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Gender Differences in Skill Content of Jobs

By

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Abstract

It is well-known that men and women segregate by occupation, but less is known about how they segregate by task within occupation. We show that the tasks performed by women are less skill intensive on the average than those performed by men having the same occupation. Neither demographic composition nor differences in cognitive and social skills can explain this pattern. In contrast, the fact that women use cognitive skills less often at home can explain one third of the differences in skill use at the workplace. As we control for work environment and the ability to use cognitive skills the remaining females' penalty in skill use suggest the possibility of labor market discrimination against women. Although skill use at the workplace has a significant wage premium, females' penalty in skill use cannot explain the gender wage gap.

JEL classification: J7, J16, J24, J31, J33

1 Introduction

Sorting on the labor market is one of the most important determinant of various labor market outcomes as workers based on their individual characteristics tend to choose different occupations and establishments (Heckman et al., 2006; De Melo, 2009; Eeckhout and Kircher, 2011; Card et al., 2013). However there is much less evidence on how sorting of different social groups affects the actual tasks, skill use and wage differentials within occupations.

For example in the case of gender based selection on the labor market, the literature stresses the effect of family structure as the most important cause of women's worse labor market outcomes (Angrist and Evans 1998, Heckman 1979; 1993, Bertrand et al. 2010)[1]. However Cobb-Clark and Tan (2011) show that the current gender wage differences are much larger *within* occupations than *between* occupations, still there are hardly any evidence on how the tasks and jobs fulfilled by males and females differ within firm and within occupation. The reason is that there are only aggregate, occupational level data on the skill content of jobs and there are hardly any information on the actual skill content of tasks performed at particular workplaces.

In this paper we show that the tasks performed by women are significantly less skill intensive on average than those performed by men having the same ability to use skill and having seemingly the same job. That is why we interpret the penalty in females's skill use as a sign of workplace discrimination The novelty of our research is that this margin of gender based differences on the labor market which were almost entirely neglected before our research[2].

We compare workplace activities of women and men by using the international survey PIAAC (Programme for the International Assessment of Adult Competencies). This data set is unique in the sense that it contains detailed information about the activities workers do at their workplace (e.g. how often they use text editor at work, read directions or instructions at work or fill in forms at work etc.). The activities are summarized into standardized indexes measuring the cognitive and non-cognitive skill use at work. We focus on the cognitive skill use and we show that the unconditional gap in numeracy skill use is 0.2 standard deviation and 0.1 standard deviation in literacy and ICT skill use. We will refer to these gaps as women do less skill intensive tasks. These differences are significant in economic terms as approximately 1 years of schooling corresponds to 0.06 standard deviation increase in all three indexes.

We run OLS regressions where the dependent variables are the skill use at workplace and utilize different set of control variables to filter out mechanisms that could explain the females' penalty in skill use. We find that (i) characteristics which can affect the skill use at the workplace but cannot be altered by

[1] Due to the decline of occupational segregation of women the gender wage gap decreased in the last 30 years (Reskin, 1993; Blau and Kahn, 2010; Goldin, 2014; Black and Spitz-Oener, 2010)

[2] The only exceptions are Spitz-Oener (2006), Black and Spitz-Oener (2010) Gathmann and Schönberg (2010) who also use self reported skill intensity measures but they also concentrates on between occupation skill differences and they do not discuss the causes of within occupation skill differences.

individuals (exogenous factors) cannot explain the gender gap in skill use at all. We control for this channel by including the migration and educational status of the parents. (ii) We also control for sorting mechanisms which may be endogenous in the sense that they are affected by individual decisions. The most important are the educational and occupational choices (Ochsenfeld, 2014), test scores for cognitive[3] (Fryer and Levitt, 2010) and non-cognitive skills (Buchan et al., 2008; Bertrand et al., 2010). According to our results controlling for these endogenous factors changes the skill use differences only slightly compared to the raw differences. After the inclusion the endogenous controls, the gender gap in numeracy and literacy skill use is approximately 0.17 and 0.16 respectively and the gap in ICT skill use is 0.11. (iii) Our findings suggest that systematic misreporting between genders, namely the hypothetical tendency that women undervalue their jobs cannot explain the gap in skill use either as there are skill intensive tasks which are executed by females more often then by males. (iv) Finally we are looking at the habit to use the skills at leisure time. For example we examine whether the fact that women use less computers at home can explain the computer use at the workplace. We demonstrate that the frequency of using writing, reading, numerical and ICT skills at home can explain one third of the gap. As the education, experience and test scores for numeracy and literacy skill jointly may be a precise predictor of the ability to use skill at work our results suggest that the remaining difference in skill use may be due to discrimination (e.g. women are given less skill intensive tasks)

The economic importance of skill use at work is strengthened by its significant effect on wages. According to our results one standard deviation rise in ICT skill use increases wages with 4 percent even after controlling for a wide set of individual and firm level characteristics (e.g. experience, occupation and numeracy and literacy test scores etc). The effect is half as large in the case of literacy skills but we did not find a positive effect in the case of literacy skills. On the other hand the gender wage gap do not changes significantly if we control for skill use at the workplace.

Besides the literature of sorting on the labor market, this paper relates to the empirical literature on skill intensity of jobs. Existing literature has mostly looked only the skill differences across occupations using detailed description of the jobs and categorized them along several dimensions (such as intensity of computer usage or the frequency of face-to-face contacts etc.) (Acemoglu and Autor 2010 Autor and Dorn, 2013; Firpo et al., 2011). The main contribution of our paper is that we can analyze the skill intensity of jobs *not only across* but also *within* occupations and we are able to compare what people are actually doing at their workplace instead of previous works that usually compare what people should do (by using the description of the job).

Our research also relates to the literature on compensating wage differentials as the skill intensity of task may be an important amenity for the employees. Although previous research shows that females put a larger weight on the work

[3]The cognitive skills are measured at the time of the survey so it is affected by the labor market history of individuals (Edin and Gustavsson, 2008).

conditions and environment than males (Konrad et al., 2000), the literature is not conclusive whether the gender wage gap can be explained by gender differences in working conditions (Filer, 1985; Kilbourne et al., 1994; Glauber, 2012). As the gender wage gap does not decrease after controlling for skill use at work we conclude that woman are not compensated monetarily for lower skill content of their jobs.

The rest of the paper is organized as follows. We describe the data set in section 2 and the main results are in Section 3. Section 4 provides evidences on the robustness of our findings. Section 5 examines the effect of skill use on wages and the gender wage gap. Section 6 concludes.

2 Dataset

We use the Programme for the International Assessment of Adult Competencies (PIAAC) survey for the analysis. The main focus of the survey is to assess cognitive and workplace skills of the individuals, it assess a broad range of abilities, from simple reading to complex problem-solving (Goodman et al., 2013). According to the OECD (2012) definition, the tests related to literacy are developed in a way to measure "understanding, evaluating, using and engaging with written text to participate in society, to achieve one's goals and to develop one's knowledge and potential" (OECD, 2012, page 20). Similary, the numeracy skill tests are aimed to measure "the ability to access, use, interpret, and communicate mathematical information and ideas, to engage in and manage mathematical demands of a range of situations in adult life" (OECD, 2012, page 33). Hereafter we use this indexes as the proxies of the cognitive skills. The survey also provides information on the respondents' labor market status, education, social background, occupation, activities at the job etc. Besides these assessments it also assess other factors such as social trust, political efficacy, cultural engagement etc., and they also asks how often does the individual use certain skills at home (how often she or he reads journals at home, whether they have a computer at home, how often she or he uses computer for communication at home etc).

The uniqueness of the survey is that it measures the skill intensity of the tasks that the individual does during his or her work. The respondents have to answer categorical questions indicating how often they do certain activities or use certain tools. These detailed questions are summarized in 9 indexes. In this analysis we focus on the summary indexes of basic skills (numeracy skill at work, literacy skill at work and ICT skill at work) and examine whether there are any differences between the two genders along these measures. We provide results for the remaining indexes in the appendix. Table 2 summarizes the short definition of the 9 indexes, while Appendix Table 1 gives more detailed information about the construction of indexes. We will refer to the indexes in the first panel of Table 2 as measures of skill intensity of the given job in our paper.

