There is ample evidence supporting that technology imports, FDI and organizational renewal shifted the relative demand curve of skilled labor outwards i.e. implied skill-biased technological change (SBTC). The recent *increase* of demand for low-educated workers, observed in several highly developed market economies (discussed in the 'job polarization' literature by Autor, Levy & Murnane 2003, Acemoglu & Autor 2012 and elsewhere) did not reach the CEEs as yet, or, its impact has so far been offset by negative effects in the tradable sector. This is probably explained by low demand for personal services on the part of a weak and small middle class, an important driver of job polarization in the West (Manning 2004).

Whether severe downturns like the transformational recession necessarily imply *crowding-out effects* is a debated issue in the literature (Teulings & Koopmanschap 1989 and van Ours & Ridder 1995 argue for the hypothesis while Gautier et al 2002 present evidence against it). It seems that the post-communist transition did imply crowding out of primary degree holders by workers with uncertified vocational training background, who took elementary and semi-skilled positions on a massive scale, and earn a wage that is only marginally higher than that paid to their low-educated counterparts (Kézdi, Köllő & Varga 2009).

Three notes apply when the literature on industrial restructuring and SBTC is applied to transition countries.

First, this paper deals with the employment of people with *primary education background* and this is not exactly what the SBTC literature is looking at. Most papers studying the impact of SBTC are concerned with the effects of computers and R&D. As much as 41 out of 78 empirical SBTC papers reviewed in Sanders and ter Weel (2000), for instance, look at the effect of

[2] The EU LFS data from 2008 relate to the population aged 15-64 in 10 CEEs and 19 non-CEEs, both genders, excluding students. The coefficient for the CEE dummy in the regression is -0.24 with a standard error of 0.035.
[3] The estimation relates to low-educated (ISCED 0-2) people aged 15-64 excluding students. The marginal effects of living in a CEE country are -18, -5 and -12 percentage points for men, women and both genders, respectively. The data come from the 2005 Q2 wave of the EU LFS.

computers and IT, and 23 addresses the impact of R&D. Most studies investigate the impact of technological change on high school versus college graduates and even those studying the production versus non-production division deal with relatively skilled labor. In their account of what is a production worker in US manufacturing Berman, Bound and Machin (1998) showed, for instance, that in the mid-1990s 58 per cent of the production workers had high school attainment, 30 per cent had some college, and 8 per cent had college or university background. Less is known about how technological development affects those, who are genuinely unskilled i.e. lack any kind of educational or vocational qualification.

Second, the available evidence on the demand effects of trade specialization suggest that in later stages of the transition demand shifts within the tradable sector were not unambiguously detrimental for unskilled labor. Woerz (2003) and Landesmann & Stehrer (2002) indicated shifts toward higher-tech and higher-skill sectors within the Visegrad-5 group while Landesmann & Stehrer (2002) also suggested that the more developed CEEs were increasing the unit value ratios of their products. In the same time, Dulleck *et al*. (2005) pointed to a move towards the low-quality product segment within low-tech industries. A paper by Egger & Stehrer (2003) on 14 manufacturing industries in the CzR, Hungary and Poland suggested that since 1993 intermediate goods trade with the EU has accounted for a considerable *reduction* of the skilled-to-unskilled wage bill ratio. Firm survey data analyzed in Commander & Köllő (2008) suggested that FDI as well as large increases in exports had significant *positive* impact on demand for workers with primary school background in Hungary and insignificantly positive in Romania. Assembly plants employing many low-educated workers were the fastest increasing segment of the economy after 1995 in Hungary, and it probably applied to several CEEs.

Third, industrial restructuring in the CEEs coincided with privatization and the liberalization of firm entry. Relying on a matched employer-employee panel, Earle & Telegdy (2012) find that both domestic *privatization* and *FDI* had detrimental effect on the share and within-firm relative wages of blue collars albeit skilled manual and non-production workers were hit harder than the low-educated. Findings from a firm panel covering 1997-2000 (Commander & Köllő 2008) suggest that job destruction in old firms (existing already in 1989) and job creation in new firms were strongly biased against low-educated workers in both Hungary and Romania.

It was expected by many that the newly acquired *freedom of enterprise* would at least partly offset these adverse effects. The gap to be filled by newly created micro businesses was enormous as shown in Maloney (2004), which compares the levels of self-employment in the Czech Republic, Hungary and Poland to those of countries with similarly productive wage labor sectors. His data depict the three CEEs as heavy outliers in the mid 1990s. The SOE sector has remained small until recently and biased against low-educated labor, as will be discussed later.[4]

The combined effects of industrial, organizational and technological changes on unskilled *employment and wages* are well documented but our knowledge of other components of the outcome is rather limited. We have a series of unanswered questions. What kinds of jobs are filled by the lucky few, who remained in employment? Can we identify job characteristics, which promote or hinder employers in hiring low-educated applicants? Is it the composition of jobs by skill requirements or firms' willingness to rely on low skilled labor (given skill requirements)

[4] Note that Maloney's figures are slightly distorted. Family-owned farms in Romania and Poland, for instance, typically operate as unincorporated companies. Therefore these countries have low self-employment rates but relatively high small-firm density. The fraction of workers employed in small businesses including sole proprietorships is nevertheless deep below the levels measured in similarly developed countries.

that makes Hungary (and other CEEs) different? The skills survey data hopefully answer a part of these questions and help in setting the hypotheses for further research right.

3 Data

The IALS and the ALL basically intended to measure the adult population's endowments with practical skills. Respondents were tested in several fields of functional literacy such as reading simple prose, understanding and interpreting uncomplicated documents, solving easy quantitative tasks (dealing with shopping lists, invoices, etc.) and communication skills. However, in this paper I basically rely on the surveys' rich background questionnaires, which provide information on the respondents' social background, education, state of health, labor market status, job content and involvement in educational and social activities.

The key variables used in the paper are the following:

Education is measured with years in school not counting repeated years. Low education is defined as 0-10 years in school. The text provides and explanation of why this measure is superior to the ISCED codes in the given case. The share of low-educated people defined in this way is 1/5 in Norway, ½ in Italy and ¼ in Hungary for the non-student population aged 16-64.

Employment is measured with status at the time of the interview. The use of alternative indicators like having a job or labor income in the year preceding the interview, does not affect the qualitative conclusions. At the time of the ALL interview 82.8 of the Norwegians, 63.5 per cent of the Italians and 59.3 per cent of the Hungarians were employed. The figures for low-educated people were 69.6, 48.8 and 33.5 per cent, respectively.

Workplace literacy requirements. The ALL interview had 17 questions on the frequency of reading, writing and quantitative tasks at the workplace. I dichotomized these variables by setting their value to 0 for respondents answering that they "never or rarely" engage in the given activity. Other options were "more than once a week" and "less than once a week", with the latter option chosen by only a small minority of the respondents. Attaching this minority to one or the other of the two large groups has no effect on the qualitative results.

Table 1 gives a list of the tasks in question, ordered by their effect on the share of high educated workers. This effect was estimated by regressing a high educated dummy on a set of controls in the pooled ALL sample, with the literacy tasks entered one by one.[5] A wage effect was estimated in a similar way. Finally, the last column of the table shows the outcome of factor analysis of the 17 items. Skill requirements typical of trade and services (such as the reading and writing of bills and invoices, calculating prices, costs and budgets, measuring the size or weight of objects and reading numbers for tracking) have high loadings in the second factor and these items also have weak effect on the skill share and wages.

In order to keep the amount of statistics at a manageable level I use three indicators to characterize the complexity of a job: (i) ΣD_j, j=1, 2, …, 17, measuring the number of literacy tasks present at a job (ii) $\Sigma \beta_j D_j$: the weighted sum of tasks using the coefficients of the wage regression as weights and (iii) $\Sigma \gamma D_j$: the weighted sum of tasks using the odds ratios of the skill share logits as weights. Appendix Figure A2 gives an overview of how the three measures of complexity relate to each other.

[5] Entering the 17 tasks together results in many insignificant coefficients because of collinearity and small size of the sample. The controls included tenure, firm size and dummies for part time jobs, occupations, agriculture and countries.

Table 1: Literacy-related tasks at the workplace (ALL)

	Effect on skilled share[a]	Effect on earnings[b]	Factors[c]
Writing letters, memos, e-mails	5.8	0.15	1
Reading letters, e-mails	5.4	0.15	1
Reading Manuals, books, catalogues	4.5	0.14	1
Reading reports, journals	4.2	0.11	1
Using statistical data to reach conclusion	3.9	0.17	1
Reading diagrams or schematics	3.6	0.18	1
Writing reports, articles, magazines or journals	3.2	0.14	1
Writing manuals or reference books, catalogues	2.8	0.09	1
Managing time or prepare timetables	2.6	0.13	1
Writing directions or instructions	2.6	0.09	1
Reading directions or instructions	2.5	0.10	1
Calculating prices, costs, or budgets	2.1	0.12	2
Reading bills, invoices, spreadsheets	2.0	0.11	2
Counting or reading numbers for tracking	1.9	0.10	2
Writing bills, invoices, spreadsheet or tables	1.9	0.05	2
Giving or following directions using maps	1.7	0.09	1
Measuring or estimating the size or weight of objects	0.9	0.00	2

a)Odds ratios from logits. Dependent variable: the worker employed in the job has 11 or more years in school. Explanatory variables: the given task is performed more than once a week, tenure, small firm, part-time, occupation dummies, country dummies. Estimation sample: pooled sample of employed workers

b) OLS regression coefficients. Dependent variable: monthly gross earnings normalized for the country means. Explanatory variables: gender, experience, experience squared, years in school occupation dummies, small firm, part time, rural. Estimation sample: pooled sample of employed workers

c) Assignment to two principal factors depending on factor loadings. Note that for "giving or following directions" the two factor loadings are very close to each other.

Firm size. I distinguish between small and large firms (0-20 versus more than 20 employees). While the 20 workers limit is rather high, a further breakdown within the small firm category is not available. More than one third of those working in small firms are self-employed: 45 per cent in Italy, 23 per cent in Hungary but only 5 per cent in Norway.

Occupations and sectors are coded using the ISIC and ISCO codes in the ALL microdata file. The one and two digit sector codes and the two digit occupation codes are missing for Hungary. In Norway, the one digit sector code has no value for agriculture despite the fact that agricultural occupations do occur. For this reason, I used a combination of the sector and occupation codes: all cases with occupational and sector codes indicating attachment to farming are separated using an 'agriculture' dummy.

State of health. The respondent's self-assessment of their state of health is measured with four proxies: a direct question offering the response options of 'excellent', 'good', 'fair' and 'poor'. There is a question on whether ill health limits moderate activities, and two questions inquiring about being limited in the last four weeks preceding the interview. (I ignored a question about ability to climb stairs because rural Hungarians rarely or never come across multistory buildings.) Both the absolute and relative levels of ill-health depend on which proxy is used – an issue discussed later.

Literacy skills are approximated with the mean of the five plausible values for reading, writing, quantitative and communication skills, respectively, adding imputation errors. The latter is required because each respondent was asked to fill in only a part of the literacy tests. The 'plausible values' for their total test scores were estimated relying on Item Response Theory. In calculating imputation error I followed the procedure proposed in Statistics Canada 201x, xx-xx.

In general, Norwegians performed much better at the tests than Hungarians and especially Italians. In the prose tests, for instance, the estimated sample means of the five plausible values fall between 288 and 289 points in Norway, 268 and 269 in Hungary and 225 and 228 in Italy.[6] The disadvantage of the low-educated range between 29-31, 32-34 and 38-41 percentage points, respectively.

I do not use the literacy test scores on the right-hand side of any model. The data provide information on current skills – ones that carry the effect of work experience – and the survey does not contain information that could be used to eliminate the resulting endogeneity bias. Variables, which might seem to be proper instruments at first sight such as parents' education, reading habits or the frequency of attending cultural events are likely to affect employment probabilities through channels other than their impact on literacy skills.[7]

Wages. Wages have been recorded but the data are missing for many observations in ALL while the public files of IALS contain only the earnings quintile position of the respondents. With a few exceptions, I refrain from using the wage figures since the data do not allow correction for non-random selection to employment and non-response bias. The latter would be particularly important in ALL since the wage data are missing for 40 per cent of the employees in both Italy and Hungary (albeit for only 1 per cent in Norway). Furthermore, the survey contains no variables that potentially affect non-response without affecting wages.

Calculating standard errors. Statistics Canada (2011b) proposes the calculation of sampling variance for all statistics like means, shares and regression coefficients and the data file offers 30 replicate weights to make this correction possible. In multivariate models I follow the jacknife procedure suggested in the manual. I also evaluate sampling errors in simple tables when the national or within-country group means fall close to each other. However, the cross-country and between-group differentials under examination are typically enormous compared to the sampling errors. The adjusted estimates (mean ± jacknife standard error) for the unskilled employment rates, for instance, fall between 67.7 and 71.5 for Norway, 47.6 and 49.9 for Italy and 31.9 and 35.2 for Hungary. In this and similar cases we can be confident that the observed sample means (69.6, 48.8 and 33.5 in the above example) indicate statistically significant differences. Therefore, in order to keep the amount of statistics under control I generally do not attach sampling variance to the observed means and cell proportions.

Treating missing values. I apply piecewise deletion of missing observations i.e. do not restrict the analysis to respondents, for whom all variables appearing in the paper are non-missing. This would imply a major loss of sample size.

Sample size. After excluding students and persons older than 64 we are left with 4493 observations in Norway, 5830 in Italy and 4875 in Hungary. For the low educated the figures are 981, 2927 and 914, respectively.

Previous work with ALL and IALS data. Since the micro-data of ALL became publicly available only at the end of 2012, academic research has not yet produced published or pre-published results, to the best of my knowledge. For the moment, only the summaries and some country reports are available (OECD & Statistics Canada 2005, 2011). The IALS results were discussed in

[6] Section 5 discusses some doubts over comparing absolute test scores across countries.
[7] This in fact relates to wages, too. Workers employed in jobs with higher literacy requirements are paid higher wages, all else equal, while they are also likely to achieve higher levels of literacy over time. Therefore their current test scores and current wages are simultaneously affected by their literacy skills and reservation wages at the time they were selected for their jobs.

a summary report (OECD & Statistics Canada 2000) supplemented with instructions for micro-data users (OECD & Statistics Canada 2001). Micklewright & Brown (2004) provide a profound discussion of methodological problems arising in the IALS and some school-based skill surveys. Micklewright & Schnepf (2004) study the consistency of the results of different skill surveys relating to English speaking countries versus the rest of the world. Devroye & Freeman (2000) and Blau & Kahn (2000) compare the skills and wage distributions of Americans compared to Europeans using the original, continuous wage variable. Denny et al. (2004) and Carbonaro (2002) estimate augmented Mincer-type wage equations using the quintile position variable on the left hand and various literacy indicators on the right hand. McIntosh & Vignoles (2000) estimate both wage regressions and employment probits with literacy measures included on the right hand. For reasons discussed beforehand, I do not follow the approach of the latter three papers.

