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Abstract

This study analyzes information communication technology (ICT) use and skills of workers, and their effects on employment opportunities. I employ a confidential data set provided by Statistical Institute of Turkey that includes detailed surveys on ICT use by households and individuals. The data contains information on ICT skills: starting from the most basic ones such as using an excel spreadsheet and uploading or transferring files, to more advanced skills such as knowing a programming language and solving computer problems. Workers that have ICT skills are more likely to be employed when individual and household level observables are held constant. However, this positive relationship is due to the workers who gained these skills at work. This data suggests there is no causal direction from ICT skills to employment and the positive relationship is due to endogeneity.

JEL Classifications: J24, O30
Keywords: Information communication technologies, ICT skills, employment

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†This research uses data by Turkish Statistical Institute and Government Planning Organization of Turkey. The results presented in this paper do not reflect the opinions of the aforementioned organizations.

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1 Introduction

The worker-firm matching process is highly affected by the flow and quality of information.[1] The information communication technologies (ICTs), especially the Internet, provide new mechanisms to improve the matching of workers with firms. The Internet can lead to better match by providing more information to firms and workers. It reduces the cost of applications for the workers and removes the geographic barrier of job search. On-the-job search can become easier through the Internet as employees can search for jobs after work hours in a limited amount of time. On the other hand, ICTs and the Internet can provide education, learning and training opportunities that can increase skill levels of workers at a lower cost. As ICTs are becoming more essential parts of the business investments, ICT skills that complement these technologies make the workers more attractive on the job market.[2]

There is limited evidence on the effects of ICTs on the job market outcomes of workers, mostly due to lack of micro-data. Kuhn and Skuterud (2004) and Stevenson (2009) use Current Population Survey data to analyze the effects of internet job search on workers. Kuhn and Skuterud (2004) find that Internet job search is associated with lower unemployment durations. However this relationship is eliminated when observable variables held constant. Stevenson (2009) analyzes on-the-job search and find that the workers who use internet job search methods are more likely to make an employment-to-employment transition.

The research questions in this study are the prevalence of ICT skills and how they affect employment opportunities of workers. Skill levels are conventionally measured by education, however innovative capacity and knowledge are not necessarily captured by the educational attainment. In order to establish the relationship between technology use and labor market

[1] Autor (2000)

[2] Additionally on the demand side, there is a well-established literature on skilled-biased technological change. Acemoglu (1998), Autor, Katz and Kruger (1998) and Autor, Levy and Murane (2001) find evidence that information technologies are skill biased. Michaels, Natraj and Van Reenen (2010) provide evidence that information communication technologies are skilled biased as well. Information communication technologies (ICTs) are considered as skill-biased that change the relative demand for skilled and unskilled labor. ICTs require skilled labor for maintenance and use. Therefore, adoption of these technologies increases the demand and wages for skilled labor.

outcomes, observing the technology related skills of workers is important. The impacts of ICT skills on workers can be even more critical in emerging countries such where these skills are more scarce compared to the developed world. Empirical evidence on ICT skills and employment opportunities of workers is scarce. In an experimental study, Blaco and Boo (2010) submit fictitious CVs to real job vacancies. The CVs that had ICT skills listed had 1% higher chance to get a call back controlling for other characteristics. To my knowledge, there are no studies on the relationship between ICT skills and employment in developing countries using representative micro-data. This paper aims to provide the first evidence on the prevalence of the ICT skills in a developing county and its relationship with employment probability of workers.

First, I summarize the prevalence of the ICT skills over time. ICT skills are not very common among the working age population; for example a very basic application such as transferring and editing a file can be done by 32% of the people. This percentage is lower for more advanced skills; 4% of the people know a programming language. The prevalence for all ICT skills are higher when home computer and internet access are controlled for. More of the working population acquires these skills over time as the the computer and internet use rates increase.

The probit regressions suggest there is a positive relationship between having ICT skills and probability of being employed. These analyses have potential endogeneity problems, which can be caused by two mechanisms. First, unobserved ability bias can affect an individual's probability of being employed and his ICT skills. Significant education gap between people who have ICT skills and do not have ICT skills confirm that there is an unobserved component of an individual's general abilities. This education gap increases by age. Since older people are less likely to have ICT skills, the ones that have ICT skills are more educated compared to their age groups. I control for this unobserved skill bias using difference in years of education of each individual compared to his age group. When this variable is added in the probit regressions, the coefficient of ICT skills on probability of being employed

decreases.

The second type of endogeneity is reverse causality. Workers can gain these skills at work; indeed 8% of all people that have at least one ICT skill reported that they gained these skills at work. Interactions of ICT skills and where these skills are acquired show that significant relationship between ICT skills and employment status is only due to people who reported that they gained these skills at work. This evidence confirm the reverse causality problem. Controlling for two types of endogeneity, there is not a causal direction from ICT skills to employment.