Table 1: Sample Size by Country and Gender

Country	Male	Female	Total
Denmark	2,746	2,596	5,342
France	2,348	2,175	4,523
Ireland	1,802	1,875	3,677
Italy	1,612	1,257	2,869
Korea	2,441	1,987	4,428
Norway	2,071	1,884	3,955
Poland	2,954	2,198	5,152
Slovak Republic	1,758	1,561	3,319
United States	1,753	1,807	3,560
Total	19,485	17,340	36,825

The study was conducted in 2011-2012, by interviewing about 5000 individuals (aged 16-65) in each of the participating countries. We are focusing in the analysis only on 9 countries, where the information on the necessary variables for our analysis were available. In the robustness section we provide evidence that our results are similar in each of these countries, although the magnitude of the gap varies across regions, the sign and the main pattern is the same everywhere. Our sample consists of the following countries: Denmark, France, Ireland, Italy, Korea, Norway, Poland, Slovak Republic, and United States. We have restricted the analysis to people working either employed or self-employed at the time of the interview. All in all, we have 36,825 observations (see Table 1). Slightly less than half of the sample is women, 47%. Throughout the analysis we use the sampling weights provided by OECD.

Table 2: Definition of the Main Index Variables

Name of the index	Definition	
in the main analysis		
Numwork	Index of use of numeracy skills at work (basic or advanced)	Literacy at work*
Writwork	Index of use of writing skills at work	
Readwork	Index of use of reading skills at work	
Ictwork	Index of use of ICT skills at work	
in the appendix		
Influence	Index of use of influencing skills at work	
Planning	Index of use of planning skills at work	
Readytolearn	Index of readiness to learn	
Taskdisc	Index of use of task discretion at work	
Learnatwork	Index of learning at work	

*The index of literacy at work combines the two index, namely reading skills at work and writing skills at work, into one measurement by using the methodology developed by Anderson (2008).

Descriptive Statistics

Table 3 provides basic descriptives for males and females, while Appendix Table 2 shows a wider range of variables. To facilitate comparison we also provide the estimated differences across gender and the t-statistics. In case of all of the results we use sampling weights provided by the data set and we use the full sample (regardless of whether our main dependent variable - measure of skill intensity - is missing or not). In the Appendix Table 2 we provide the descriptives for the subsample where every measures of the skill intensity of job is non-missing as well, but there is no substantial difference in the two samples. Male workers are somewhat more experienced and they are more likely to have full time jobs. Women tend to have higher level of eduction and work at non-private companies (state owned companies or non-profit organization) more often than male workers in our sample. Males end up more often in the tradable sector, while women appearance in the public sector is higher and gender difference in the non-tradable sector is very small (see Appendix Table 2). According to the literacy and numeracy test results, males are better in mathematics related problems while women have better literacy skills. These findings are similar to the pattern documented in the literature (Fryer and Levitt, 2010).

Table 3: Descriptive statistics of the main variables

Variable	Male	Female	Difference	t-stat
Experience (year)	19.94	17.73	-2.20	-7.37
	(0.21)	(0.20)		
Years of education	12.67	13.12	0.45	7.90
	(0.04)	(0.04)		
Share of fulltime workers	0.81	0.66	-0.14	-13.43
	(0.006)	(0.008)		
Share have children	0.64	0.69	0.05	4.39
	(0.007)	(0.007)		
Native	0.81	0.82	0.01	0.66
	(0.007)	(0.007)		
Share of privat organization	0.82	0.69	-0.13	-13.06
	(0.006)	(0.007)		
Share of public & non-profit organization	0.18	0.31	0.13	12.72
	(0.006)	(0.007)		
Average matchematic test score*	0.08	-0.09	-0.17	-7.47
	(0.015)	(0.020)		
Average lliteracy test score*	-0.02	0.03	0.05	2.14
	(0.017)	(0.021)		
Observations	19,313	17,319		

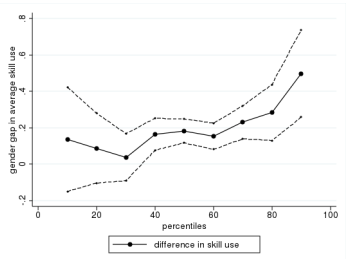
*standardized test score with mean 0 and variance of 1

Turning to the main interest of our analysis we provide descriptives on the gender gap in skill use at work. We focus on the three main indexes that we mentioned previously, namely numeracy skill at work, literacy skill at work and ICT skill at work. Figure 1 shows the gender gap by quantiles both unconditionally (left figure) and conditionally (right figure) on demographic composition, firm characteristics, social skills and test scores. Both the unconditional and conditional gender differences shows the same pattern, the difference at the top of the distribution is large and significant, while at the bottom there is no gender differences at all.

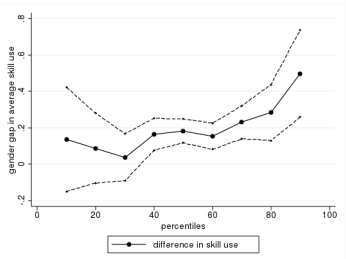
Figure 1: The gender gap in skill used at work by quantiles

Panel A: numeracy skill used at work by quantiles

The unconditional gap

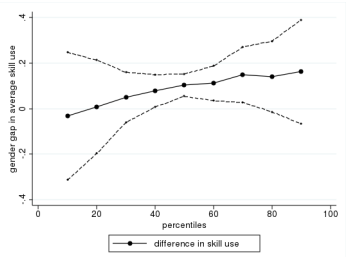


The conditional gender gap

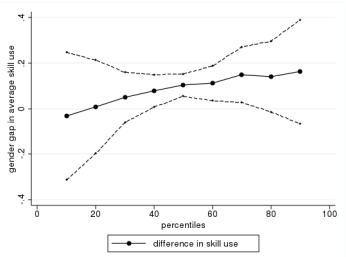


Panel B: literacy skill used at work by quantiles

The unconditional gap

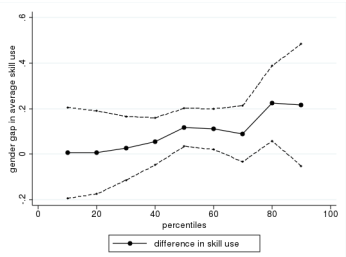


The conditional gender gap

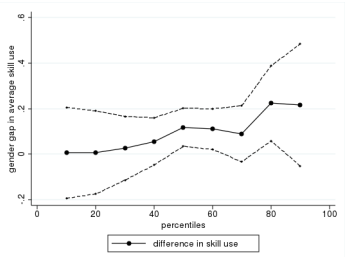


Panel C: ICT skill used at work by quantiles

The unconditional gap



The conditional gender gap



note: The unconditional gap is the raw difference by gender by deciles. The conditional gap is the gender differences after taking into account composition effects (demographic differences and firm related characteristics), social and cognitive skills.

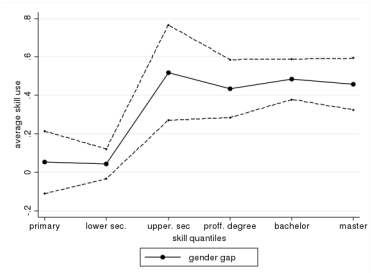
To have a deeper understanding of the gender gap in skill intensity, we plot the gap by education level for all of the skill intensity measures (numeracy skill, literacy skill and ICT skill at work). Figure 2shows the unconditional and conditional (on demographic composition, firm characteristics and test score) differences by education level. The gender gap (both the unconditional and conditional gap) is small and insignificant at lower education level (primary

and lower secondary), while starts to increase from upper secondary level. In the case of numeracy skill and ICT skill the gap remains at that higher level among people who finished territory education, while for literacy skill at work it decreases at the top, for those having at least bachelor degree.