4 Size and employment of the unskilled population

As shown in Table 2, Italy has a large unskilled population, amounting to more than 50 per cent in 1998 and about 6 percentage points lower in 2003. The unskilled share also fell by about 4 percentage points from 28 to 25 per cent in Hungary between 1998 and 2008. In these two countries the unskilled shares based on years in school versus ISCED are similar. This is not the case in Norway, which adopted the internationally accepted classification procedure for ISCED only in 2006.[8] Therefore I use the schoolyear-based definition, which indicates a 20 per cent share for Norway in both surveys.

Table 2: Share of the unskilled

	Norway	Italy	Hungary
Low educated: 0-10 years in school, not counting repeated years[a]			
IALS	19.0	52.4	28.6
ALL	20.5	46.1	24.6
Low educated: ISCED 0-2			
IALS	11.7	55.2	28.3
ALL	12.6	48.7	24.7

The data relate to the population aged 15-64 excluding students and persons, who are older than 35 and never worked.
a) Based on question *a1* in both surveys, except for Norway in the IALS (*a8no*).

The level of unskilled employment in absolute and relative terms is shown in Table 3. The proportion of workers employed (i) at the time of the interview and (ii) at least once in 12 months prior to the interview follows similar patterns across countries: Norway has a 30-35 percentage points advantage over Hungary while Italy is halfway between the two countries. In terms of full time equivalent employment Italy gets close to Norway and Hungary's disadvantage diminishes but remains substantial.

Since this paper is primarily concerned with the issue of social inclusion I put the dividing line between *no work* and *some work* i.e. do not distinguish between full-time and part-time employment. While it is true that part-time work generates lower income, it allows formal and informal on-the-job training and can deliver most of the non-wage benefits from work such as a structured everyday life, social contacts, appreciation, self-esteem and the feeling of usefulness[9].

[8] See EWCO (2009). As a result, the unskilled share jumped from 10 to 20 per cent.
[9] See a seminal lecture by Marie Jahoda (1979) for a profound discussion of these benefits.

From the two indicators measuring the *incidence* of work I choose the first one (employed at the time of the interview) in order to maintain comparability with LFS-based and other stock-type data.

Table 3: Employment rates of the low-educated using alternative definitions of employment

	IALS			ALL		
	Norway 1998	Italy 1998	Hungary 1998	Norway 2003	Italy 2003	Hungary 2008
Employment to population ratios (per cent)[a]						
Employment rate[b]	68.5	58.4	36.7	69.8	60.8	33.9
FTE employment rate[c]	57.9	61.3	40.5	63.4	59.5	34.1
Had paid job in year t-1[d]	78.7	62.2	43.6	77.4	63.0	42.4
Relative to the high-educated (those with 11 or more years in school = 1)						
Employment rate[b]	0.79	0.76	0.50	0.81	0.74	0.49
FTE employment rate[c]	0.74	0.84	0.51	0.79	0.76	0.49
Had paid job in year t-1[d]	0.83	0.77	0.55	0.85	0.67	0.57

a) Employment is compared to the population aged 15-64 excluding full-time students and persons, who are older than 35 and never worked before. b) Employed at the time of the interview c) FTE stands for full-time equivalent employment. Each person contributes to FTE with $h/40$ units, where h denotes weekly working hours d) The respondent is employed, or non-employed but had a paid job in 12 months preceding the interview.

One might argue that the labor market status of unskilled people should be measured with their *unemployment rate* rather than the employment to population ratio since the non-participants withdraw from the market at will. The results would be similar: in the IALS the self-reported unskilled unemployment rates were 5.2, 9.9 and 27.1 per cent in Norway, Italy and Hungary, respectively, while the corresponding figures in ALL were 5.9, 15.2 and 36 per cent. The latter are 1.3, 1.7 and 3.3 times higher than the skilled unemployment rates. However, from the point of view of social inclusion and skills formation the dividing line is clearly between work and no work rather than between labor force participation and inactivity.

Table 4: Probability of employment - Average partial effect of low education after logit

	IALS			ALL		
	Norway	Italy	Hungary	Norway	Italy	Hungary
Total	-0.120	-0.140	-0.227	-0.109	-0.266	-0.309
	(0.024)	(0.022)	(0.028)	(0.019)	(0.018)	(0.021)
Men	-0.069	-0.028	-0.226	-0.059	-0.097	-0.345
	(0.029)	(0.032)	(0.030)	(0.021)	(0.019)	(0.033)
Women	-0.173	-0.234	-0.231	-0.171	-0.355	-0.279
	(0.035)	(0.024)	(0.026)	(0.034)	(0.027)	(0.028)
Women (adj.)[a]	-0.171	-0.214	-0.228	-0.171	-0.281	-0.277
	(0.036)	(0.029)	(0.026)	(0.034)	(0.031)	(0.028)
Total (adj.)[a]	-0.119	-0.119	-0.224	-0.109	-0.183	-0.304
	(0.024)	(0.024)	(0.019)	(0.020)	(0.017)	(0.022)

Standard errors in parentheses. Controlled for age, age squared, rural residence, migrant status and gender in the first and last rows. Dependent variable: employed at the time of the interview. Low-educated = 0-10 years in school. Average marginal effects have been calculated with Stata's *margeff* procedure. xx

The raw differences between the employment rates of low and high skilled people partly stem from compositional differences, may vary by gender and affected by the choice of the reference population. To account for these variations Table 4 reports regression- adjusted differences for several sub-populations.

The effect of low education is controlled for age, age squared, rural/urban residence and migrant status and the equations are estimated for both genders and men and women separately. The estimations for women and both genders are repeated after excluding people older than 35, who reported that they never worked before. Slightly less than 5 per cent of the pooled sample belongs to this category, of which 89 per cent are female, 93 per cent do not look for jobs, 81 per cent are low educated and 97 per cent are Italian. Low educated Italian women constitute the dominant group (86 per cent) within the excluded population. The intention is to restrict the attention to the population attached to the labor market under the best guess that the vast majority of those, who did not work at all in the first 15-20 years of their post-school lifetime, and do not look for jobs now, are unlikely to enter the labor market later.

The estimates for Norway indicate an 11-12 percentage points disadvantage of the low educated (6-7 per cent for men and 17 per cent for women) in both IALS and ALL that is robust to the inclusion/exclusion of the unattached population. In Hungary, the gender differentials are small, the estimates are practically equal for the total and restricted samples but the data indicate a major deterioration over time. The disadvantage of unskilled males grew from 23 percentage points in 1998 to 35 in 2008 and the skilled-unskilled gap widened from 22 to 30 points in the whole population. A similar deterioration is observed in Italy over a five-year period, especially with women. This is probably explained by fast changes in the composition of the working age population i.e. the inflows of young women with college and university background and the outflows of 'mammas', who spent their entire active lifespan as 'inactive' (working hard at home, that is). The gender differentials are large even in the restricted sample: the skilled-unskilled gaps were 3 per cent for men but 21 percent for women in the IALS, which grew to 10 and 28 per cent by the time of the ALL. The total low educated population's disadvantage grew from 14 to 27 percentage points while in the restricted sample the magnitude of change was smaller: a growth from 12 to 18 percentage points.

It is hard to decide how to deal with the prevalence of lifelong female inactivity in Italy and how to choose the population that is relevant for the problems addressed in the paper. The key question is whether we only observe a special, southern-type division of gender roles (and the resulting unequal sharing of employment opportunities) that has no effect on the aggregate level of unskilled employment, or, the case is that massive female inactivity actually reduces the number of jobs available for the entire unskilled population. In the long run, reality is probably better described by the second option: more women in the labor force would predictably do more than just crowding out some men from their jobs. It would reduce the costs of job creation through several channels (lower recruitment costs, wage push, less of the skills-related and geographic mismatch) and stimulate employment growth. However, in this paper concerned with the status quo at a point in time, it seems justified to regard the level of unskilled employment as given and consider gender differentials a distributional issue. To the extent this reasoning is right, it is defensible to look at the employment probability of the entire low educated population after excluding those, who are not (had never been and predictably will never be) attached to the labor market. Therefore I regard the coefficients in the last row of Table 4 as the first best estimate for the employment gaps between high and low educated people. The average partial effects indicate a relatively small difference between Norway and Italy and an enormous gap between any of these countries and Hungary.

It is worth noting that any comparison with Italy is subject to omitted variable bias because of its exceptionally large low educated population. It is likely that (i) the median unskilled person is located higher in the ability ranking in Italy than in Hungary and Norway and (ii) unobserved ability affects employability through channels other than its effect on schooling. If we were able

to control for ability, the estimates for Italy would indicate a wider employment gap between low and high educated people.

Appendix Figures A2-A3 and Table A1 provide supplementary information on the low educated population and its employment level, based on the ALL. The histograms of Figure A3 show that the population is nearly normally distributed by completed schoolyears in Norway with a mode at 12 years. In Italy, three large groups stand out at 5, 8 and 13 years. In Hungary, the largest groups have 8 (primary), 11 (uncertified vocational) and 12 (secondary) years in school. A justification for setting the upper limit for low education at 10 years in school is given in Figure A4, which shows the fraction of respondents classified as ISCED 0-2 by single years in school. In both Italy and Hungary the fractions suddenly fall as we step from 10 to 11 years in school. The data for Norway are incomparable as was discussed earlier.[10] Table A1 compares the number of schoolyears completed by low and high educated people. The high-educated had 13.5-13.8 years in school in the three countries on average while the low-educated seem to have longer records in Norway (8.8 years) than in Hungary (8.1 years) and Italy (7.2 years)[11]. In relative terms, the school career of low educated people are equally long in Norway and Hungary but shorter in Italy. Finally, Figure A5 shows employment rates by years in school. While the profiles for Norway and Italy decrease monotonously as we move towards less educated people, the Hungarian profile breaks between 11 and 10 years in school.

5 Notes on relative skills, wages, ill-health and the informal economy

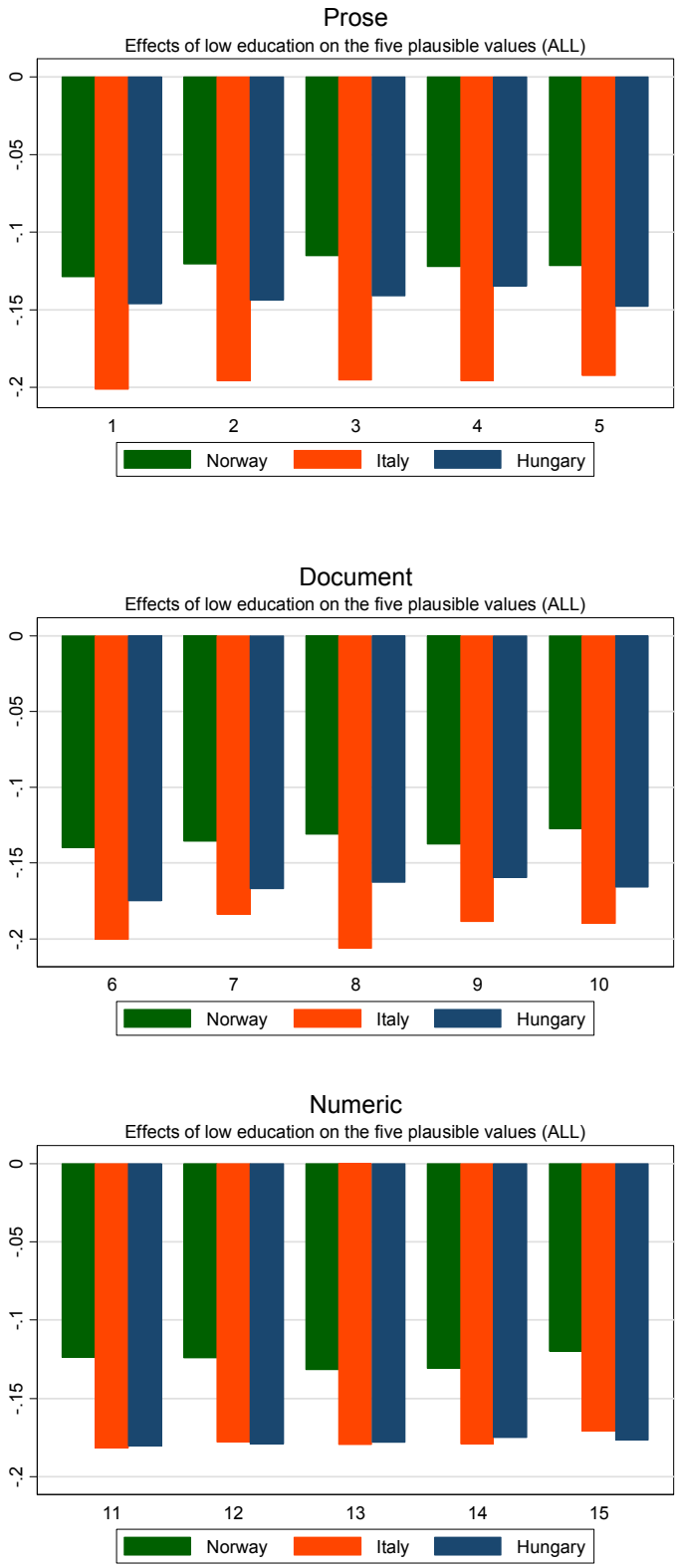
In this section I briefly touch upon some plausible-looking explanations for the exceptionally low unskilled employment levels in the CEEs: particularly severe skill deficiencies, high wages, poor health and informal work.

Are the unskilled 'very unskilled' in Hungary and other CEEs? It seems they are not, not at least in terms of the cognitive skills measured in the literacy surveys. Figure 1 presents estimates of the effect of low education on each of the five plausible values for prose, document and numeric tests in ALL.[12] The low-educated perform worse relative to the high educated in Hungary than Norway but better or equally well than in Italy. This result is consistent with those in the IALS: in a ranking of 21 samples from 18 countries by the relative performance of the low educated (measured with the first plausible value for prose) the Czech Republic ranked 3rd , Hungary 9th, Poland 17th and Slovenia 20th. The two surveys do not support the belief that the skills gap between low and high educated East Europeans is exceptionally wide.[13]

A note on absolute test performance applies at this point. In a globalized world skill deficiencies i.e. low skills in *absolute* terms may exclude the low educated from employment irrespective of how their competencies relate to those of their high educated compatriots. In this sense the unskilled perform worse in the CEEs: in the IALS the Czech Republic was ranked 8th , Hungary 16th, Poland 18th and Slovenia 21st. However, there are several facts making the observer suspicious about cross-country comparisons in terms of absolute test performance. It is hard to believe that Norwegian laborers employed in elementary occupations have higher cognitive skills (268 points in ALL) than do Italian professionals (266 points). It is also hard to accept as

[10] The share of ISCED 0-2 falls from 60-66 per cent at 0-9 years in school to 33 per cent at 10 years and 11 per cent at 11 years in Norway.
[11] The differences in both educational categories remain significant after accounting for sampling error.
[12] Since the plausible values were regressed on the expanatory variables one by one there was no need to calculate imputation error. Its magnitude can be assessed from differences in the height of the bars.
[13] Throughout these parapgraphs I use the first plausible value estimates for the prose test for sake of illustration.