2 Data

I employ individual and household level data set by Turkish Statistical Institute and Government Planning Organization of Turkey. This confidential data set include surveys on ICT adoption and use over 2007 to 2010. The surveys are nationally representative repeated cross-sections with total of approximately 75,000 observations over 4 years. When I restrict the sample to people of working age, 16 and 65, number of observations drops to 48,404.

The data includes household adoption information such as presence of computers, internet and other ICT devices at home. There are individual level questions for each member of the household. These questions provide detailed information of ICT adoption and use by the individuals, as wells as and purposes, locations and frequency of ICT use. Additionally, this data set includes information on ICT skills and where people gained these ICT skills.

2.1 ICT Skills

Individuals report the ICT skills they have among the following options:

1. Copying and transferring files/folder

2. Using copy/paste command

3. Using formulas in a spreadsheet

4. Zipping files/folders

5. Connecting and installing devices to computer (modem, scanner etc..)

6. Knowing a programming language

7. Connecting computers to networks

8. Problem solving/trouble shooting involving computers and internet

These skills are ranked based on their complexity. I have classified these skills into 3 groups: basic ICT skills, medium ICT skills, advanced ICT skills. Basic skills include copying and transferring files/folder and using copy/paste command. These are the most basic skills in order to create and edit a computer file. Medium skills include using formulas in a spreadsheet, zipping files/folders and connecting devices to computer. Advanced skills are knowing a programing language, connecting computers to networks and problem solving involving internet and computers.

2.2 Where the ICT skills are gained

The next question in the survey asks where people gained these ICT skills. These variables are helpful in terms of controlling the endogeneity of ICT skills variables. These questions are only available for 2007 and 2008.

There are 6 possible answers for the question "Where/how did you gain the ICT skills you have listed?"

1. At an educational institute (school, college)

2. In a workshop/class by your own initiation (without employer's demand)

3. In a workshop/class by employer's demand or at work

4. Individually with the help of books and DVDs

5. Individually with experience/ trial and error

6. With the help of your friends and family

2.3 Summary Statistics

Table 1 summarizes the ratio of people who have listed ICT skills. Even very basic tasks such as copy/paste and file transfer can only be done by 30-40% of the workers in the labor force. This shows the basic skills that are taken for granted in the developed world might be not as widespread in the developing world.

Twenty six percent of the households have home computer access in 2007 and this goes up to 46 percent in 2010. Twenty percent of the households have home internet access in 2007 and this percentage goes up to 46 in 2010. Part B and C of table 1 show the ratio of people that have ICT skills given home computer and home internet access respectively. As expected, for people who have access to computer and internet at home the probability of having ICT skills are higher.

Table 2 presents the summary of ratio of people who have any ICT skill, any basic ICT skill, any medium ICT skill and any advanced ICT skill. The basic skills are more common and the prevalence for all types of ICT skills are higher given home computer and internet access and over time.

Table 3 summarizes where the ICT skills are acquired among the people that have any of the ICT skills. People can list more than one mechanism so the ratios do not add up to 1. Most people said they have gained ICT skills through friends & family, trial & error or at an educational institute. In 2007 and 2008, 8% of the people who have one or more ICT skills reported they gained the skill(s) at work or through a workshop with employer's demand.

3 Empirical Specification and Results

3.1 A Probit Model of Employment and ICT skills

I use the following basic probit model for empirical specification:

$$\text{Employment Status}_i = \beta_0 + \beta_1 \text{ICT Skills}_i + \delta X_i + \alpha Z_h + \lambda_t + \epsilon_i \quad (1)$$

where Employment Status_i is an indicator for whether individual i is employed or not, ICT Skills_i is the ICT skills of individual i, X_i includes individual controls, Z_h includes household level control variables. The time control that absorbs time specific shocks shared by all the individuals is λ_t.

The individual level control variables include years of education, age, gender, residence in an urban area and whether they think they have a foreign language barrier (English) in order to use ICTs. Race is not an important control variable for Turkey as it is a homogenous society and the foreign immigration rate is negligible. Household level control variables include presence of computer, internet and other ICT devices (iPad, smart phone, scanner) at home and number of working people in the household besides the individual.

Table 4 presents the probit regressions for basic ICT skills. Column 1 is the simple regressions without any individual or household level control variables. The people who have at least one basic ICT skill are 44 percent more likely to be employed. Once the individual characteristics are controlled for this probability drops to 25 percent. Including the household level controls lead to basic ICT skills coefficient to be 29 percent. In sum, controlling for time and individual and household characteristics, having at least one basic ICT skills is associated with around 32 percent higher probability of being employed.