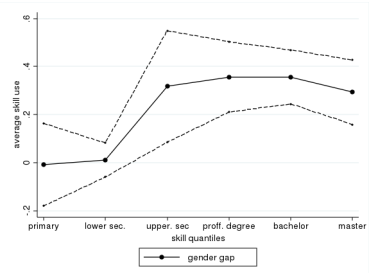
Figure 2: The gender gap in skill used at work by quantiles

Panel A: numeracy skill used at work by education level

The unconditional gap

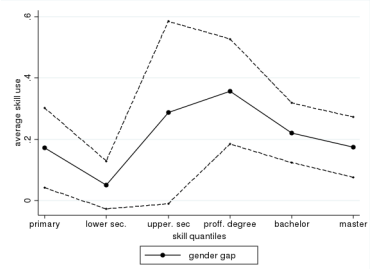


The conditional gender gap

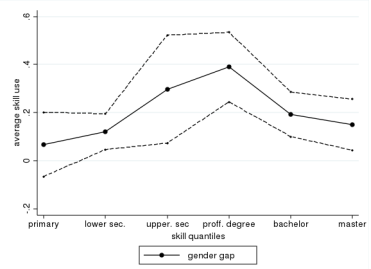


Panel B: literacy skill used at work by education level

The unconditional gap

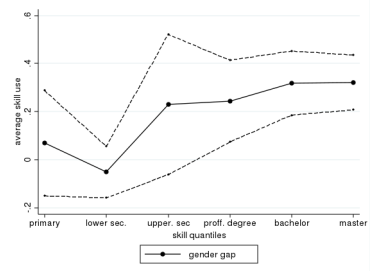


The conditional gender gap

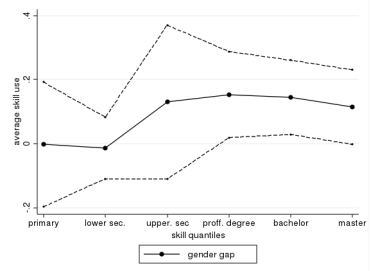


Panel C: ICT skill used at work by education level

The unconditional gap



The conditional gender gap



note: The unconditional gap is the raw difference by gender by deciles. The conditional gap is the gender differences after taking into account composition effects (demographic differences and firm related characteristics), social and cognitive skills.

3 Results

We run OLS regressions where the left hand side variable is one of the indexes measuring the skill intensity of the job (see Table 2). We pool all countries (Denmark, France, Ireland, Italy, Korea, Poland, Slovak Republic, U.S. and Norway - except in case of readiness to learn where there is no observation for Norway) together. Our main right hand side variable is the gender, while controlling for different sets of variables:

$y_i = \alpha_c + \beta * female_i + \gamma * X_{,i} + u_i$

where y_i denotes the examined skill intensity measure (standardized to have zero mean and standard deviation of 1), α_c is the country fixed effect, X_i is the set of control variables and the coefficient β is our main focus showing the gender gap in skill use.

The basic results can be found in Table 4, where the columns show the results of numeracy skill at work, literacy skill at work and ICT skill at work, while the results for the other variables (influence, learning at work, planning, readiness to learn and task discretion) are in the Appendix Table 4. We included three panels to show the gender gap using different set of control variables. First we run a regression where the left hand side variable is the given index and the only right hand side variable is the gender, we do not include country fixed effects in this setup (Panel A) than we add control variables that are exogenous in the sense that it cannot be altered by individuals (Panel B) and in the last panel (Panel C) the results including the full set of control variables can be found.

In the second panel we use country fixed effects and the information about parents education (highest of mother or father's level of education and parent's immigration status) as exogenous regressors. In the full set of control variables setting (Panel C) we add variables to the regression that can be affected by the individuals. In this setup we further control for family structure (partner, children), years of education, occupation, experience (and its square), type of contract (full time, permanent), firm characteristics (industry, size - five categories, ownership - private dummy), social skills (political efficacy, cultural engagement and social trust) and cognitive skills (measured by mathematics test score and literacy test scores). For cognitive skills we include the tests scores as plausible values in the regression as recommended by OECD (2013) The effect of the control variables on the skill use at work is shown in Appendix Table 3.

Table 4: Gender differences in skill intensity of the job

VARIABLES	Numeracy	Literacy	ICT
	skill use at work		
Panel A - Raw differences			
Female	-0.204***	-0.087***	-0.116***
	(0.026)	(0.023)	(0.028)
R-squared	0.010	0.002	0.003
Panel B - Exogenous control variables			
Female	-0.217***	-0.094***	-0.111***
	(0.025)	(0.021)	(0.027)
R-squared	0.039	0.060	0.026
Panel C - Endogenous control variables			
Female	-0.170***	-0.160***	-0.074***
	(0.027)	(0.022)	(0.027)
R-squared	0.229	0.328	0.317
Observations	29,037	30,038	23,854

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, control variables differs by panels. Control variables in panel A: raw differences without any control variable. Control variables in panel B: country fixed effects, parents highest level of education and parents immigration status. Control variables in Panel C:all of the above plus partner dummy, child dummy, years of education, occupation categories (ISCO 2 digit), dummy for full time work, self-employment dummy, experience, square of experience, dummy for those having permanent contract, dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status) and cognitive test results (plus a dummy for each variable indicating whether it was reported or not). Standard errors are calculated with the jackknife method (suggested by OECD, 2013) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey

The drawback of any survey data are the issues arising from non-answers. In our analysis we handle missing observations by including a dummy variable for each independent variable indicating whether the individual answered the question or not. In the robustness check section we use a different strategy to handle missing observations; we restrict the sample to only those who have non-missing observation for every variable that is used in the analysis. According to these results there are no substantive differences between the two methods, the overall pattern of the results remain the same, only the point estimates change slightly.

According to the results in Table 4, the raw gender gap is significant and large in magnitude (0.2 standard deviation large in case of numeric skills at work), and the gap remain large (even increases in some cases) and significant as we control for exogenous factors (see Table 4 panel B).

Due to pre-labormarket selection women choose different type of fields, occupations and firms (Cobb-Clark and Tan, 2011; Reskin, 1993). But beside these

directly observable characteristics, differences in social skills and cognitive skills might explain the gender gap in skill use as well. According to the literature, there is a substantial gender difference between the reading and mathematical skills (Fryer and Levitt, 2010), and the cognitive skills play an increasing role as tenure increases (Murnane et al. 1995). Regarding the social skills, recent research (mostly experimental evidences) emphasize that a set of social skills differ across genders (Bertrand 2011, Buchan et al. 2008), these differences can lead to the fact that women select into firms and occupations with lower labor market opportunities. For example Heinz et al. (2014) showed that gender differences in competitive behavior may increase the gender wage gap.

The PIAAC includes some personality related questions that might correlate with the behavior of the individual at the workplace and thus might affect task-allocation. People who are more willing to trust in others might also be more willing to learn from others (learn at work, readiness to learn) or might co-operate better and be allocated to more complex tasks. The survey includes some measures of such social skills, namely cultural engagement (categorical variable showing how intensely the individual is involved in voluntary work for non-profit organizations), political efficacy (categorical variable showing how much the individual is in accordance with the statement "no influence on the government") and two measures for social trust (categorical variable showing how much the individual is in accordance with the statement "trust only in few people" and categorical variable showing how much the individual is in accordance with the statement "other people take advantage of you"). In Panel C table 4 we control for all these channels, by adding to the regression demographic and firm related variables, test results (mathematics and literacy test results) and the measure of social skills.

After controlling for all these variables the gender gap remain large and significant for all of the examined indexes. To sum up there are substantial differences between the two genders in case of almost all indexes even if we take into account the composition effect and the skill differences. Women do fewer tasks that involve numerical, literacy and ICT skills.

Another channel that we examine is the habit of. doing skill intensive activites at home in leisure time. The survey provides information on ICT usage at home, numeracy skill usage at home, reading and writing frequencies at home. We control for these measures in the following regressions.

Table 5 and the last panel (panel D) in Appendix Table 4 provides the results. In accordance with our expectations the effect of the usage of the given skill at home is significant and it is large in magnitude in all of the regressions. The fact that someone reports frequent reading or writing at home has a large effect on the frequency of using the same task at her workplace. After taking into account the composition effect (demographic and firm selection), social skills and cognitive skills, differences in habits can explain more than one third of the gap found previously. In case of computer usage, the fact that men use more frequently ICT tools also at home than women can fully explain the gender gap, not only the significance disappears but also the coefficient on female becomes almost zero. As the cognitive skills may be a proxy of the ability to use ICT

skills also at home and we control for that in the regression. Thus the lower frequency of skill use of women at home is not due to the lack of the necessary skills. Contrary the parameter of the skill use at home cannot be interpreted as causal relationship. It is possible that skill use of at the work place affect the habit of using skills at home also. Besides it is possible that the stronger expectations of women to do housework force them to use less their cognitive skills at home. If this kind of reverse causality and the division of labor within housholds make women to use their skill less at home than the skill use at home partly controls also for discrimination aginst women.