Figure 1: Plausibe values of test performance adjusted for gender age, residence and migrant status (ALL)



true that the absolute level of test performance so admirably improved between 1998 and 2008, in each and every Hungarian birth cohort, as suggested by the IALS and ALL data (see Figure A6). It is quite obvious that the absolute measures are affected by the quality of the questionnaire's translation, familiarity with testing and the situations described in the tests as well as by the rigorousness of supervision. Therefore I stay away from the cross-country comparison of test scores and leave the question of competency *levels* open.

The benchmark explanation of why the unskilled labor market fails to clear refers to the constraints of *wage adjustment*. The incomplete wage data at hand suggest that low educated Hungarians have poor employment prospects despite having significantly *lower* absolute and relative wages than have their Norwegian and Italian counterparts. The former claim is obvious while the latter is supported by the wage regressions in Table 5.[14] When wages are controlled only for gender and experience, unskilled wages appear to be lower by 0.27 log points in Norway, 0.47 in Italy and 0.67 in Hungary. Adding occupation, firm size, rural residence and migrant status modifies the estimates to -0.2, -0.35 and -0.49 log points, respectively. When skills are also controlled for (using the first plausible value for the prose tests again) the Norwegian estimate falls to -0.13, the Italian to -0.32 and the Hungarian to -0.39. The latter two coefficients are statistically equal according to an F-test. While the results, unadjusted for selectivity and non-response bias, should be treated with caution they call into question if unskilled wages are higher in relative terms in Hungary than in the two comparators.

Table 5: OLS estimates of the wage effect of low education

	Norway	Italy	Hungary
Specification 1	-0.272***	-0.469***	-0.671***
	(0.041)	(0.051)	(0.109)
Specification 2	-0.209***	-0.348***	-0.486***
	(0.058)	(0.050)	(0.119)
Specification 3	-0.139***	-0.319***	-0.391***
	(0.058)	(0.056)	(0.114)
No. of observations	3739	1891	1988

Dependent variable: log gross monthly earnings calculated using information on type of payment (D39), weekly working time (D37) and reported earnings (D41). Sample: employees
Specification 1: controlled for gender, experience and experience squared
Specification 2: also controlled for rural residence, migrant status, firm size and occupation
Specification 3: also controlled for mean score at the prose tests
Jacknife standard errors in parantheses. Significant at the ***) 0.01 level.
Note that the estimates are unadjusted for selection and non-response bias

Another suspect blamed for massive non-employment is *ill-health*. Indeed, a much larger part of Hungarians complain of poor health in general (blocks 1 and 2 in Table 6). However, the suspicion that this result has to do with a 'culture of complaining' is hard to avert: when it comes to more specific questions (blocks 3-5) the Hungarian results become similar to the Norwegian ones. Italy stands out for less frequent complaints irrespective of how the questions are asked. Table 5 also suggests that low educated Hungarians do not complain more in *relative* terms than do their Norwegian and Italian counterparts.

[14] Average annual earnings in Hungary evaluated at current USD exchange rate amounted to 20 per cent of the Norwegian and 36 per cent of the Italian levels. In terms of PPP-adjusted levels the respective figures were 51 and 57 per cent in 2003. See http://stats.oecd.org/Index.aspx?DatasetCode=AV_AN_WAGE downloaded on May 16, 2013

Table 6
Level of education and proxies of state of health (ALL)

	Norway	Italy	Hungary
State of health: fair or poor			
Skilled	12.0	9.4	26.1
Unskilled	26.6	22.2	55.3
Ratio	2.2	2.4	2.1
State of health: poor			
Skilled	3.3	1.3	5.3
Unskilled	9.3	5.0	15.1
Ratio	2.9	3.9	2.8
Ill health limits moderate activities			
Skilled	12.6	7.3	18.5
Unskilled	25.3	17.6	38.4
Ratio	2.0	2.4	2.1
Last 4 weeks: did less because of ill health			
Skilled	20.0	14.5	18.3
Unskilled	30.6	17.7	36.4
Ratio	1.5	1.2	2.0
Last 4 weeks: ill health limited work/activity			
Skilled	20.2	9.3	20.2
Unskilled	31.7	14.8	28.8
Ratio	1.6	1.6	1.4

The association between ill health and non-employment is strong in both Norway and Hungary. The question of whether the penalty of ill health is stronger for the low educated is addressed by estimating a logistic regression, which includes ill health, low education and the interaction of the two (Table A2). Our point of interest is the interaction effect that is relatively difficult to assess. As shown in Norton, Wang & Ai (2004) the full interaction effect of two dummy variables after logit can be calculated as in (1), where the β-s are the coefficients for the first and second dummies and their interaction, respectively:

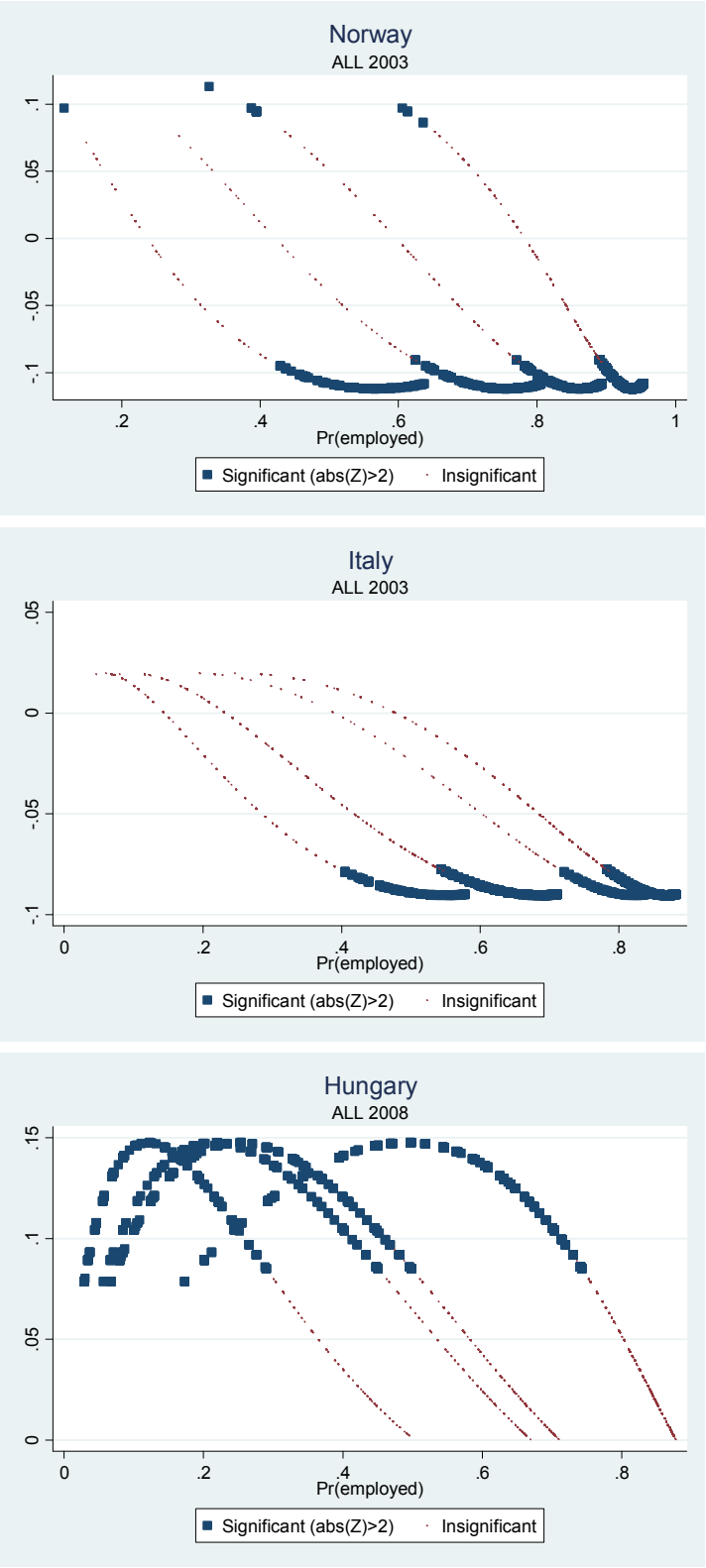
$$(1)\quad \frac{\Delta^2 F}{\Delta x_1 \Delta x_2} = \frac{1}{1+e^{-(\beta_1+\beta_2+\beta_{12}+X\beta)}} - \frac{1}{1+e^{-(\beta_1+X\beta)}} - \frac{1}{1+e^{-(\beta_2+X\beta)}} + \frac{1}{1+e^{-X\beta}}$$

Note that the sign, magnitude and significance of the cross derivative may vary from case to case. Table A2 presents the distribution of the cases by the sign and significance of the interaction effects while Figure 2 plots them against the predicted probabilities of being employed. In both Norway and Italy the interaction effects are negative and significant for a few cases with high predicted employment probabilities (i.e. for prime age urban males) while in Hungary nearly all the significant interaction effects are positive, suggesting that ill health actually has a stricter penalty in the case of high educated people. The ALL data do not support that ill health and unemployment are particularly strongly correlated among the low educated Hungarians.

Last but not least, unskilled employment can be seemingly low if unqualified people *work informally* on a massive scale and do so more frequently than their skilled counterparts. Hungary has a relatively large informal economy compared to Norway but not to Italy. Schneider's (2002) estimates, for instance, are 25, 19 and 27 per cent for the three countries, respectively, and other sources hint at similar relative rankings. Furthermore, the ILO-OECD employment figures, which fall very close to the self-reported ones, actually include a large part of the unregistered work.

Figure 2: Full interaction effect of low education and ill health (ALL)

Health proxy: health is fair or poor (rather than good or excellent)



There was a 13 percentage points gap between LFS-observed and registered (by the tax office) employment for low educated Hungarians in 2011, for instance. Other data and research results cited in Benedek, Elek & Köllő (2013) suggest that black work, unobserved in the LFS, may not be particularly frequent with the low educated: the reviewed studies suggest narrower-than-average gap between their declared consumption and income, lower life satisfaction holding declared household income constant and less frequent receipt of envelop wages i.e. an official minimum wage supplemented with informal side payments. Any explanation blaming the hidden economy for low (observed) unskilled employment in the CEEs ought to address and falsify an abundance of contradicting evidence.

6 Who employs low educated workers?

6.1. An introductory regression

As a first pass at the data of our interest, I estimate a descriptive logistic regression, in which the units of observation are job-worker matches, which were created $t \geq 0$ years ago and survived until the date of the interview. The covariates are job-specific or employer-specific. The dependent variable is 1 if the worker employed in the job is low-educated and 0 otherwise.

Ideally, one would like to address the question in the section's title by looking at the point of hiring (estimating a matching function including both employer and employee characteristics) and also analyzing how the survival of a match depends on skills, skill requirements and other variables. Even with only cross-section data at hand a McFadden model with alternative-specific covariates such as education-specific reservation wages would be superior to what is estimated in Table 7. (See Appendix Box 1 for an explanation). In lack of data from the past and because of the questionable value of the wage data we content ourselves with a descriptive logit, which basically describes how the *unskilled share* varies with job and firm characteristics.

In both Norway and Italy, the unskilled shares steeply rise as we move towards older matches (longer tenure). This is not the case in Hungary, where the average partial effect of tenure amounts to only 1/6 and 1/8 of the levels measured in the other two countries. This result together with some further data suggest that (i) the jobs attended by low educated Hungarians before the transition had a low probability of surviving until 2008 (ii) their jobs are short-lived today.[15]

Literacy tasks required in the job have strong negative effect on the unskilled share in Norway and Italy and slightly weaker in Hungary. In other words, in Hungary the unskilled share does not increase as steeply as we move towards simple jobs – a pattern discussed in detail in the rest of the section.
Small firms employ more unskilled workers in Italy (by 10 per cent) and less in Hungary (by 2 per cent) while the respective coefficient for Norway is zero. The contrast between Italy and Hungary will also be discussed later in this section.

Managerial and other skilled jobs employ significantly less low educated workers, and the unskilled shares are practically equal in elementary and semi skilled occupations such as

[15] As shown in Appendix Table A3, in Norway and Italy the unskilled shares exceed or equal to the population shares in job-worker matches older than 20 years (32 and 46 per cent), and they monotonously decrease as we move towards new matches. By contrast, the unskilled share is only 14 per cent in the oldest matches in Hungary, compared to a population share of nearly 25 per cent, and it varies in a range of between 12 and 14 per cent in 2-20 year old matches. The unskilled share is the highest (19 per cent) in the youngest jobs with shorter than 2 years of tenure.

assembly work. The unskilled share is substantially higher in agriculture than elsewhere, especially in Italy and Hungary. Finally, part-time jobs employ less low educated workers in all countries but this result is significant only in Italy and (less so) in Norway.

Table 7: The probability of employing a low educated worker (ALL)
Average partial effects after logit, per cent

Dependent variable: the worker employed in the job is low educated (had 0-10 years in school)

	Norway	Italy	Hungary
Age of the match (tenure) in years	0.8***	0.6***	0.1***
	(14.2)	(11.3)	(2.7)
Number of literacy tasks	-2.0***	-3.2***	-1.7***
	(11.3)	(25.8)	(15.5)
Small firm (less than 20 workers)	0.5	10.3***	-1.7**
	(0.3)	(7.7)	(2.2)
Firm size unknown	..	-4.8**	0.4
	..	(2.3)	(0.4)
Managerial job	-17.4***	-23.6***	-19.1***
	(4.0)	(7.0)	(13.4)
Professional job	-15.3***	-21.2***	-8.6***
	(7.9)	(14.5)	(13.5)
Semi-skilled job	-9.0*	-6.4*	-2.1
	(1.9)	(1.7)	(1.11)
Occupation unknown	-18.2***	-25.4***	-15.6***
	(4.6)	(8.3)	(10.5)
Agriculture	7.1*	16.2***	22.2***
	(1.7)	(5.5)	(5.3)
Part time job	-2.3*	-7.7***	-1.4
	(1.8)	(6.6)	(1.4)
Number of observations	3626	3260	2712

Significant at the *) 0.1 **) 0.05 ***) 0.01 level. Z-values based on jacknife standard errors in parantheses. The equations were estimated with survey logit allowing for sampling error, using the 30 replicate weights offered in the ALL microdata file. The average partial effects were calculated with Stata's *margeff* procedure. The reference category for occupations is non-agricultural elementary occupations. Agriculture was defined on the basis of ISIC and ISCO codes: ISIC1=A and/or ISIC2=0100 and/or ISCO = 1211, 1311, 6000-6210 or 9200-9213.