Table 5 and 6 present similar probit analysis for medium ICT skills and advanced ICT skills respectively. The first column presents the coefficients without any control variables. Column 2 introduces the individual level controls and column 3 introduces the household level controls along with the time fixed effects. Having at least one medium ICT skill is

associated with 29 percent higher probability of being employed. This probability is 27 percent for people that have at least one advanced ICT skills.

3.2 Unobserved Skill Bias

One concern regarding the empirical specification is the unobservable skill bias. The significant relationship between employment status and ICTs kills might be spurious due to unobserved skills that are correlated with both. For example an individual with higher IQ will have a higher probability of being employed and acquiring ICT skills. In order to find some evidence supporting this assertion, I analyze the education gap between people who have ICT skills and people who do not have ICT skills. The education gap is the difference in average years of education between people with and without ICT skills. Additionally, younger people have a higher probability of gaining ICT skills. This can lead the unobservable bias associated with ICT skills to be different for people at different ages. I also explore how this education gap changes for people of different ages.

Table 7 shows the education gap between people who have basic ICT skills and the people who do not have basic ICT skills for different age groups and over time. For each age group, I took the difference in average years of education between people with and without ICT skills. I dropped observations of people age 60-65 since there were only a couple of people with ICT skills. The difference in education between people with and without advanced ICT skills increase with age. The education gap is decreasing within the same age group over time. All the differences in education within and between groups are statistically significant.

Table 8 shows the education gap between people who have medium ICT skills and the people who do not have medium ICT skills for different age groups and time. Similarly, the difference in years of education between people with and without medium ICT skills increases by age. The education gap within groups decrease for younger age groups and increase for some older age groups even though they are not statistically different for older age groups.

Table 9 shows the education gap between people who have advanced ICT skills and the people who do not have advanced ICT skills for different age groups and time. Here again there is a similar pattern as in the gap for medium skills.

Overall unobserved skill bias is different at different ages and over time. The unobserved bias is higher for older people. In order to control for this unobserved skill bias, I calculate the difference between the individual's years of education and average years of education of of his age cohort. This variable is used as proxy for the unobservable skill bias. Once this education difference variable is added in the probit regressions, the coefficients of ICT skills decrease. The coefficient of basic ICT skills drops to 24% from 32%, the coefficient of medium ICT skills drops to 25% to 29% and the coefficient of advanced ICT skills drops to 19% from 27%. This evidence shows that some of the relationship between ICT skills and employment status are due to unobservable factors.

3.3 Interactions between ICT skills and where people gained ICT skills

Another potential problem is reverse causality: employed people can gain ICT skills at work. Employers can require ICT training programs and workshops. I use the question about where people gained ICT skills in order to address this problem. In the sample 8 percent of people indicated that they have gained ICT skills at work. This question is only available for 2007 and 2008. I drop the observations from 2009 and 2010 in this section and the sample size drops to 2414 observations.

I include interactions terms between the ICT skills and where people gained ICT skills. The purpose is to analyze whether the relationship between ICT skills and employment are due to certain ways in which people acquire these skills. Column 1 of table 13 presents the employment probit regressions for years 2007 and 2008. Column 1 presents the coefficient of basic skills without any control variables, column 2 includes the individual controls and column 3 includes the household controls. Column 3 suggests having at least one basic skill

is associated with 23 percent higher probability of being employed. Column 4 introduces the interaction terms between the basic ICT skills and how people gained the skills. The only interaction term that is significant is the one between basic ICT skills and gaining these skills at work. The level of basic skills coefficient is insignificant as well, suggesting the positive relationship between basic skills and employment is only due to people who gained these skills at work. These results confirm the endogeneity of ICT skills and employment status and suggest hat there is no causal direction from ICT skills to employment.

4 Conclusion

This study aims to provide the first evidence on the prevalence and effects of ICT skills on employment probability in a developing county. I use a confidential individual and household level data set provided by the Turkish Statistical Institute that is nationally representative. Data shows the adoption and use of computers and the internet increase rapidly between 2007 and 2010. ICT skills also become more widespread over time and among the people who have home computer and internet access.

Having at least one basic, medium or advanced ICT skill is associated with 20 to 30 percent higher probability of being employed. There are two types of endogeneity problems in the probit analysis: unobservable skill bias and reverse causality. There is evidence for unobservable skill bias in the data as there is a significant education gap between people who have ICT skills and people who do not have ICT skills. This education gap is larger for older people. I proxy the unobservable ability using the difference in years of education of the individual compared to the age cohort. Controlling for the education gap decreases the magnitude of ICT skill coefficients. There is also evidence for reverse causality as 8% of all the people who have at least one ICT skill reported that they gained these skills at work. The significant relationship between ICT skills and employment probability is only due to people who gained these skills at work. Controlling for observable characteristics, a proxy

for the unobserved ability and where the ICT skills are gained, there is no causal direction from ICT skills to employment.