Table 5: Home skill usage

VARIABLES	Numeracy	Literacy	ICT
	skill use at work		
Female	-0.114***	-0.117***	-0.009
	(0.027)	(0.022)	(0.026)
Numeracy skill use at home	0.318***	0.022	0.003
	(0.020)	(0.016)	(0.019)
ICT skill use at home	0.064***	0.076***	0.338***
	(0.020)	(0.016)	(0.024)
Writing skill use at home	-0.013	0.107***	-0.005
	(0.017)	(0.016)	(0.019)
Reading skill use at home	0.108***	0.282***	0.090***
	(0.015)	(0.015)	(0.016)
R-squared	0.332	0.438	0.412
Observations	29,037	30,037	23,854

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Control variables: country fixed effects, parents highest level of education, parents immigration status, partner dummy, child dummy, years of education, occupation categories (ISCO 2 digit), dummy for full time work, self-employment dummy, experience, square of experience, dummy for those having permanent contract, dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status), cognitive test results and index of skill use at home (plus a dummy for each variable indicating whether it was reported or not). Index of skill use at home are standardized to have zero mean and standard deviation of one. Standard errors are calculated with the jackknife method (suggested by OECD, 2013) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey

The last (but not least important) explanation that we are analyzing is reporting behavior. It might be the case that the reporting strategy of women is different from those of men. Women might undervalue themselves and thus under report the skill intensity of the job that they do. To evaluate whether this is the case, we have analyzed the detailed questions that are reported in the survey instead of the indexes. The regressions include the full set of control

variables (demographic and firm characteristics, social and cognitive skills). The results are reported in the Table 5 of the Appendix.

If misreporting would lead our findings than we should have found that in case of all detailed questions women would under report and thus find a negative coefficient for all regression. As it can be seen in Table 5 of the Appendix, this is not the case. Although in most of the cases women report lower level of usage of different tools and sub-tasks in accordance with our main findings, in many cases there are no differences at all between gender (for example reading letters and memos, using spreadsheets and text editor), or if there is something than in favor of women (for example in case of reading financial statements). We conclude that the hypothetical differences in reporting strategy does not drive our results.

4 Robustness

Missing Observations

One of the largest drawbacks of using survey data is the possibility of nonrandom missing observations due to the possibility of leaving some questions blank. Throughout in the analysis we have handled the issue by including additional dummy variables for each independent variable indicating whether the answer was missing or not. To see whether our results are affected by this issue, we have restricted our sample to only those workers, who answered all of the questions that we use in our main analysis.

The results are reported in Table 6**,** including exactly the same control variables as previously but run on the restricted sample. The structure of the table is similar as previously, the columns show the gender gap in case of the different measures of the skill intensity of the job, while the panel shows the results using different set of control variables. Panel A shows the raw differences, Panel B is the gap while controlling for exogenous variables, Panel C add more controls to the regression in order to handle differences in demographic and firm related characteristics and differences in skills (social and cognitive). The last panel show the results where control for skills that are used at home. Comparing the results of the main results in Table 4 and Table 5, we can see that our findings qualitatively do not change. According to these results we conclude that our findings are not driven by sample selection issues arising from missing observations.

Table 6: Gender differences in skill intensity of the job - non missing sample

VARIABLES	Numeracy	Literacy	ICT
	skill use at work		
Panel A - Raw differences			
Female	-0.197***	-0.137***	-0.190***
	(0.023)	(0.029)	(0.027)
R-squared	0.010	0.005	0.009
Panel B - Exogenous			
Female	-0.196***	-0.121***	-0.168***
	(0.023)	(0.027)	(0.027)
R-squared	0.025	0.078	0.041
Panel C - Endogenous			
Female	-0.156***	-0.151***	-0.064**
	(0.024)	(0.027)	(0.028)
R-squared	0.240	0.334	0.290
Panel D - Habit			
Female	-0.081***	-0.067***	0.027
	(0.022)	(0.024)	(0.025)
R-squared	0.336	0.439	0.389
Observations	14,966	15,803	13,380

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, control variables differs by panels. Control variables in panel A: raw differences without any control variable. Control variables in panel B: country fixed effects, parents highest level of education and parents immigration status. Control variables in Panel C: all of the above plus partner dummy, child dummy, years of education, occupation categories (ISCO 2 digit), dummy for full time work, self-employment dummy, experience, square of experience, dummy for those having permanent contract, dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status) and cognitive test results (plus a dummy for each variable indicating whether it was reported or not). Panel D: all of the above plus index of skill use at home (plus a dummy for each variable indicating whether it was reported or not). Index of skill use at home are standardized to have zero mean and standard deviation of one.Standard errors are calculated with the jackknife method (suggested by OECD, 2013) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey

It is also possible that people rearly using cognitive skills do not answer the questions about the skill use. If the non-reporting behaviour is correalted with the gender than this would bias our results. To control for this we resticted our sample to observations where we observe every skill use measure. As appendix table 2 shows there is no systematic discrepancy between the restricted and the whole sample. Besides we found no significant difference between the males' and females' skill reporting probability conditional on our usal control variables. Neither do our main results change qualitatively if we restrict our sample to

people who report every skill use measure. (see Appendix Table 5).

Fulltime worker

Mostly due to motherhood women and men have different working hours on average and are expected to stay with the firm for different time periods (Reskin 1993, Bertrand et al., 2010, Blau and Kahn, 2010) this might lead to lower bargaining power for women (Anderson et al., 2002; Simonsen and Skipper, 2006). Based on these firms may statistically discriminate women working at part time or having temporary contracts since employees have lower incentives to motivate women with challenging tasks.

We analyze this channel in two different ways, first we examine whether female part time or temporary workers do different tasks from the tasks done by similar male workers by including the interaction of gender and contract types in the regressions with the full set of controls (controlling for demography, firm characteristics, social and cognitive skills). Second we restrict our sample to full time workers only and rerun our main regressions. The results can be found in Table 7 and Table 8, the structure of these tables are the same as previously, the skill intensity measures can be found in the columns and the panels in case of Table 8 show the results by using different set of control variables.

In the regression in Table 7 the control group consists of fulltime, permanent workers. The gender gap within the control group is somewhat smaller than found previously (see Table 7), but still large and significant. Women with fulltime-permanent contract do less skill intensive tasks according to any measure than similar male workers. As we have expected part time and temporary workers do less skill intensive tasks but the neither of the interaction terms are significant. By summing up the coefficient on the female dummy and the coefficients on the interaction terms we can see that the gender gap remains in each group (fulltime-temporary, part time-temporary, part time-permanent and fulltime-permanent).

Table 7: Gender differences in skill intensity of the job - contract type

VARIABLES	Numeracy	Literacy	ICT
	skill use at work		
	Endogenous		
Female	-0.161***	-0.145***	-0.066**
	(0.031)	(0.027)	(0.032)
Part-time	-0.192***	-0.245***	-0.263***
	(0.044)	(0.051)	(0.056)
Parttime * Female	-0.069	-0.085	-0.025
	(0.057)	(0.060)	(0.076)
Temporary	-0.082**	-0.059*	-0.019
	(0.036)	(0.035)	(0.044)
Temporary * female	0.041	0.010	-0.043
	(0.044)	(0.040)	(0.053)
R-squared	0.229	0.328	0.317
Observations	29,037	30,038	23,854

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Control variables: country fixed effects, parents highest level of education, parents immigration status, partner dummy, child dummy, years of education, occupation categories (ISCO 2 digit), dummy for full time work, self-employment dummy, experience, square of experience, dummy for those having permanent contract, dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status) and cognitive test results (plus a dummy for each variable indicating whether it was reported or not). Standard errors are calculated with the jackknife method (suggested by OECD, 2013) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey

By comparing the results of the restricted sample (Table 8) to the full sample version (Table 4 and Table 5) we can see that there are no substantial differences, the signs and pattern remain the same, only the magnitudes change somewhat. Only in the case of the Literacy skill at work in panel A and B (raw differences and exogenous) the coefficient on female dummy became insignificant, but still negative. This might be due to the smaller sample size. All in all the documented gender differences are not driven by the pattern that women tend to be part time worker more often.