In the rest of this section I look at the effects of job complexity and firm size in more detail.

6.2. More on the effect of skill requirements

In order to disentangle the effects of job composition (by complexity) and employers' willingness to employ low educated workers (given complexity) I decompose the unskilled employment to population ratio in the following way:

$$(2) \quad \sum_{j=1}^{17} \frac{E_j^L / E_j}{P^L / P} \cdot \frac{E_j}{P} = \sum_{j=1}^{J} \varphi_j \Omega_j = \frac{1}{P_L} \sum_{j=1}^{J} E_j^L = e_L$$

where E_j stands for the number of employed persons in jobs requiring j=0,1,...,17 literacy tasks, L refers to low educated people while P and P^L denote the size of the total and the low educated

populations. The first term in the first expression (φ) measures the representation of the low educated in *j*-type jobs, with φ_j=1 meaning that their share in *j*-type employment is equal to their population share. We might call φ a *share effect*. The second term (Ω) measures the ratio of total employment in *j* type jobs to the total population attached to the labor market. This might be called a *size effect,* which indicates how many j-type jobs are 'at the disposal' of the entire labor force. The product of the share effect and the size effect ($\varphi\Omega$) measures the contribution of *j* type jobs to the unskilled employment to population ratio in percentage points (e_L). The results are presented in Figure 3.

Starting with the size effect (upper panel), we see that in Norway the modal job involves 10 different literacy-related activities. By contrast, in both Italy and Hungary the largest group of jobs requires no literacy tasks (present in our list) at all. The Italian economy operates a particularly large number of very simple jobs. The curves for these two countries fall close to each other but Italy's higher aggregate employment rate is reflected in a larger area below its curve.

The share effect shown in the middle panel indicates that many low educated Norwegians attend complex jobs: their share in employment exceeds their population share in the domain of 0-8 literacy tasks unlike in Italy and Hungary, where low educated people are under-represented in jobs requiring more than 3 tasks. Compared to Hungarians, low educated Italians have a higher probability of being employed in all categories of jobs.

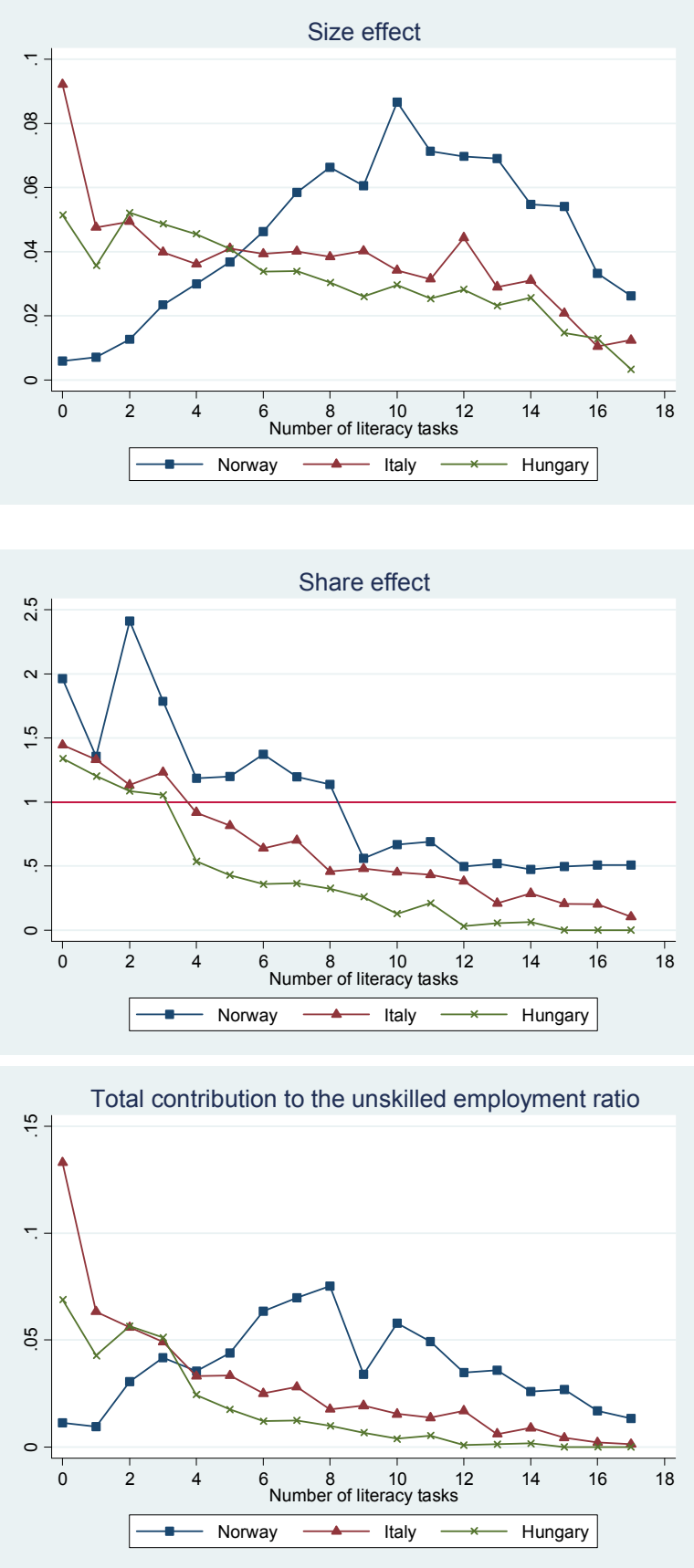
Finally, the bottom panel of Figure 3 plots the contributions of job types to the unskilled employment ratio. In Norway, the bulk of unskilled employment comes from jobs requiring 6-11 different literacy tasks. In Italy, simple jobs demanding no literacy and numeracy at all play the most important role and the contributions monotonously decrease as we move toward complex workplaces. Hungary follows a similar pattern but the contributions are smaller at almost all levels of complexity.

The patterns arising in Figure 3 remain valid if we distinguish the literacy tasks by their effects on wages and/or skill intensity and characterize each job with a weighted sum of the tasks present in the job, as was discussed in the Data section. Appendix Figures A7 and A8 depict the same picture as we saw here: Norway offers much more complex jobs than either Italy or Hungary and Italy provides more simple jobs than does Hungary. The low educated are over-represented even in relatively complex jobs in Norway while their Hungarian counterparts are under-represented everywhere except the least demanding workplaces. Italy is halfway between the two extremes. [16]

Note that the 'share effect' discussed here is a relative indicator: it measures low educated people's risk of being in a *j*-type job relative to the average citizen's risk. Since the low educated population is roughly twice as large in Italy as in the other two countries the unskilled share (unadjusted for the population share) is the highest in Italy in almost all categories of jobs. Furthermore, in decomposition (2) the employment figures are normalized for the respective populations. Appendix Figure A7 provides additional information by showing the distribution of low educated workers' jobs (E_j^L/E^L rather than E_j^L/P^L) and the unskilled share in each category of jobs (E_j^L/E_j rather than $[E_j^L/E_j]/[P^L/P]$). The job distribution is skewed at 6-10 tasks in Norway, zero in Italy and 0-4 in Hungary. The shares are high in the domain of simple jobs not only in Italy but also in Norway and very low in Hungary throughout the distribution.

[16] The alternative complexity measures are continuous therefore I use histograms and lowess curves in this case.

Figure 3: Decomposition of the unskilled employment to population ratio



6.3. More on small firms

The unskilled share is significantly higher in small firms in Italy while small firm size has negative effect in Hungary and no effect in Norway. Table 8 suggests that this contrast is only partly explained by a higher share of simple jobs in Italian small businesses. Small firms' higher propensity to employ low educated labor and/or unskilled people's better chance to run simple sole proprietorships are equally important. The marginal effects for small firms in equations controlled for tenure, occupation and part time dummies indicate a 14-16 percentage points gap between Italy and Hungary, which drops to 7-9 percentage points i.e. does not disappear when the equation is also controlled for the presence of different literacy tasks (Table 8).

Table 8: The effect of firm size on the probability of employing a low educated worker (ALL)
Average partial effect of firm size after logit, per cent

Dependent variable: the worker employed in the job has primary education attainment

Specifications:	Norway	Italy	Hungary
Small firm dummy	-1.0	11.1***	-3.8***
	(0.5)	(5.4)	(3.4)
+ age of the match	0.6	12.1***	-4.0***
	(0.4)	(8.4)	(5.3)
+ occupation, agriculture and part-time dummies	0.5	12.2**	-2.0***
	(0.3)	(8.7)	(2.7)
+ literacy tasks			
- number of tasks	0.5	10.2***	-1.7**
	(0.3)	(6.0)	(2.1)
- number of tasks adjusted for wage returns	-1.6	8.7***	-2.0**
	(0.0)	(6.0)	(2.1)
- 17 dummies, one for each task	-1.5	7.0***	-1.5**
	(1.0)	(6.0)	(2.1)

Significant at the *) 0.1 **) 0.05 and ***) 0.01 level. Reference category: firms employing more than 20 workers. Z-values based on jacknife standard errors in parantheses. The equations were estimated with survey logit allowing for sampling error, using the 30 replicate weights offered in the ALL microdata file. The average partial effects were calculated with Stata's *margeff* procedure. XXX

It seems that Italian small businesses manage the gap between skills and skill requirements quite successfully. As shown in Table 9, the skill shares are similar in large and small firms in jobs requiring no literacy tasks while a wide gap opens as we move toward more complex jobs. This is not the case in Norway and Hungary, where small firms employ a larger or equal percentage share of low educated workers than do large companies.

Table 9: The share of low educated workers in small and large firms (ALL)

	Norway		Italy		Hungary	
Literacy tasks:	Large	Small	Large	Small	Large	Small
Zero	..	..	72.3	73.7	31.5	37.0
1-5	31.6	25.8	47.1	65.0	25.7	13.2
6-10	19.8	17.3	21.9	34.0	7.1	7.3
11-17	10.9	11.2	11.9	19.0	2.0	0.8
Total	17.2	16.2	34.0	45.4	15.4	10.9

..) Skipped because of less than 50 observations

7 How the low educated Norwegians and Italians are able to attend skill-intensive jobs?

In this section I discuss three mechanisms potentially explaining how the gap between skill requirements and low education can be bridged. First I present data on adult training, informal learnings and community activites, which potentially develop the cognitive and non-cognitive skills of adults with primary school beckground. Second, I present data on how cognitive skills (as measured by test scores) rise as we move toward more complex jobs under the expectation that a stronger association hints at either more effective selection or a higher degree of learning by doing. Finally, the section speculates on how Italian small firms and sole proprietorships can manage the skill deficiencies of those involved in the business.

7.1. Adult training and informal learning

In the preceding sections we found that low educated Norwegian workers often make it to skill intensive jobs: the vast majority of them (80 per cent) are employed in workplaces, which require 4 or more literacy-related tasks and more than 50 per cent attend jobs involving 7 or more tasks. (The respective figures are 36 and 19 per cent in Italy and 22 and 9 per cent in Hungary). Educational attainment alone can hardly explain this sharp contrast: the median Norwegian low educated person had 9 years in school as opposed to 8 years completed by Italians and Hungarians.[17]

Norway's success could best be described as a kind of 'high equilibrium', in which adult training, informal learning activities and integration to the civil society generate skills and allow access to skill-intensive employment which, in turn, is itself a source of cognitive and non-cognitive competencies and a bridge to social inclusion. The question of causation remains unsolved: with cross-section data at hand we cannot aim at unraveling the 'chicken or the egg' problem. What the data can show is how dramatic the cross-country differences are in *all* dimensions of the problem area. The discussion is supported by data in Tables 10, 11 and 12.

First of all, there is clean-cut disparity in the intensity of *adult training*. As shown in Table 10, no more than 5.7 per cent of the unskilled Hungarians and Italians participated in formal training in 12 months prior to the ALL interview as opposed to 33 per cent of the Norwegians. These rates amount to 29, 22 and 58 per cent of the levels measured with high educated adults.

Second, uneducated Norwegians engage in *informal learning activities* at rates that exceed the Italian and Hungarian levels by factors between two and six. The ALL questionnaire has nine questions on such activities ranging from visiting fairs and workshops to learning by watching, copying, trial and error and practicing. While nearly all Norwegians (90 per cent) are involved in at least one of these activities, only 40 and 27 per cent of the Italians and Hungarians do so. The gap between low and high educated Norwegians in minimal in the field of learning by doing and following personal advice and significantly smaller than in the other two countries when it comes to learning by reading and attending events.

[17] Note that the Norwegian educational system does not perform brilliantly at the PISA tests for 15 year old students – the age when our subjects complete their studies. In 2000-2006 Norway was ranked 13th, 19th and 24th in reading, maths and science while the respective rank numbers were 20, 22 and 25 for Italy and 22, 25 and 15 for Hungary out of 30 countries. In 2009 the ranks were 21, 24 and 12 (Norway), 29, 35 and 26 (Italy) and 35, 22 and 29 (Hungary), out of 74 countries. http://en.wikipedia.org/wiki/Programme_for_International_Student_Assessment

Table 10: Potential sources of skills - Selected indicators (ALL)

	Levels[a]			Relative to the high educated		
	NO	IT	HU	NO	IT	HU
School-based education						
Completed schoolyears (mean)	8.8	7.2	8.1	0.64	0.52	0.59
Completed schoolyears (median)	9	8	8	0.60	0.62	0.67
Adult training						
Took training in last 12 months	33.4	5.7	5.7	0.58	0.22	0.29
Informal learning activities						
Visit trade fairs, professional conference	20.2	8.7	2.5	0.49	0.32	0.13
Attend lectures, seminars, workshops	28.1	3.7	4.6	0.44	0.15	0.19
Read manuals, reference books, journals	51.6	16.9	10.4	0.57	0.35	0.31
Museums, art galleries, etc.	19.0	9.2	1.9	0.53	0.32	0.13
Use computer/internet not part of a course	43.2	8.6	3.4	0.54	0.21	0.14
Use video, television, tapes to learn	34.6	13.7	7.6	0.71	0.51	0.43
Learn by watching, getting help/advice	63.5	22.0	11.5	0.75	0.49	0.35
Learn by trying things out, practice	86.3	23.3	13.5	0.89	0.51	0.36
Learn by being sent to an organization	16.2	2.9	6.3	0.58	0.23	0.55
At least one item in the above list	*90.3*	*40.6*	*27.6*	*0.94*	*0.53*	*0.48*
Other sources of literacy						
Reads newspapers[b]	99.3	76.1	80.1	1.00	0.82	0.84
Reads magazines[b]	99.3	73.8	67.8	0.95	0.78	0.74
Reads books[b]	86.6	38.5	43.8	0.90	0.51	0.55
Uses a computer[b]	76.7	24.4	28.9	0.79	0.35	0.38
More than 24 books at home	85.3	44.4	57.5	0.97	0.58	0.66
Work as a source of literacy[a]						
Index for all tasks	5.7	2.5	1.0	0.64	0.36	0.21
Index for Type 1 tasks	4.0	1.5	0.7	0.63	0.29	0.18
Index for Type 2 tasks	2.2	1.0	0.6	0.73	0.42	0.34

a) Per cent, except for the first and last two rows. b) At least occasionally c) Employment rate times the mean number of Type 1 (Type 2) job-related literacy tasks performed by those in employment

Third, a similar gap can be observed in reading *books*, using *computer* and having books at home. In this respect the Norwegian levels are 2-3 times higher than the Italian and Hungarian ones and the distances between low and high educated people are minimal (in reading and owning books) or small (in using computer). The cross-country differences in reading newspapers and magazines are less striking but even in this case the Italian and Hungarian levels lag behind by 20-30 percentage points.