Table 8: Gender differences in the skill intensity of the job - Fulltime worker

VARIABLES	Numeracy	Literacy	ICT
	skill use at work		
Panel A - Raw differences			
Female	-0.146***	-0.008	-0.066*
	(0.027)	(0.025)	(0.034)
R-squared	0.005	0.000	0.001
Panel B - Exogenous			
Female	-0.166***	-0.023	-0.064**
	(0.027)	(0.023)	(0.032)
R-squared	0.048	0.090	0.036
Panel C - Endogenous			
Female	-0.149***	-0.141***	-0.053*
	(0.031)	(0.030)	(0.031)
R-squared	0.224	0.321	0.302
Panel D - Habit			
Female	-0.105***	-0.094***	0.008
	(0.028)	(0.028)	(0.029)
R-squared	0.346	0.443	0.411
Observations	22,877	23,663	19,099

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, control variables differs by panels. Control variables in panel A: raw differences without any control variable. Control variables in panel B: country fixed effects, parents highest level of education and parents immigration status. Control variables in Panel C: all of the above plus partner dummy, child dummy, years of education, occupation categories (ISCO 2 digit), dummy for full time work, self-employment dummy, experience, square of experience, dummy for those having permanent contract, dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status) and cognitive test results (plus a dummy for each variable indicating whether it was reported or not). Panel D: all of the above plus index of skill use at home (plus a dummy for each variable indicating whether it was reported or not). Index of skill use at home are standardized to have zero mean and standard deviation of one.Standard errors are calculated with the jackknife method (suggested by OECD, 2013) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey

By country

Although we use country fixed effects in all of our regressions, it might be that the observed gender gap in skill intensity is driven by only a few outlier countries. That is why we also provide the results of the main regressions by countries, allowing various differences between genders across countries. The results are provided in the Appendix Table 6 a-i, the structure of the tables are the same as previously: the columns show the results of the different skill

intensity measures and the panels show the gender gap by using different set of control variables. According to our results, women do much better in Italy and Slovak Republic than in any other country, but the main pattern are very similar in each of the countries. Some of the variables are insignificant within a country, but this might be due to the smaller sample size. To sum up, our main results are not driven by one outlier country, but most of the countries show similar patterns.

5 The skill use and the gender wage gap

In this section we run OLS regressions to determine what is the wage premium of the above mentioned indexes, namely numeracy skill at work, literacy skill at work and ICT skill at work. The left hand side variable in all of the regression in this section is the logarithm of the hourly wages, and we have restricted our sample to wage and salary earners, we pool all countries (Denmark, France, Ireland, Italy, Korea, Poland, Slovak Republic, and Norway) together. We drop the observations for the USA at this part of the analysis, as they do not provide data related to wages. Our main right hand side variable is the gender, while controlling for different sets of variables.

$wage_i = \alpha_c + \beta * female_i + \gamma * X_{_i} + u_i$

where y_i denotes the logarithm of hourly wage (PPP corrected in US dollar), α_c is the country fixed effect, X_i is the set of control variables and the coefficient β is our main focus. The basic results can be found in Table 9, where the columns show the results of different settings.

Table 9: Skill premium and the gender wage gap

	logarithm of hourly wage (PPP corrected in US dollar)						
Female	-0.140***	-0.151***	-0.125***	-0.120***	-0.116***	-0.118***	-0.152***
	(0.010)	(0.009)	(0.011)	(0.011)	(0.011)	(0.011)	(0.010)
Country fixed effects		X	X	X	X	X	
Exogenous		X	X	X	X	X	
Endogenous			X	X	X	X	
Cognitive skills			X	X	X	X	
Social Skills			X	X	X	X	
Skills at work:							
- Numeric				0.008	0.006		-0.013
				(0.008)	(0.008)		(0.009)
- Literacy				0.019***	0.011*		0.070***
				(0.006)	(0.006)		(0.007)
- ICT				0.047***	0.038***		0.097***
				(0.010)	(0.011)		(0.010)
Skills at home:							
- Numeric					-0.005	-0.005	
					(0.006)	(0.006)	
- ICT					0.014**	0.026***	
					(0.007)	(0.006)	
- Writing					-0.005	-0.002	
					(0.007)	(0.007)	
- Reading					0.017**	0.025***	
					(0.008)	(0.008)	
R-squared	0.012	0.215	0.436	0.442	0.443	0.440	0.153

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Number of observation in each of the regression is 25,235. Control variables: country fixed effects, parents highest level of education, parents immigration status, partner dummy, child dummy, years of education, occupation categories (ISCO 2 digit), dummy for full time work, self-employment dummy, experience, square of experience, dummy for those having permanent contract, dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status) and cognitive test results (plus a dummy for each variable indicating whether it was reported or not). Standard errors are calculated with the jackknife method (suggested by OECD, 2013) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey

Our results suggest that skill use differences within occupation is translated into wages as an increase of 4.7% in wages for every additional standard deviation in the use of ICT skills. As the last column shows the difference is even larger if we do not take into account the confounding factor of occupation, and other personal level characteristics. Similarly one standard deviation increase of literacy skill use increases wages by 1.9% but there is no significant connection between the numeric skill use and the wages. What is more the labor mar-

ket rewards the habit of using cognitive skills as the reading and computer use at home increases wages even after controlling for literacy and numeracy test results.

Turning to the gender wage gap, we find that the raw wage penalty of women are 14% in our sample. The difference is increasing up to 15% if we control for exogenous variables but it drops to 12,5% as we control for every dimension of composition effects (demographic and firm related characteristics), social and cognitive skills. Although there is a significant wage premium of literacy skill and ICT skill, the gender gap does not change significantly after taking skill intensity at the work into account. According to our interpretation woman are not compensated monetary for the lower skill intensity of their jobs.

6 Conclusion

Although a large body of empirical literature documents the gender differences on the labor market, we know almost nothing about what people actually do at their workplace and whether there are any gender differences within occupation. To the best of our knowledge we are the first to document within occupation differences and examine the underlying mechanisms.

By using an international survey (PIAAC - Programme for the International Assessment of Adult Competencies) that provides detailed information on tasks performed during work, we found that women report significantly lower levels of numeracy skill and computer usage and they also read and write significantly less than men do. This finding is robust against taking into account the composition effects (demographic and firm characteristics, different levels of education and experience) and controlling for social and cognitive skill differences. We argue that the most important driving force behind the gap in the skill intensity of jobs across genders is that women use these kinds of skills less even in their everyday lives. Since our finding is robust even after controlling fortest scores we argue that this difference cannot be contributed to the lack of capabilty. The skill use habits at home can explain about one third of the gender difference in numeracy and literacy skills use at the workplace, while in case of ICT skills it can fully explain it. We also show that the observed gap is not due differences in reporting strategy (e.g. not due the hypothetical tendency that women undervalue themselves).

The remaining gap is still unexplained, and we cannot rule out discrimination in task-allocation (men tend to be allocated to more complex tasks). It might be the case, that employers statistical discriminate women due to the possibility of motherhood, and thus allocate women to less complex tasks as in this case it is cheaper to replace them in case of maternity leave. As a future plan, we would like to examine this channel as well.

Our results regarding to the wage equations suggest that there is a skill use premium even after controlling for demographic (including occupation) and firm related characteristics, moreover the labor market rewards the habit of

using cognitive skills as the reading and computer use at home increases wages even after controlling for literacy and numeracy test results. Despite the existing wage premium of skill use at work and premium of the habit of using such skills, the gender gap does not change significantly after taking skill intensity at the work into account. According to our interpretation woman are not compensated monetary for the lower skill intensity of their jobs. As previous research showed that decline of gender based segregation between occupations led to the decrease of the gender pay gap we plan to extend our analysis to the preceding waves of the PIAAC survey to better understand the affects of the within occupational differences on the gender wage gap.

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Appendix

Appendix Table 1

Influence: Index of use of influencing skills at work
Skill use work - How often - Teaching people
Skill use work - How often – Presentations
Skill use work - How often - Advising people
Skill use work - How often - Planning others activities
Skill use work - How often - Influencing people
Skill use work - How often - Negotiating with people
Learn at work: Index of learning at work
Current work - Learning - Learning from co-workers/supervisors
Current work - Learning - Learning-by-doing
Current work - Learning - Keeping up to date
Numeric at work: Index of use of numeracy skills at work (basic or advanced)
Skill use work - Numeracy - How often - Calculating costs or budgets
Skill use work - Numeracy - How often - Use or calculate fractions or percentages
Skill use work - Numeracy - How often - Use a calculator
Skill use work - Numeracy - How often - Prepare charts graphs or tables
Skill use work - Numeracy - How often - Use simple algebra or formulas
Skill use work - Numeracy - How often - Use advanced math or statistics
Planning Index of use of planning skills at work
Skill use work - How often - Planning own activities
Skill use work - How often - Planning others activities
Skill use work - How often - Organizing own time
Task discretion: Index of use of task discretion at work
Current work - Work flexibility - Sequence of tasks
Current work - Work flexibility - How to do the work
Current work - Work flexibility - Speed of work
Current work - Work flexibility - Working hours
Write at work: Index of use of writing skills at work
Skill use work - Literacy - Write letters memos or mails
Skill use work - Literacy - Write articles
Skill use work - Literacy - Write reports
Skill use work - Literacy - Fill in forms

Read at work: Index of use of reading skills at work
Skill use work - Literacy - Read directions or instructions
Skill use work - Literacy - Read letters memos or mails
Skill use work - Literacy - Read newspapers or magazines
Skill use work - Literacy - Read professional journals or publications
Skill use work - Literacy - Read books
Skill use work - Literacy - Read manuals or reference materials
Skill use work - Literacy - Read financial statements
Skill use work - Literacy - Read diagrams maps or schematics

ICT at work: Index of use of ICT skills at work
Skill use work - ICT - Internet - How often - For mail
Skill use work - ICT - Internet - How often - Work related info
Skill use work - ICT - Internet - How often - Conduct transactions
Skill use work - ICT - Computer - How often - Spreadsheets
Skill use work - ICT - Computer - How often - Word
Skill use work - ICT - Computer - How often - Real-time discussions

Appendix Table 2: Descriptive statistics

	Total sample				Restricted sample - non of the skill intensity measures is missing			
VARIABLES	Male	Female	Difference	t-stat	Male	Female	Difference	t-stat
Experience (year)	19.94	17.73	-2.20	-7.37	20.53	19.13	-1.40	-3.61
	(0.21)	(0.20)			(0.28)	(0.26)		
Years of education	12.67	13.12	0.45	7.90	13.87	14.09	0.22	3.53
	(0.04)	(0.04)			(0.04)	(0.04)		
Share of fulltime workers	0.81	0.66	-0.14	-13.43	0.86	0.74	-0.13	-9.82
	(0.006)	(0.008)			(0.008)	(0.009)		
Having children	0.64	0.69	0.05	4.39	0.67	0.69	0.02	1.21
	(0.007)	(0.007)			(0.010)	(0.009)		
Native	0.81	0.82	0.01	0.66	0.83	0.84	0.02	1.44
	(0.007)	(0.007)			(0.009)	(0.008)		
Share of privat organization	0.82	0.69	-0.13	-13.06	0.77	0.64	-0.13	-9.11
	(0.006)	(0.007)			(0.009)	(0.010)		
Share of public & non-profit organization	0.18	0.31	0.13	12.72	0.23	0.35	0.12	8.95
	(0.006)	(0.007)			(0.009)	(0.010)		
Share of tradable sector	0.36	0.12	-0.25	-27.62	0.27	0.11	-0.17	-15.14
	(0.007)	(0.004)			(0.009)	(0.006)		
Share of non-tradable sector	0.47	0.48	0.01	0.93	0.51	0.47	-0.04	-2.85
	(0.008)	(0.008)			(0.010)	(0.010)		
Share of public sector	0.15	0.39	0.23	22.72	0.21	0.42	0.21	15.08
	(0.005)	(0.008)			(0.009)	(0.010)		
Share of observations with missing sector	0.01	0.01	0.01	2.96	0.01	0.01	0.00	0.36
	(0.001)	(0.001)			(0.000)	(0.001)		
Firms size 1 to 10 people	0.20	0.22	0.02	2.14	0.15	0.19	0.04	3.72
	(0.006)	(0.006)			(0.008)	(0.008)		
Firms size 11 to 50 people	0.23	0.25	0.02	1.94	0.22	0.26	0.04	2.96
	(0.006)	(0.007)			(0.009)	(0.009)		
Firms size 51 to 250 people	0.18	0.20	0.02	1.94	0.17	0.21	0.04	3.32
	(0.006)	(0.006)			(0.007)	(0.008)		
Firms size 251 to 1000 people	0.11	0.11	0.00	-0.23	0.14	0.12	-0.02	-1.84
	(0.005)	(0.005)			(0.007)	(0.007)		
Frm size more than 1000 people	0.08	0.08	0.00	-0.08	0.12	0.10	-0.01	-1.25
	(0.004)	(0.004)			(0.007)	(0.006)		
Firm size missing	0.19	0.13	-0.06	-6.81	0.20	0.11	-0.09	-8.29
	(0.005)	(0.005)			(0.008)	(0.006)		
Average numeric skill	0.08	-0.09	-0.17	-7.47	0.14	-0.15	-0.30	-8.77
	(0.015)	(0.020)			(0.026)	(0.023)		
Average literacy skill	-0.02	0.03	0.05	2.14	0.01	-0.01	-0.02	-0.59
	(0.017)	(0.021)			(0.027)	(0.023)		
Observations	19,313	17,319			11,128	10,356		

Appendix Table 3: Skill intensity of jobs - detailed results

	Numeracy skill use		Literacy skill use		ICT skill use	
VARIABLES	coef	se	coef	se	coef	se
Female	-0.170***	(0.027)	-0.160***	(0.022)	-0.074***	(0.027)
Years of education	0.050***	(0.007)	0.065***	(0.005)	0.056***	(0.007)
Experience	0.004	(0.004)	0.002	(0.004)	0.008**	(0.004)
Experienceˆ2	-0.000*	(0.000)	0.000	(0.000)	-0.000**	(0.000)
Experience missing	-0.214	(0.145)	-0.048	(0.134)	-0.169	(0.154)
Has a partner (dummy)	-0.006	(0.039)	0.021	(0.029)	-0.005	(0.036)
Partner information missing	-0.068	(0.042)	-0.027	(0.035)	-0.054	(0.033)
Has children	0.026	(0.033)	0.030	(0.026)	-0.002	(0.029)
Children information missing	-0.198	(0.325)	-0.306	(0.269)	-0.142	(0.452)
Permanent contract	0.062**	(0.026)	0.054**	(0.023)	0.042	(0.028)
Contract information missing	0.118**	(0.054)	0.087	(0.060)	0.080	(0.061)
Fullt time woker	0.231***	(0.032)	0.295***	(0.032)	0.278***	(0.035)
Work time information missing	0.640**	(0.320)	-0.477	(1.393)	-0.440	(0.452)
Privat sector (dummy)	0.077*	(0.043)	-0.057	(0.042)	0.047	(0.043)
information on sector is missing	0.431***	(0.148)	-0.005	(0.132)	-0.173	(0.144)
Self employed (dummy)	0.075	(0.099)	-0.013	(0.083)	0.043	(0.111)
Information on self employment missing	-0.199*	(0.118)	0.130	(0.113)	0.041	(0.119)
Firm size between 11 and 50 workers	-0.048	(0.032)	0.054*	(0.029)	0.048	(0.048)
Firm size between 51 and 250 workers	-0.096**	(0.041)	0.042	(0.035)	0.082**	(0.040)
Firm size between 251 and 1000 workers	-0.173***	(0.055)	0.050	(0.039)	0.065	(0.052)
Firm size larger than 1000 workers	-0.056	(0.059)	0.057	(0.045)	0.149***	(0.049)
Information on firm size missing	-0.155*	(0.093)	0.038	(0.063)	-0.066	(0.089)
France	0.131***	(0.030)	-0.003	(0.029)	-0.105***	(0.030)
Ireland	0.065**	(0.033)	0.054*	(0.029)	-0.093***	(0.033)
Italy	0.087**	(0.042)	-0.025	(0.034)	0.099**	(0.045)
South-Korea	0.090**	(0.035)	0.400***	(0.030)	0.056	(0.038)
Norway	-0.160***	(0.024)	0.021	(0.029)	-0.150***	(0.025)
Poland	0.041	(0.040)	-0.129***	(0.022)	-0.223***	(0.036)
Slovakia	0.095***	(0.035)	-0.149***	(0.032)	-0.122***	(0.040)
USA	0.265***	(0.049)	0.110*	(0.057)	-0.049	(0.054)
Numeracy skill	0.084***	(0.031)	-0.017	(0.022)	0.027	(0.027)
Literacy skill	-0.025	(0.027)	-0.026	(0.022)	-0.006	(0.025)
Observations	29,032		30,032		23,848	
R-squared	0.229		0.327		0.317	