Last but not least, there is substantial difference in the role of *work as a source of literacy*. I approximate the feedback from work to the skills of the average low educated person by creating and index, which takes into consideration the employment probability, on the one hand, and the complexity of jobs held, on the other. The product of the employment rate and the mean number of literacy related tasks to be performed at work (i.e. the share of the population exposed to literacy requirements at work times the degree of exposure) roughly captures the strength of the feedback in question. As shown in the last block of Table 10, there is a fivefold difference between Norway and Hungary and a more than twofold difference between Norway and Italy in this respect. The gap is particularly wide in the case of Type 1 tasks which require proficiency in reading and writing letters, notes, reports and other office-type documents.

Labor market success depends on both cognitive and non-cognitive skills like interpersonal and communication skills, dependability and docility as demonstrated in a series of studies ranging

from an early work by Bowles & Gintis (1976) to a series of more recent papers by James Heckman and several co-authors (Heckman & Rubinstein 2001, Heckman, Sixtrud & Ursua 2006). While the ALL survey tells nothing about non-cognitive skills directly it does provide information on activities, which are known to develop some of these skills. Social encounters in which the low educated meet, communicate and interact with high educated people, share common goals and work together to reach them are typical engines of development. The ALL questionnaire had a dozen of questions on participation in such activities and civil organizations including political, cultural, sports, religious and community groups, fundraising, charity and other volunteer activities. Table 11 collects the data on participation by unskilled people.

Table 11: Low-educated people's participation in selected activities (ALL, per cent)

	NO	IT	HU	NO	IT	HU
Participation in organizations/groups						
Political	6.9	2.0	0.9	0.71	0.31	0.45
Sports or recreation	25.0	8.5	1.9	0.61	0.44	0.24
Cultural, educational or hobby	17.5	4.4	2.1	0.63	0.33	0.26
Service club	16.8	4.2	n.a.	1.05	0.49	n.a.
School or community group	20.2	4.6	1.9	0.74	0.67	0.39
Group of worship	7.8	8.5	4.6	1.03	0.75	0.80
Other group, organization	19.3	2.1	3.3	0.99	0.38	0.59
At least one item in the above list (except for service clubs)	*60.1*	*21.5*	*11.7*	*0.82*	*0.54*	*0.51*
Working as a volunteer						
Fundraising	13.4	6.5	3.5	0.69	0.57	0.58
Unpaid member of a board	22.0	2.8	2.2	0.71	0.54	0.35
Coaching/teaching or counselling	9.0	1.7	0.1	0.49	0.19	0.02
Collecting food/goods, charity	8.5	7.5	1.8	0.98	0.61	0.42
Any other activity as a volunteer	12.3	2.0	2.3	0.76	0.28	0.57
At least one item in the the above list	*51.8*	*19.1*	*14.3*	*0.77*	*0.55*	*0.49*

Apart from involvement in groups of worship, where Italy takes the lead, and charity, where Italians and Norwegians score similarly we observe a wide gap between unskilled Norwegians and Italians and also between Italians and Hungarians. In Norway, 60 and 50 per cent of the unskilled participate in at least one type of groups and volunteer work while the respective rates are 22 and 19 per cent for Italy and 12 and 14 per cent for Hungary.

In relative terms, the picture is less unambiguous. The skilled-unskilled gap is markedly narrower in Norway than in the other two countries but Italy and Hungary score similarly in some fields (cultural, educational and hobby organizations, religious groups and fundraising) and Hungary leads in some others (involvement in political organizations and unspecified groups and volunteer activities).

Table 11 and the 'informal learning' block of Table 10 distinguish a total of 20 activities outside the school system and adult training that potentially contribute to cognitive and non-cognitive skills. As shown in Table 12, practically all low educated Norwegians participate in at least one of these activities. The 4.4 per cent share of non-participants compares to 49.3 per cent in Italy and 63.5 per cent in Hungary. As much as 41.1 per cent of the Norwegians are involved in 6 or more activities, which compares to 7.1 of the Italians and 2.0 per cent of the Hungarians.

Table 12: The distribution of low-educated people by the number of activities listed in Table 10 (informal learning activites) and Table 11 (ALL)

Number of activities, in which the respondent participates	Norway	Italy	Hungary
0	4.4	49.3	63.5
1	5.0	15.3	16.4
2	10.2	10.0	7.8
3	11.0	8.2	5.5
4	14.5	5.3	2.7
5	13.8	4.8	2.1
6 or more	41.1	7.1	2.0
Total	100.0	100.0	100.0

7.2. Efficient selection and/or learning by doing?

More efficient screening and selection is a plausible explanation of how some low educated workers can attend complex jobs. As a direct test of this assumption one might look at the skills of newly hired and fired workers. Since this is not possible with the data at hand, I compare the measured skills of workers by the level of job complexity. This clearly is a second best solution because workers attending complex jobs might also have accumulated their literacy skills via on the job training. The data in Table 13 do not disentangle these mechanisms – they simply indicate the strength of the association between job complexity indices and test scores.

Table 13: The test scores of low educated workers regressed on alternative measures of job complexity

Measures: number of literacy tasks	Norway	Italy	Hungary
Unweighted	0.0459***	0.0707***	0.0414***
	(0.0720)	(0.0089)	(0.0184)
Adjusted for wage returns	0.0494***	0.0767***	0.0395**
	(0.0071)	(0.0096)	(0.0190)
Adjusted for effect on skill shares	0.0514***	0.0769***	0.0385*
	(0.0073)	(0.0098)	(0.0199)

OLS regression coefficients and jacknife standard errors in parantheses. Dependent variable: mean of the 15 plausible values for the prose, document and quantitative tests relative to the country mean. Explanatory variables: proxies of job complexity as defined in the text commenting Table 1. The proxies are standardized to have zero mean and unit standard deviation in the pooled sample. The equations are controlled for experience, tenure, gender, rural residence and migrant status.

As shown in the table, the test scores of low educated workers rise as we move toward more complex jobs in all countries but the correlation is markedly stronger in Italy than Norway and Hungary. This finding is consistent with the expectation in that the scope for screening, selection and self-selection to demanding jobs is wider in a country with a large low educated population. The findings, in priciple, may also reflect that unskilled Italians learn more efficiently by performing complex tasks but it is hard to find arguments for such an assumption.[18]

[18] Note that the mean test scores are calculated from a set of predicted variables (plausible values). They appear on the left hand side of the equations, so the proper procedure would be estimating 15·3 equations by country and looking at the variance of the coefficients. Since the differences between Norway and Hungary are insignificant anyway and the coefficients for Italy are markedly higher, I do not account for imputation error in this case.

7.3. On small firms in Italy

Italy and Hungary perform almost equally poorly in most of the fields considered in the previous sections – apart from employment. As was previously discussed, this outcome is to a large extent explained by the existence of a large small firm sector and it's higher than average propensity to hire unskilled workers for all kind of jobs. Putting differently, many unskilled Italians are able to run businesses as self employed despite facing duties, which require a degree of proficiency in reading, writing and counting.

The benchmark hypothesis that the over-representation of low educated workers in small businesses is fully explained by their industrial attachment and other easy-to-observe compositional differences was previously rejected: about half of the raw differential in the skill shares across firm size remains even after controlling for them.

A possible explanation for the paradox may originate in the exceptional size (by European standards) of the low educated population, which opens the possibility of 'skimming the cream' of it. Unskilled Italians, who work in small firms or run their own small businesses may have low education but higher than average proficiency levels and/or higher participation rates in skill enhancing activities.

The former assumption is tested by comparing the literacy performance of low educated Italian workers employed in small and large firms. In doing so I follow the suggestions of Statistics Canada (2011b, 85-86): I first calculate the average of the five plausible values for small and large firm employees by field of testing (Θ_m, m=1,2,…5), get their means (Θ) and compute the imputation variance for each field of testing and firm size as:

$$(3) \quad Var_{imp}(\Theta) = \left[1 + \frac{1}{5}\right] \times \sum_{m=1}^{5} \frac{(\Theta_m - \Theta)^2}{4}$$

Overall error variance is computed as the sum of the sampling variance estimates for the first plausible values and the imputation variance, following a shortcut method proposed in Statistics Canada (2011b, 86) :

$$(4) \quad Var(\Theta) = Var_{smpl}(\Theta_1) + Var_{imp}(\Theta)$$

As shown in Table 14, at the given sample size we find no evidence for 'creaming': the literacy score estimates fall very close to each other and the small differences are statistically insignificant given the size of the error variances. Likewise, all attempts to find differences across firm size in terms of participation at skill enhancing activities (listed in Tables 10 and 11) have failed.[19]

There are two plausibly looking explanations for small firms' tolerance of a gap between skills and skill requirements. The first might refer to a small firm's ability to overcome skill deficiencies through intense and helpful interpersonal communication that is unavailable at a similar scale in large organizations. The second explanation questions the assumption that the skills gap is *successfully* managed. More often than not, small firms are considered less productive than large companies in terms of both labor productivity and TFP (see Economist 2012 for the mainstream argument but also Dhawan 2001 and Diaz and Sanchez 2008 among

[19] I do not present the negative findings on this issue.

others for contradicting empirical evidence). To the extent it is true, the skills gap is bridged at the cost of inefficiencies and can even be one of the causes of lower productivity. Obviously, the data at our disposal are insufficient to test which of these speculative scenarios have more to do with reality.

Table 14: The test performance of low educated Italians employed in small and large firms

	Large firms		Small firms	
Field of testing:	Mean	Overall error variance	Mean	Overall error variance
Prose	210	6	211	5
Document	208	9	212	4
Numeric	220	3	219	3

See equations 3 and 4 and the neighbouring text for the calculation of mean test performance and error variance. The number of observations is 1356 (618 in large firms and 738 in small firms)

7.4. Notes on Hungary's failure

Every piece of information examined in this paper suggested that Hungary spectacularly fails at integrating low educated people. Their employment rate is extremely low, their market is restricted to an array of the simplest jobs, they have no access to adult training, their participation in informal learning activities is minimal and they do not meet people of different social standing in civil organizations and activities. They lack the proper competencies for attending skill intensive jobs, unlike their Norwegian counterparts, and the expertise, traditions, capital and business service background to start their own businesses. Neither can they rely on an existing network of family-owned and family-managed small firms, as do the unskilled Italians.

Country-specific factors like a relatively high minimum wage, a segregated school system[20], a welfare regime dominated by passive rather than active assistance (early retirement, long-lasting and generous child care allowance and a practically open-ended social benefit) are often and justifiably blamed for Hungary's low unskilled employment ratio. However, when it comes to the international comparison of the low educated populations, Hungary's institutional specifics appear to be unimportant. We would expect, for instance, that employment will be particularly depressed near the retirement age for both genders and at childbirth age for women. The age-employment profiles in Figure 4 contradict this expectation: the profiles are practically parallel, hinting at constant differences across countries at all ages and both genders.[21]

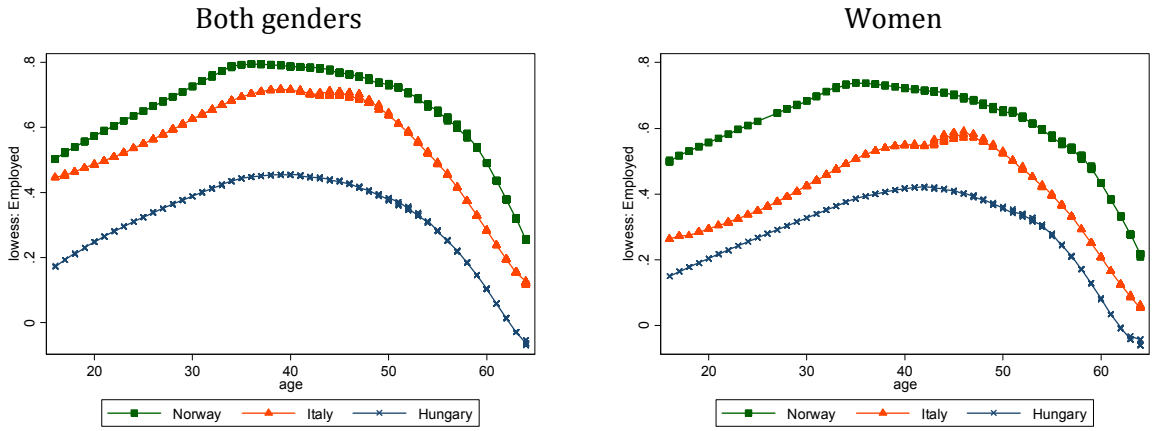
Similar doubts arise concerning the often-heard argument that Hungary's unskilled unemployment problem is, in fact, a Roma problem. This is unlikely in view of the fact that unskilled unemployment is a problem in all post-socialist countries including those with no or miniscule Roma population like Slovenia, Poland or the Baltic states. The scarcely available data from Hungary also call into question if the whole problem is driven by Roma unemployment.

[20] The impact of social background on academic test scores is nowhere as strong among the countries participating in PISA 2006 as in Hungary (Jenkins et al. 2008). The same survey shows that Hungary has the highest ratio of *between schools* to *total* variance in student performance (OECD 2007). Furthermore, using TIMSS and PIRLS data, Csapó et al. (2009) demonstrate that a large part of what seems to be within-school variance at first sight comes from between-class and between-premises variance.

[21] This is not true for the entire population. See Bajnai et al. (2008) using EU LFS data.