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, The regressions also controls for occupation categories (ISCO 2 digit) dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status) and cognitive test results (plus a dummy for each variable indicating whether it was reported or not). Baseline category is Denmark, and firm size is smaller than 10 workers. Standard errors are calculated with the jackknife method (suggested by [OECD2013]) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey

Appendix Table 4: Gender differences in non-cognitive skill intensity of the job

VARIABLES	Influence	Learn	Planning at work	Ready to learn	Task disc.
			Panel A - Raw differences		
Female	-0.005	-0.033	-0.052*	-0.011	-0.083***
	(0.027)	(0.021)	(0.029)	(0.021)	(0.021)
R-squared	0.000	0.000	0.001	0.000	0.002
			Panel B - Exogenous		
Female	-0.032	-0.055**	-0.059**	-0.038*	-0.087***
	(0.026)	(0.021)	(0.028)	(0.021)	(0.021)
R-squared	0.062	0.060	0.016	0.135	0.017
			Panel C - Endogenous		
Female	-0.177***	-0.075***	-0.048**	-0.067***	-0.073***
	(0.025)	(0.024)	(0.025)	(0.023)	(0.023)
R-squared	0.303	0.125	0.165	0.243	0.206
			Panel D - Habit		
Female	-0.158***	-0.055**	-0.036	-0.031	-0.061***
	(0.025)	(0.024)	(0.025)	(0.022)	(0.024)
R-squared	0.338	0.152	0.172	0.315	0.211
Observations	32,489	31,979	32,761	32,527	34,860

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, control variables differs by panels. Control variables in panel A: raw differences without any control variable. Control variables in panel B: country fixed effects, parents highest level of education and parents immigration status. Control variables in Panel C: all of the above plus partner dummy, child dummy, years of education, occupation categories (ISCO 2 digit), dummy for full time work, self-employment dummy, experience, square of experience, dummy for those having permanent contract, dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status) and cognitive test results (plus a dummy for each variable indicating whether it was reported or not). Panel D: all of the above plus index of skill use at home (plus a dummy for each variable indicating whether it was reported or not). Index of skill use at home are standardized to have zero mean and standard deviation of one.Standard errors are calculated with the jackknife method (suggested by OECD (2013) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey.

Appendix Table 5: Misreporting - Detailed questions

VARIABLE	Female	St. Dev.	R-square	Observation
Work flexibility				
- Sequence of tasks	-0.034	(0.034)	0.211	36,538
- How to do the work	-0.068**	(0.034)	0.167	36,521
- Speed of work	-0.080**	(0.036)	0.135	36,526
- Work flexibility - Working hours	-0.107***	(0.034)	0.243	36,552
Learning				
- Learning from co-workers/supervisors	-0.097***	(0.033)	0.123	33,223
- Learning - Learning-by-doing	-0.059*	(0.031)	0.144	36,461
- Learning - Keeping up to date	-0.046	(0.032)	0.169	36,453
Job satisfaction	0.006	(0.024)	0.089	36,546
Skill use at work				
- Time cooperating with co-workers	-0.010	(0.033)	0.146	33,239
- How often - Sharing work-related info	-0.046*	(0.028)	0.244	36,525
- How often - Teaching people	-0.175***	(0.045)	0.270	36,534
- How often - Presentations	-0.273***	(0.027)	0.313	36,538
- How often - Selling	-0.094***	(0.034)	0.369	36,527
- How often - Advising people	-0.215***	(0.033)	0.229	36,531
- How often - Planning own activities	-0.026	(0.040)	0.209	36,516
- How often - Planning others activities	-0.204***	(0.041)	0.228	36,531
- How often - Organizing own time	0.004	(0.036)	0.198	36,505
- How often - Influencing people	-0.151***	(0.040)	0.242	36,472
- How often - Negotiating with people	-0.259***	(0.039)	0.203	36,494
- Problem solving - Simple problems	-0.120***	(0.030)	0.197	36,486
- Problem solving - Complex problems	-0.183***	(0.029)	0.238	36,469
- How often - Working physically for long	-0.139***	(0.038)	0.386	36,530
- How often - Using hands or fingers	0.045	(0.034)	0.195	36,527
- Not challenged enough	0.027***	(0.009)	0.054	36,220
- Need more training	0.020	(0.012)	0.071	36,504
Literacy skill use at work				
- Read directions or instructions	-0.149***	(0.037)	0.215	36,546
- Read letters memos or mails	-0.008	(0.030)	0.453	36,548
- Read newspapers or magazines	-0.145***	(0.032)	0.320	36,554
- Read professional journals or publications	-0.152***	(0.029)	0.327	36,548
- Read books	-0.153***	(0.026)	0.279	36,550
- Read manuals or reference materials	-0.273***	(0.036)	0.254	36,550
- Read financial statements	0.027	(0.034)	0.293	36,550
- Read diagrams maps or schematics	-0.491***	(0.035)	0.246	36,548
- Write letters memos or mails	0.012	(0.035)	0.461	36,556
- Write articles	-0.062***	(0.019)	0.155	36,557
- Write reports	-0.211***	(0.030)	0.244	36,549
- Fill in forms	-0.066**	(0.033)	0.242	36,548

VARIABLE	Female	St. Dev.	R-square	Observation
Numeracy skill use at work				
- How often - Calculating costs or budgets	-0.041	(0.030)	0.325	36,553
- Use or calculate fractions or percentages	-0.211***	(0.036)	0.287	36,551
- How often - Use a calculator	0.010	(0.035)	0.307	36,557
- How often - Prepare charts graphs or tables	-0.131***	(0.031)	0.257	36,553
- How often - Use simple algebra or formulas	-0.271***	(0.039)	0.235	36,548
- How often - Use advanced math or statistics	-0.219***	(0.023)	0.161	36,548
ICT skill use at work				
- Experience with computer in job	-0.002	(0.010)	0.436	36,567
- Internet - How often - For mail	-0.049	(0.040)	0.342	25,239
- Internet - How often - Work related info	-0.139***	(0.054)	0.282	25,237
- Internet - How often - Conduct transactions	-0.118**	(0.054)	0.230	25,234
- Computer - How often - Spreadsheets	-0.026	(0.057)	0.301	25,233
- Computer - How often - Word	-0.007	(0.049)	0.368	25,231
- Computer - How often - Programming language	-0.215***	(0.036)	0.191	25,217
- Computer - How often - Real-time discussions	-0.090**	(0.035)	0.229	25,235
- Computer - Level of computer use	-0.028*	(0.016)	0.305	25,214
- Computer - Got the skills needed	0.000	(0.007)	0.090	25,226
- ICT - Computer - Lack of skills affect career	-0.000	(0.009)	0.064	25,168

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Control variables: country fixed effects, parents highest level of education, parents immigration status, partner dummy, child dummy, years of education, occupation categories (ISCO 2 digit), dummy for full time work, self-employment dummy, experience, square of experience, dummy for those having permanent contract, dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status) and cognitive test results (plus a dummy for each variable indicating whether it was reported or not). Standard errors are calculated with the jackknife method (suggested by OECD (2013) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey.

Appendix Table 6: Gender differences in skill intensity of the job - non of the skill intensity measure is missing

VARIABLES	Numeracy	Literacy	ICT
	skill use at work		
Panel A - Raw differences			
Female	-0.314***	-0.194***	-0.110***
	(0.030)	(0.023)	(0.029)
R-squared	0.025	0.009	0.003
Panel B - Exogenous			
Female	-0.318***	-0.189***	-0.103***
	(0.030)	(0.023)	(0.029)
R-squared	0.035	0.034	0.023
Panel C - Endogenous			
Female	-0.234***	-0.224***	-0.068**
	(0.031)	(0.024)	(0.027)
R-squared	0.198	0.214	0.286
Panel D - Habit			
Female	-0.152***	-0.143***	0.000
	(0.030)	(0.025)	(0.026)
R-squared	0.309	0.342	0.388
Observations	21,484	21,484	21,484

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, control variables differs by panels. Control variables in panel A: raw differences without any control variable. Control variables in panel B: country fixed effects, parents highest level of education and parents immigration status. Control variables in Panel C: all of the above plus partner dummy, child dummy, years of education, occupation categories (ISCO 2 digit), dummy for full time work, self-employment dummy, experience, square of experience, dummy for those having permanent contract, dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status) and cognitive test results (plus a dummy for each variable indicating whether it was reported or not). Panel D: all of the above plus index of skill use at home (plus a dummy for each variable indicating whether it was reported or not). Index of skill use at home are standardized to have zero mean and standard deviation of one.Standard errors are calculated with the jackknife method (suggested by OECD, 2013) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey.