Kemény, Janky & Lengyel (2004) estimate that slightly more than 20 per cent of the low-educated male population aged 20-59 was regarded as Roma by their neighborhood in 2003, and their employment rate was around 23 per cent. Back-of-the-envelop calculations based on these and LFS data suggest that about 60 per cent of the non-Roma prime age males might have been employed in 2003. This is still way below the Norwegian and Italian levels in the same population and year: 85 and 80 per cent according to the ALL, respectively. Furthermore, it is likely that one could easily circumscribe sub-populations in Italy, perhaps less so in Norway, which have similar social attributes (living in poverty and social deprivation in urban ghettos and remote villages) and similar employment rates to those of the Hungarian Gypsies.[22]

Figure 4: Employment – age profiles
Lowess regression estimates for the low educated population (ALL)



The characteristics found important in this paper are clearly region-specific. The traditional small firm sector was destroyed in all communist countries with the exception of private farming in Poland and Slovenia. The heritage of low educated populations – trained for simple workplaces, having lost their jobs during the transition and unable to stand the proof in skill-intensive positions within large organizations today – is a common legacy and so is the scarcity of governmental and civil organizations building bridges to the rest of the society and promoting skill formation.

8 Conclusions

The paper used data from the Adult Literacy and Life Skills Survey on the employment prospects, skills, jobs and social integration of the low educated population in Norway, Italy and Hungary. The paper identified two factors providing part of the explanation for Hungary's failure to integrate the unskilled. On the one hand, low-educated Hungarians lack a series of basic competencies, which allow their Norwegian counterparts to work in skill-intensive jobs. The data also hint at a dramatic degree of social isolation that further deteriorates the skills and jobs prospects of the unskilled. On the other hand, while skills deficiencies occur even more frequently in Italy, the country's sizeable small-firm sector provides a shelter for the unskilled. The double burden of insufficient skills (relative to Norway) and having an undersized and skill-intensive small-firm sector (relative to Italy) significantly contributes to non-employment

[22] Note that if either discrimination or the voluntary withdrawal of the Roma from work is part of the problem, the 60 per cent employment rate of the prime age non-Roma males should be regarded as upward-biased by positive discrimination and/or weaker competition for jobs compared to a country with no similar minority.

among low-educated Hungarians. The factors found important for Hungary are region-specific and their deeper study might help in understanding why the post-socialist countries *as a group* fail in integrating their low educated populations.

It is hard not to arrive at the bluntly and comically sounding policy conclusion that 'we need a complex approach' in order to mitigate the problem. I believe we do.

It seems that the road towards Italy is closed. The expertise, the tradition, the family networks and a helpful business environment are missing and so do some other factors (like country-wide mass tourism and an internationally acknowledged sector of handicraft) which keep the family-based small firm sector alive. Even if the way were open, the recent crisis of the South-European economic model would call for caution.

The road towards Norway is beyond doubt a long one. The data indicate more than just an alarming gap between Norway and Hungary in all aspects of social integration, from employment and skills to interactions with the middle class. The Norwegian data depict a world of synergies wherein high skills promote employment, employment maintains and generates skills and social contacts, which in turn develop skills and help in getting a job. Any movement toward such synergies requires more than just well designed employment policies, cautious minimum wage practices and a reasonably planned welfare system. Better schools, intense adult training, provision of access to the means of informal learning and support and autonomy for the civil organizations working in the field are all required to get closer to a moment of critical mass, which can once turn the system to a state of 'high equilibrium'.

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Appendix

Tables, figures and box

Table A1: Mean and median years in school (ALL)

	Norway	Italy	Hungary
Mean			
High-educated	13.8	13.9	13.5
Low-educated	8.8	7.2	8.1
Ratio	0.64	0.52	0.59
Median			
High-educated	13	13	12
Low-educated	9	8	8
Ratio	0.69	0.62	0.67

Table A2: Employment equation with an interaction of low education and poor health
Logit partial effects and distribution by the sign and significance of the intercation effect

	Norway		Italy		Hungary	
	men	women	men	women	men	women
Health poor or fair						
Low-educated	-0.066	-0.142	-0.068	-0.254	-0.258	-0.216
	(2.37)	(3,70)	(3.49)	(7.56)	(6.91)	(5.89)
Affected	-0.243	-0.281	0.001	-0.045	-0.263	-0.176
	(4.92)	(6.20)	(0.02)	(0.83)	(11.45)	(8.23)
Interaction effect (pct)						
Positive, significant	0.3	0.2	0.0	0.0	29.6	27.6
Insignificant	99.7	98.0	46.7	100.0	70.4	72.4
Negative, significant	0.0	0.0	53.3	0.0	0.0	0.0
Ill-health limits moderate activity						
Low-educated	-0.049	-0.115	-0.067	-0.245	-0.242	-0.200
	(1.99)	(2.91)	(3.50)	(7.58)	(7.22)	(6.68)
Affected	-0.270	-0.160	-0.064	-0.022	-0.253	-0.186
	(5.99)	(3.45)	(0.16)	(0.36)	(9.70)	(7.71)
Interaction effect (pct)						
Positive, significant	0.0	0.0	0.0	0.0	19.4	19.9
Insignificant	100.0	78.1	11.0	100.0	54.7	80.1
Negative, significant	0.0	21.9	89.0	0.0	25.8	0.0
Last 4 weeks: did less because of ill health						
Low-educated	-0.057	-0.125	-0.084	-0.249	-0.259	-0.193
	(2.14)	(3.12)	(4.29)	(8.22)	(7.85)	(6.46)
Affected	-0.156	-0.174	-0.061	-0.119	-0.239	-0.125
	(4.14)	(4.69)	(1.37)	(1.55)	(9.26)	(5.18)
Interaction effect (pct)						
Positive, significant	0.0	0.0	0.0	0.0	21.0	0.0
Insignificant	100.0	41.5	100.0	100.0	78.9	93.2
Negative, significant	0.0	58.5	0.0	0.0	0.0	6.8

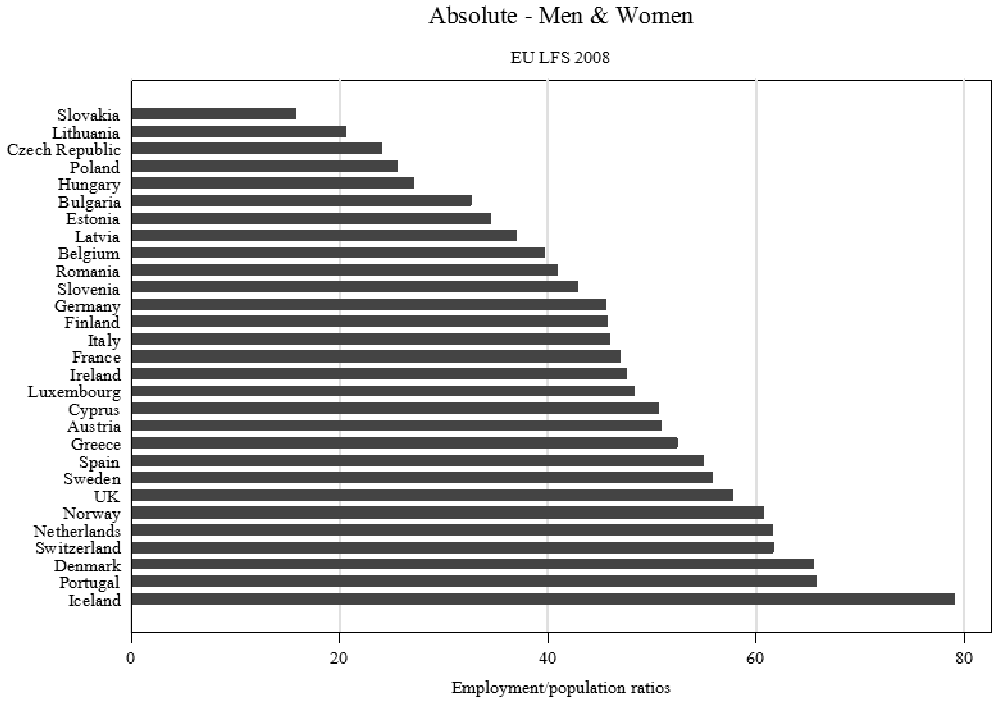
Explain model: d:/KOLLOJ/data/fp7_all_illness do/log/

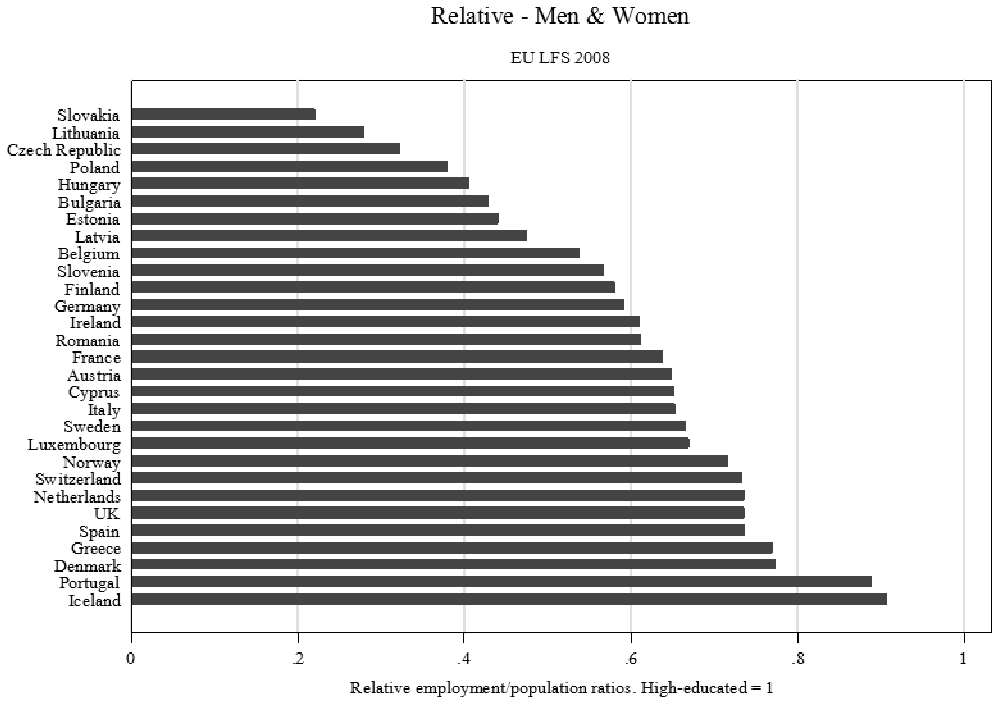
Table A3: The percentage share of low educated workers by the age of the match (ALL)

Age of the match	Norway	Italy	Hungary
Less than 2 years	12.3	31.3	19.4
	(624)	(468)	(627)
2-5 years	10.5	32.7	13.8
	(1143)	(756)	(837)
6-10 years	16.0	39.2	11.0
	(641)	(501)	(632)
11-15 years	19.0	39.2	12.4
	(378)	(466)	(277)
16-20 years	24.9	40.5	11.9
	(361)	(365)	(173)
More than 20 years	31.8	46.3	14.1
	(565)	(903)	(255)
Total share in employment	17.3	38.4	14.2
	(3712)	(3459)	(2801)
Population shares[a]	20.5	46.1	24.6

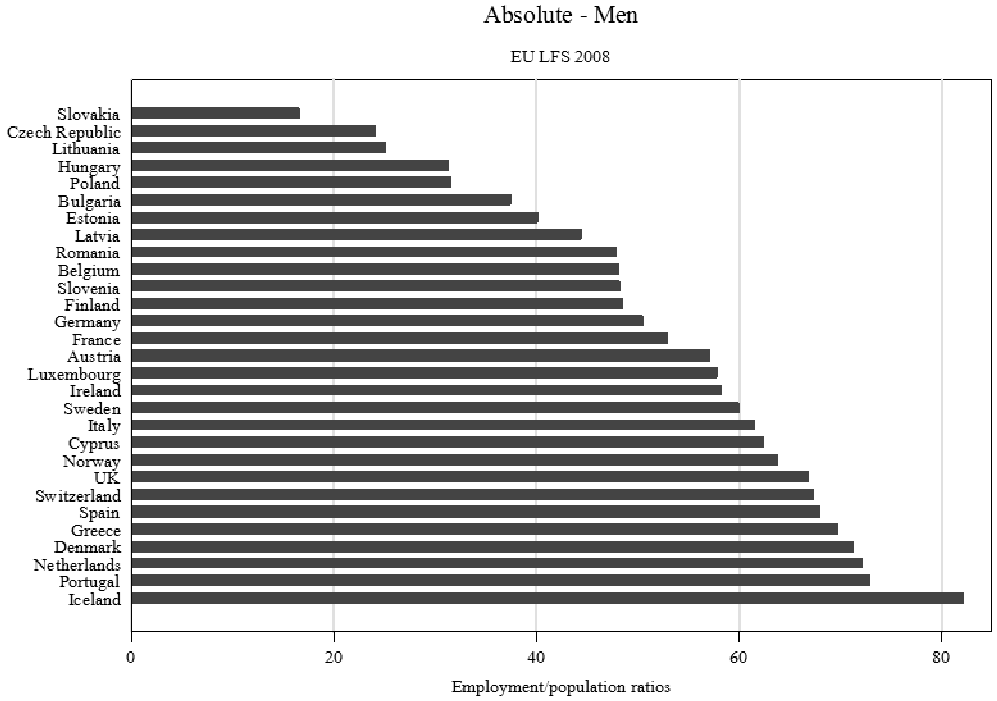
The number of observations in parantheses
a) Population aged 15-64 excluding students and persons older than 35, who never worked

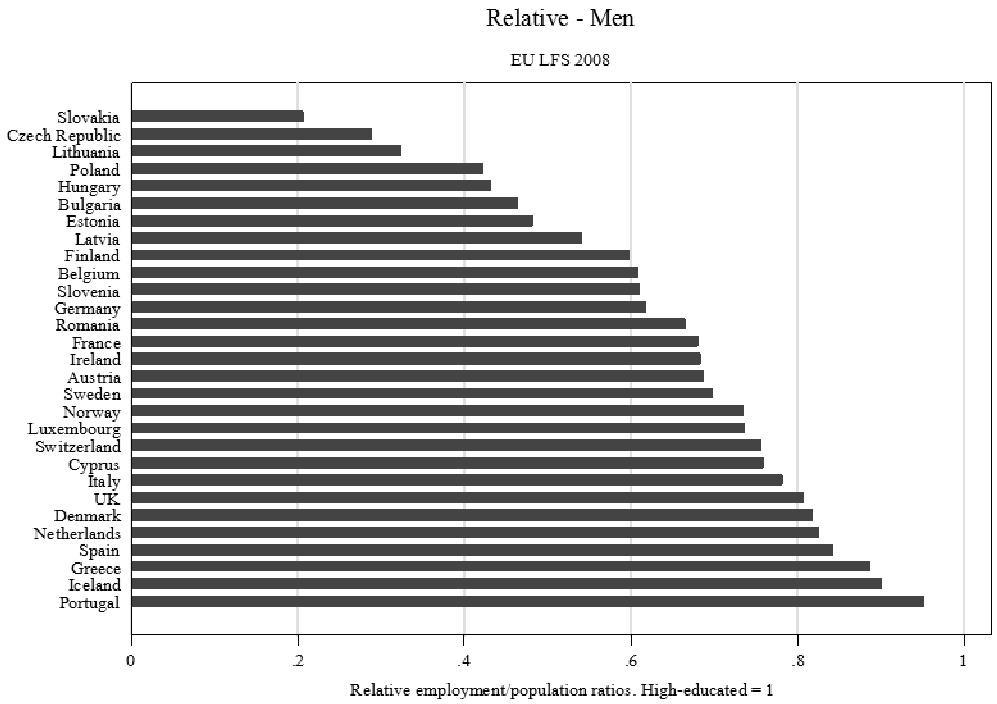
Figure A1: Absolute and relative employment rates of the low-educated (EU LFS)