Appendix Table 7: Gender differences in skill intensity of the job - by country

(a) Denmark

VARIABLES	Numeracy	Literacy	ICT
	skill use at work		
Panel A - Raw differences			
Female	-0.378***	-0.101***	-0.250***
	(0.033)	(0.036)	(0.030)
R-squared	0.035	0.003	0.016
Panel B - Exogenous			
Female	-0.380***	-0.104***	-0.248***
	(0.033)	(0.037)	(0.030)
R-squared	0.043	0.007	0.022
Panel C - Endogenous			
Female	-0.263***	-0.181***	-0.155***
	(0.040)	(0.035)	(0.036)
R-squared	0.286	0.346	0.396
Panel D - Habit			
Female	-0.170***	-0.141***	-0.097***
	(0.039)	(0.033)	(0.031)
R-squared	0.354	0.409	0.469
Observations	4,345	4,745	4,160

(b) France

VARIABLES	Numeracy	Literacy	ICT
	skill use at work		
Panel A - Raw differences			
Female	-0.189***	-0.182***	-0.049
	(0.026)	(0.025)	(0.033)
R-squared	0.009	0.008	0.001
Panel B - Exogenous			
Female	-0.196***	-0.184***	-0.046
	(0.026)	(0.025)	(0.033)
R-squared	0.032	0.040	0.028
Panel C - Endogenous			
Female	-0.150***	-0.170***	-0.024
	(0.031)	(0.027)	(0.035)
R-squared	0.280	0.333	0.324
Panel D - Habit			
Female	-0.099***	-0.127***	0.018
	(0.031)	(0.026)	(0.032)
R-squared	0.337	0.414	0.392
Observations	3,412	3,725	2,904

(c) Ireland

VARIABLES	Numeracy	Literacy	ICT
Panel A - Raw differences			
Female	-0.188***	-0.075**	-0.056
	(0.038)	(0.037)	(0.042)
R-squared	0.009	0.001	0.001
Panel B - Exogenous			
Female	-0.197***	-0.088**	-0.048
	(0.038)	(0.038)	(0.043)
R-squared	0.025	0.037	0.025
Panel C - Endogenous			
Female	-0.139***	-0.166***	0.007
	(0.047)	(0.039)	(0.039)
R-squared	0.274	0.374	0.375
Panel D - Habit			
Female	-0.106**	-0.145***	0.030
	(0.048)	(0.040)	(0.039)
R-squared	0.325	0.441	0.443
Observations	2,934	3,185	2,440

(d) Italy

VARIABLES	Numeracy	Literacy	ICT
	skill use at work		
Panel A - Raw differences			
Female	-0.065	0.030	-0.104*
	(0.055)	(0.055)	(0.059)
R-squared	0.001	0.000	0.003
Panel B - Exogenous			
Female	-0.074	0.005	-0.107*
	(0.053)	(0.051)	(0.059)
R-squared	0.046	0.088	0.030
Panel C - Endogenous			
Female	-0.080	-0.099*	-0.055
	(0.058)	(0.052)	(0.066)
R-squared	0.343	0.444	0.293
Panel D - Habit			
Female	-0.007	-0.031	0.017
	(0.049)	(0.050)	(0.060)
R-squared	0.461	0.540	0.410
Observations	1,941	2,004	1,552

(e) Republic of Korea

VARIABLES	Numeracy	Literacy	ICT
		skill use at work	
Panel A - Raw differences			
Female	-0.271***	-0.175***	-0.200***
	(0.034)	(0.035)	(0.037)
R-squared	0.018	0.007	0.010
Panel B - Exogenous			
Female	-0.296***	-0.211***	-0.232***
	(0.036)	(0.037)	(0.038)
R-squared	0.049	0.058	0.038
Panel C - Endogenous			
Female	-0.174***	-0.158***	-0.107**
	(0.036)	(0.040)	(0.044)
R-squared	0.260	0.305	0.312
Panel D - Habit			
Female	-0.170***	-0.093***	-0.039
	(0.035)	(0.036)	(0.038)
R-squared	0.375	0.466	0.460
Observations	3,547	3,343	2,650

(f) Norway

VARIABLES	Numeracy	Literacy	ICT
		skill use at work	
Panel A - Raw differences			
Female	-0.412***	-0.235***	-0.359***
	(0.030)	(0.033)	(0.035)
R-squared	0.042	0.014	0.032
Panel B - Exogenous			
Female	-0.418***	-0.244***	-0.362***
	(0.031)	(0.033)	(0.035)
R-squared	0.049	0.030	0.044
Panel Cc- Endogenous			
Female	-0.296***	-0.230***	-0.115***
	(0.037)	(0.034)	(0.034)
R-squared	0.297	0.330	0.460
Panel D - Habit			
Female	-0.185***	-0.156***	-0.026
	(0.032)	(0.033)	(0.033)
R-squared	0.381	0.401	0.531
Observations	3,329	3,730	3,290

(g) Poland

VARIABLES	Numeracy	Literacy	ICT
		skill use at work	
Panel A - Raw differences			
Female	0.033	0.152***	-0.102*
	(0.042)	(0.038)	(0.059)
R-squared	0.000	0.006	0.003
Panel B - Exogenous			
Female	0.015	0.123***	-0.100*
	(0.043)	(0.037)	(0.059)
R-squared	0.041	0.102	0.043
Panel C - Endogenous			
Female	-0.106**	-0.110**	-0.130**
	(0.047)	(0.044)	(0.056)
R-squared	0.317	0.402	0.363
Panel D - Habit			
Female	-0.033	-0.037	-0.011
	(0.043)	(0.040)	(0.048)
R-squared	0.439	0.511	0.462
Observations	3,904	3,683	2,596

(h) Slovak Republic

VARIABLES	Numeracy	Literacy	ICT
		skill use at work	
Panel A - Raw differences			
Female	0.048	0.107**	-0.077*
	(0.041)	(0.046)	(0.043)
R-squared	0.001	0.003	0.001
Panel B - Exogenous			
Female	0.042	0.105**	-0.052
	(0.041)	(0.047)	(0.043)
R-squared	0.024	0.068	0.051
Panel C - Endogenous			
Female	-0.068	-0.109**	-0.037
	(0.051)	(0.045)	(0.049)
R-squared	0.273	0.399	0.309
Panel D - Habit			
Female	-0.025	-0.050	0.066
	(0.045)	(0.039)	(0.043)
R-squared	0.368	0.511	0.457
Observations	2,585	2,590	1,706

(i) USA

VARIABLES	Numeracy	Literacy	ICT
	skill use at work		
Panel A - Raw differences			
Female	-0.256***	-0.113***	-0.109**
	(0.041)	(0.034)	(0.042)
R-squared	0.016	0.003	0.003
Panel B - Exogenous			
Female	-0.253***	-0.104***	-0.097**
	(0.040)	(0.030)	(0.041)
R-squared	0.025	0.024	0.018
Panel C - Endogenous			
Female	-0.187***	-0.179***	-0.067*
	(0.047)	(0.035)	(0.041)
R-squared	0.226	0.331	0.356
Panel D - Habit			
Female	-0.130***	-0.146***	-0.003
	(0.045)	(0.033)	(0.041)
R-squared	0.331	0.442	0.442
Observations	3,040	3,033	2,556

note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, control variables differs by panels. Control variables in panel A: raw differences without any control variable. Control variables in panel B: country fixed effects, parents highest level of education and parents immigration status. Control variables in Panel C: all of the above plus partner dummy, child dummy, years of education, occupation categories (ISCO 2 digit), dummy for full time work, self-employment dummy, experience, square of experience, dummy for those having permanent contract, dummies for 1 digit industry, 5 firm size categories, private sector control and a set of social skills (categorical variable for cultural engagement, political efficacy, social trust, social trust 2 and health status) and cognitive test results (plus a dummy for each variable indicating whether it was reported or not). Panel D: all of the above plus index of skill use at home (plus a dummy for each variable indicating whether it was reported or not). Index of skill use at home are standardized to have zero mean and standard deviation of one.Standard errors are calculated with the jackknife method (suggested by OECD, 2013) using 80 replication weights. All of the the results are calculated by using sampling weights provided by the survey.