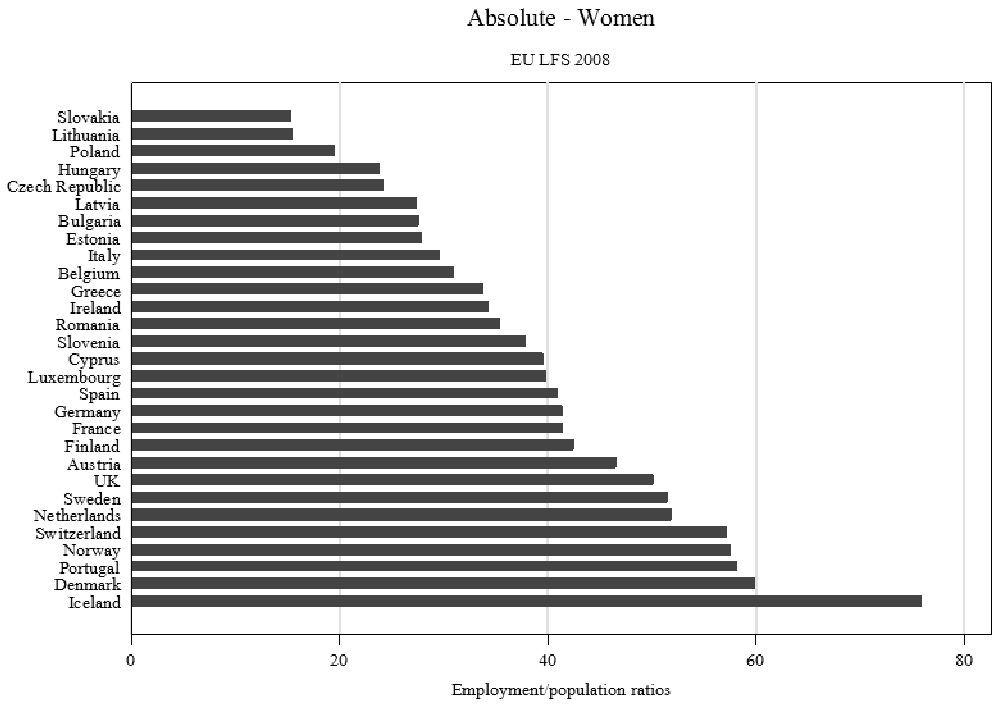


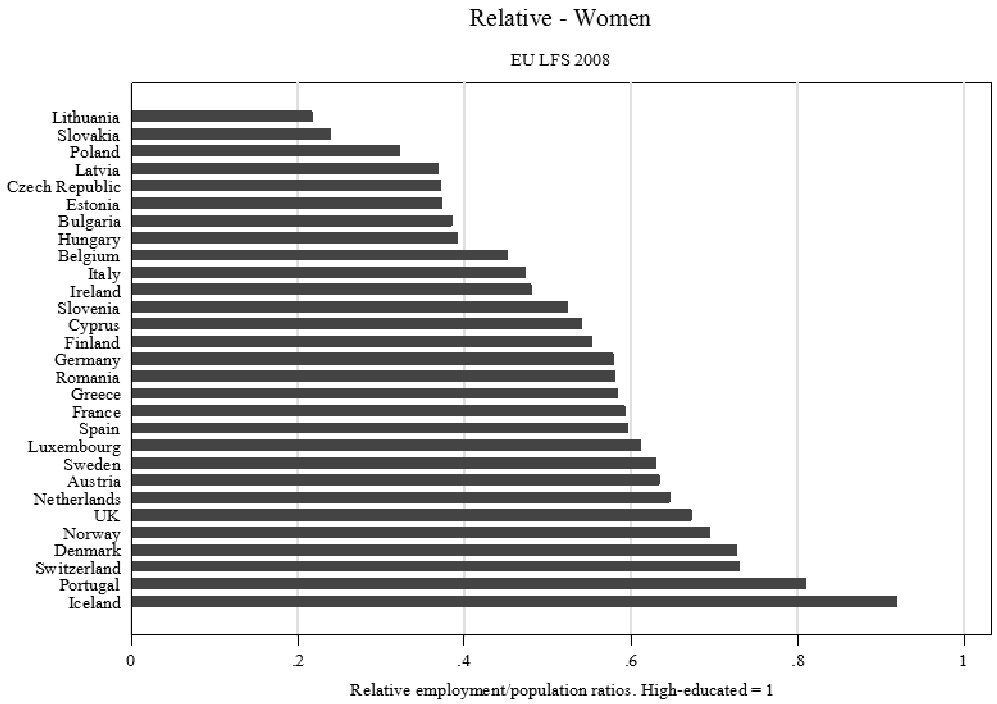
Note: the data relate to the population aged 15-64 excluding students and persons older than 35, who never worked. Unskilled stands for those classified as ISCED 0-2





Note: the data relate to the population aged 15-64 excluding students and persons older than 35, who never worked





Note: the data relate to the population aged 15-64 excluding students and persons older than 35, who never worked

Figure A2: Alternative measures of job complexity compared

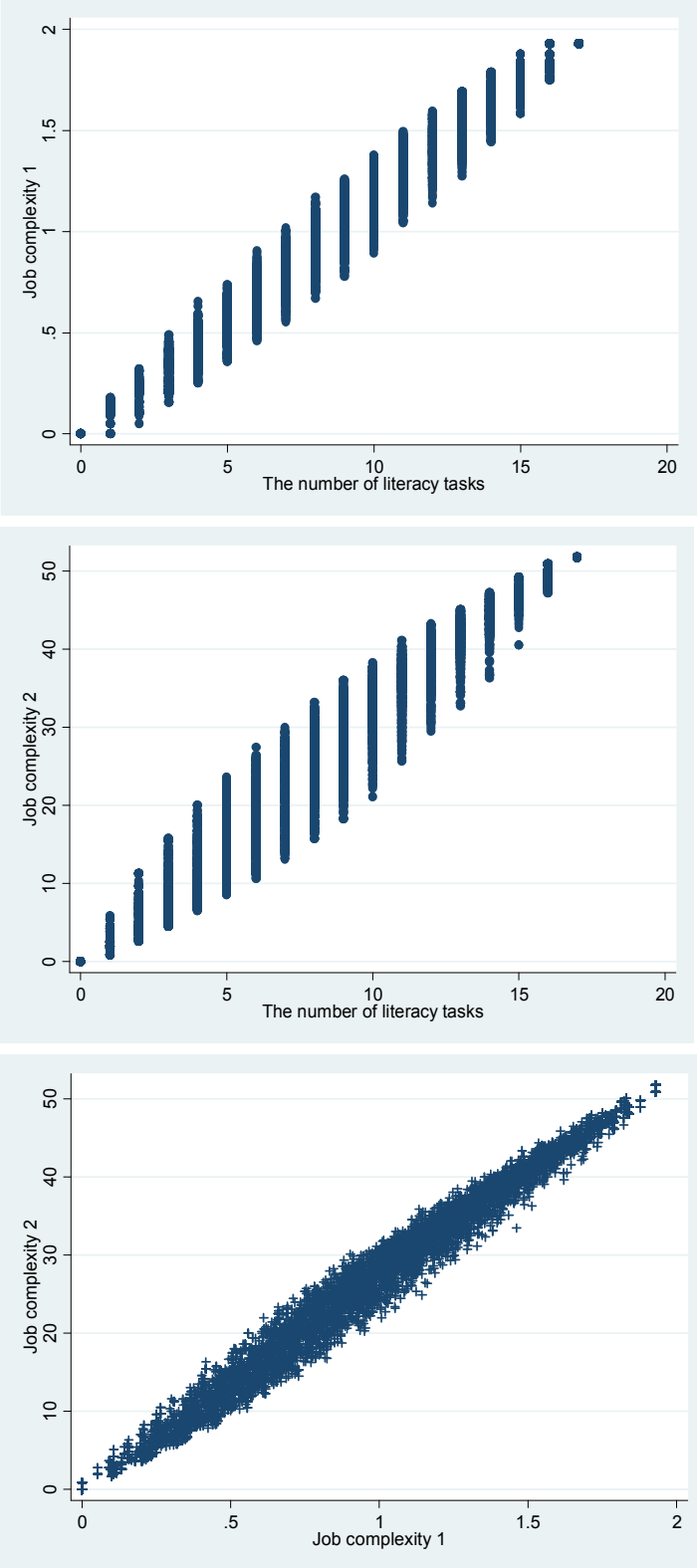


Figure A3: Distribution of the working age population by completed schoolyears

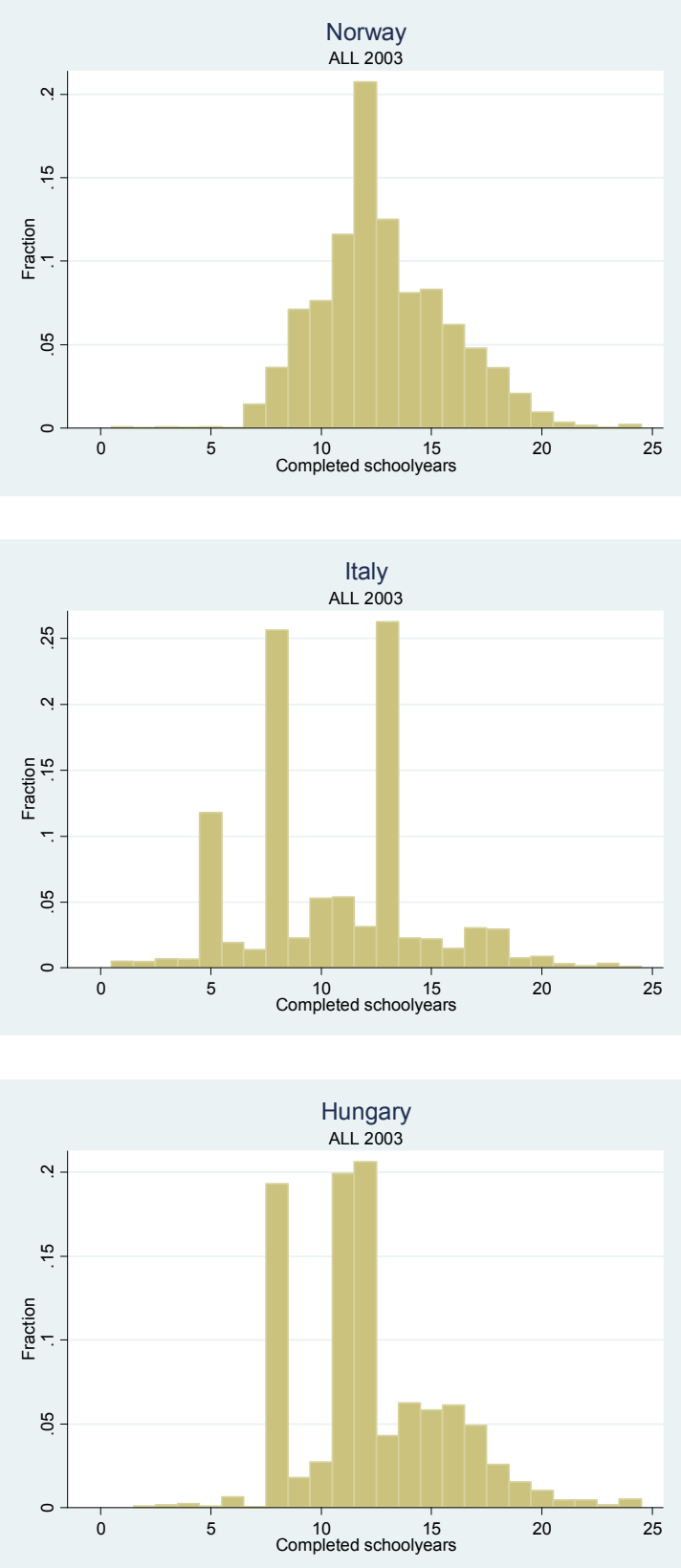
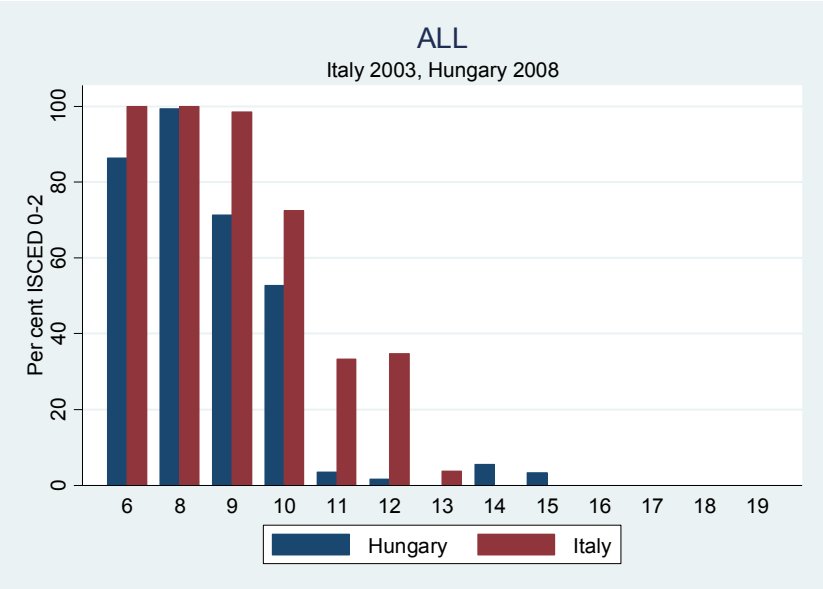
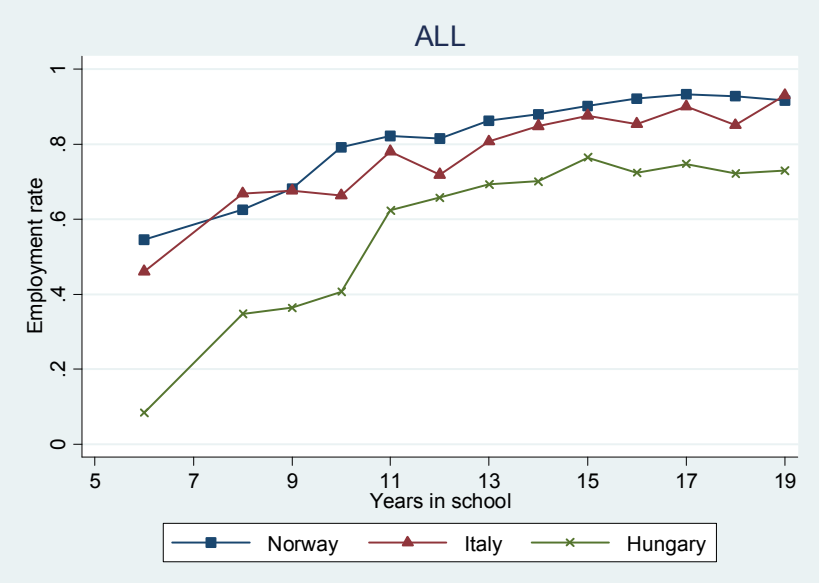


Figure A4: Percentage share of respondents classified as ISCED 0-2 by years in school



Note: The ISCED classification for Norway deviated from the international standards prior to 2006

Figure A5: Employment rates by completed schoolyears



The figures relate to the population aged 16-64 excluding full-time students and persons older than 35 , who never worked before. Years in school: 6 stands for less than 8, 19 stands for 19 or more

Figure A6: Absolute test performance by year of birth in Hungary 1998, 2008
(Means of the first plausible value for prose)

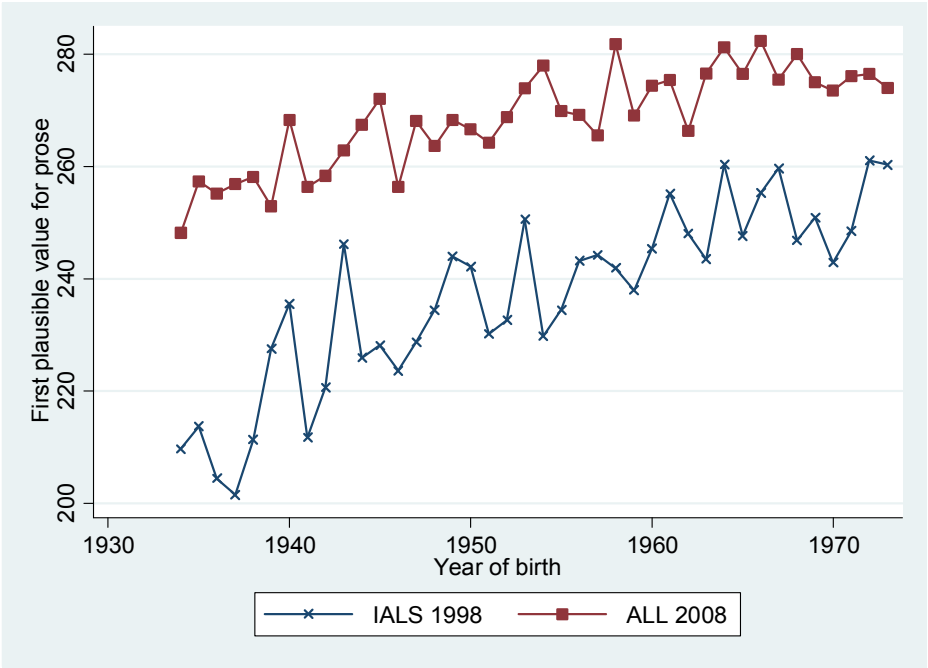


Figure A7: The distribution of jobs using alternative measures of complexity

Complexity measure: weighted sum of the 17 literacy tasks

Weights: regression coefficients approximating wage returns

Weights: odds ratios approximating bias for skilled labor

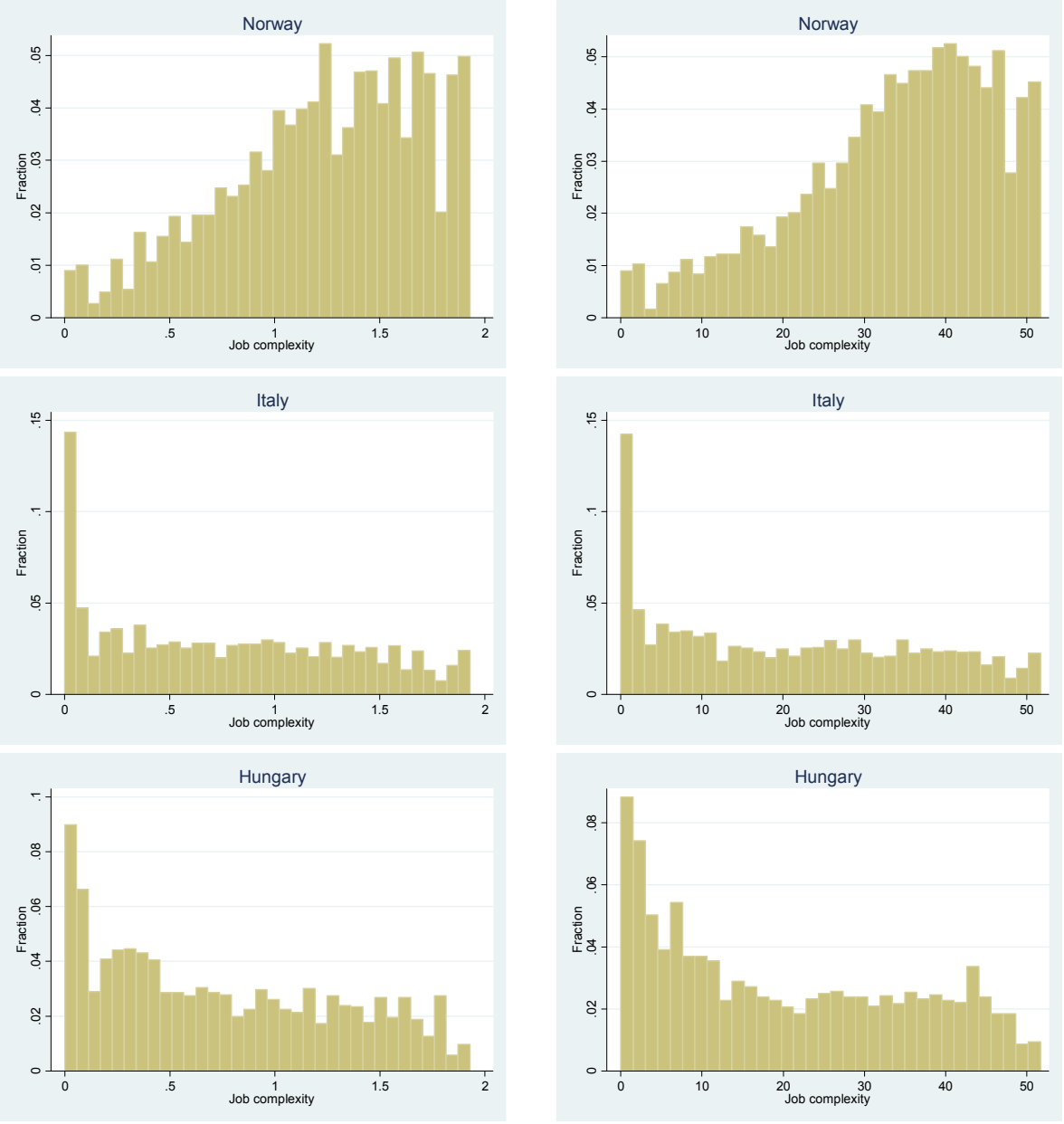
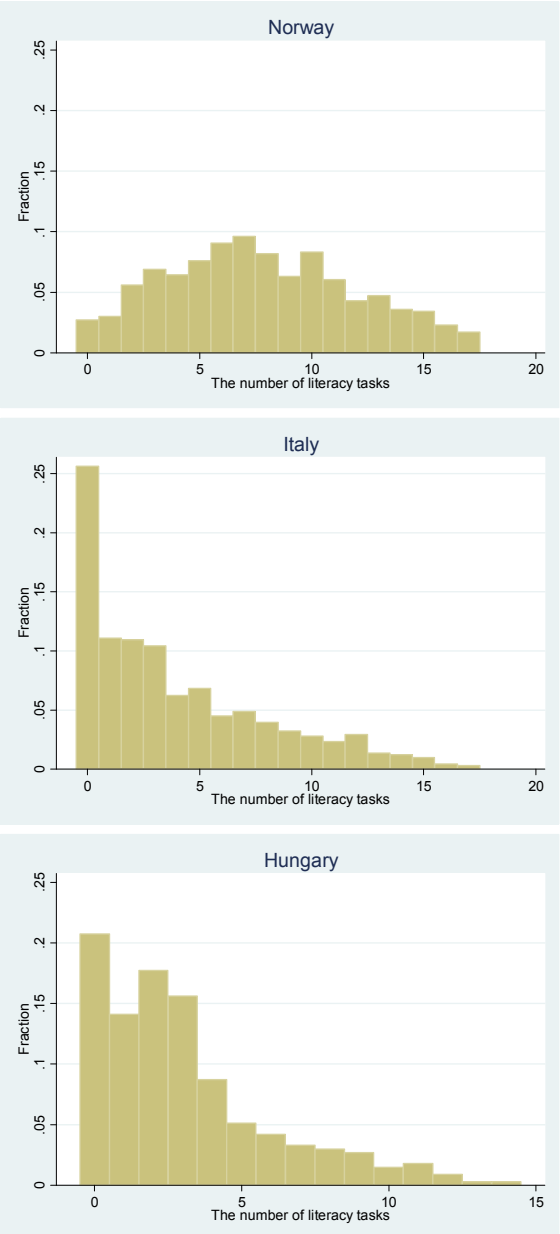
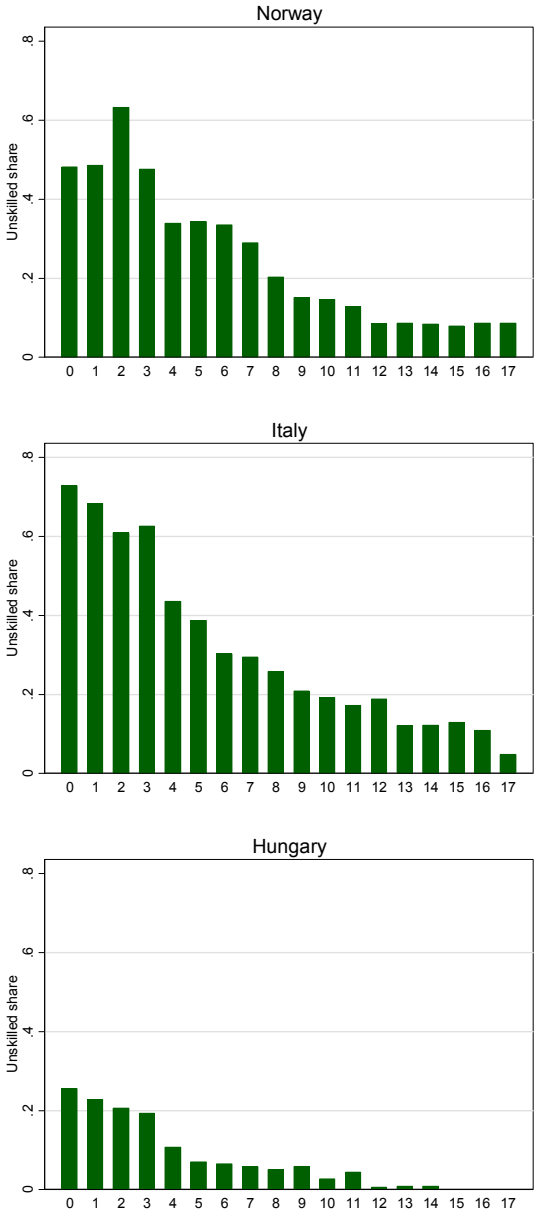


Figure A8: The distribution of jobs held by low educated workers and their fraction in each type of jobs (ALL)

The distribution of low educated workers' jobs by the number of literacy tasks



The share of low educated workers in jobs distinguished by the number of literacy tasks



Box 1

In this box I briefly discuss the assumptions underlying the skill share logits in Table 7 and the biases, which stem from the unavailability of some variables. Let y_{ij} denote the expected productivity yield of *j*-educated workers (*j*=1,2,...,J) when employed in job type *i* (*i*=1,2,...,I), and the w_j-s their reservation wages, assumed to vary with educational attainment but not with the type of job. Assuming that wages are set as a weighted average of reservation wages and the productivity yield of a given match – with $0 \leq \beta \leq 1$ standing for the relative bargaining power of employers in a country or region – the firm solves:

$$(1) \quad \max_j \pi_{ij} = \max_j (y_{ij} - w_{ij}) = \max_j [y_{ij} - (\beta w_j^* + (1-\beta) y_{ij})]$$

Suppose that job types can be characterized with a continuous or ordinal measure of complexity (*R*) so that $R_1 < R_2 < ... < R_I$, and that the productivity yields from employing a *j*-educated worker in a job of *R*-level complexity can be approximated with the linear projection $y_{ij} = \propto_j R_i$. Equation (1) can be re-written as:

$$(2) \quad \max_j \pi_{ij} = \max_j \left(\beta \alpha_j R_i - \beta w_j^* \right)$$

When employers decide on hiring an individual their choices are based on wages and expected productivity that they predict on the basis of the applicant's education and further proxies of his/her skills. These may be observed by the employer but not by the researcher and are therefore summarized in a residual term ξ satisfying $E(\xi)=0$, $cov(\xi,w)=0$ and $cov(\xi, R)=0$. For an applicant of *j*-level education expected profit is:

$$(3a) \quad \pi_{ijk} = \beta \alpha_j R_i - \beta w_j^* + \xi_{ijk}$$

For an applicant for the same job with education J:

$$(3b) \quad \pi_{iJK} = \beta \alpha_J R_i - \beta w_J^* + \xi_{iJK}$$

Subtracting 3b from 3a we have:

$$(4) \quad \pi_{ijk} - \pi_{iJK} = \beta(\alpha_j - \alpha_J) R_i - \beta(w_j^* - w_J^*) + (\xi_{ijk} - \xi_{iJK}) = v_{ijJ} \ ,$$

and the probability that *J* is chosen for job type *i* is:

$$(5) \quad \Pr(J \ is \ chosen \ for \ i) = \Pr(v_{i1J} \leq 0, v_{i2J} \leq 0, ..., v_{i,J-1,J} \leq 0) = F(R_i, w_j^*)$$

While the educational categories may be ordered in the sense that $y_{i1} < y_{i2} < ... < y_{iJ}$, the alternatives in equation (5) are unordered since *J>j* does not imply $\pi_{iJ} > \pi_{ij}$. This is a McFadden model, where the alternative-specific variable is the reservation wage. It is clear from the above formulas that the skill share logits in Table 7 implicity assume identical (relative) reservation wages.