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Table 1: ICT Skills

A. Prevalence of ICT skills

	2007	2008	2009	2010
File/folder copy and transfer	0.26	0.33	0.35	0.37
Using copy/paste command	0.22	0.28	0.30	0.31
Using formulas in a spreadsheet	0.11	0.13	0.15	0.17
Zipping the files/folders	0.14	0.17	0.18	0.20
Connecting and installing devices to computer	0.11	0.13	0.15	0.17
Knowing a programming language	0.03	0.03	0.03	0.03
Connecting computers to networks	0.06	0.08	0.09	0.10
Problem solving/trouble shooting about computers	0.09	0.11	0.12	0.13

B.Prevalence of ICT skills given home computer access

File/folder copy and transfer	0.53	0.57	0.58	0.58
Using copy/paste command	0.49	0.50	0.51	0.50
Using formulas in a spreadsheet	0.25	0.26	0.28	0.29
Zipping the files/folders	0.33	0.34	0.34	0.34
Connecting and installing devices to computer	0.27	0.28	0.28	0.29
Knowing a programming language	0.08	0.08	0.07	0.07
Connecting computers to networks	0.28	0.31	0.29	0.34
Problem solving/trouble shooting about computers	0.18	0.17	0.17	0.18

C. Prevalence of ICT skills given home internet access

File/folder copy and transfer	0.54	0.56	0.58	0.59
Using copy/paste command	0.51	0.52	0.51	0.52
Using formulas in a spreadsheet	0.28	0.28	0.28	0.28
Zipping the files/folders	0.34	0.33	0.36	0.37
Connecting and installing devices to computer	0.30	0.30	0.29	0.29
Knowing a programming language	0.08	0.08	0.06	0.06
Connecting computers to networks	0.25	0.26	0.24	0.25
Problem solving/trouble shooting about computers	0.20	0.19	0.19	0.18

Table 2: ICT Skills

A. Prevalence of ICT Skills

	2007	2008	2009	2010
Any one of the ICT skills	0.32	0.38	0.42	0.44
Any one of the basic ICT skills	0.27	0.34	0.36	0.38
Any of the medium ICT skills	0.17	0.21	0.23	0.24
Any of the the advanced ICT skills	0.11	0.14	0.15	0.17

B. Prevalence of ICT Skills given home computer access

Any one of the ICT skills	0.64	0.67	0.68	0.69
Any one of the basic ICT skills	0.56	0.57	0.59	0.60
Any of the medium ICT skills	0.40	0.42	0.43	0.45
Any one of the advanced ICT skills	0.25	0.26	0.28	0.30

C. Prevalence of ICT Skills given home internet access

Any one of the ICT skills	0.66	0.67	0.71	0.72
Any one of the basic ICT skills	0.60	0.60	0.62	0.61
Any of the medium ICT skills	0.40	0.43	0.44	0.44
Any one of the advanced ICT skills	0.28	0.29	0.31	0.32

Table 3: Where the ICT Skills are gained

Ratios among people who have any of the ICT skills

	2007	2008
At an institute (School, college)	0.25	0.25
In a workshop/class with your own initiation(without employer's demand)	0.15	0.15
In a workshop/class with employer's demand or a work	0.08	0.08
On your own with the help of books and DVDs	0.07	0.07
On your own with experience/ trial and error	0.71	0.68
With help of your friends and family	0.47	0.55

Table 4: Probit for Basic ICT Skills

Dependent Variable: Employment Status			
	(1)	(2)	(3)
	no control	ind control	hh control
Basic ICT skills	0.4410***	0.2700***	0.3246***
	(0.0121)	(0.0163)	(0.0174)
Years education		0.0607***	0.0636***
		(0.0017)	(0.0018)
Language Barrier		-0.0384	-0.0185
		(0.0533)	(0.0535)
Age		0.0045***	0.0046***
		(0.0005)	(0.0005)
Female		-0.0516***	-0.0522***
		(0.0117)	(0.0117)
Urban		-0.4405***	-0.4301***
		(0.0133)	(0.0137)
Household computer			-0.0533
			(0.0341)
Household other devices			0.0514***
			(0.0171)
Household Internet			-0.0948***
			(0.0166)
Number of other people working in the household			-0.0067
			(0.0061)
Year 2007		0.1075***	0.0667***
		(0.0168)	(0.0183)
Year 2008		0.0812***	0.0610***
		(0.0163)	(0.0165)
Year 2009		-0.0007	-0.0154
		(0.0166)	(0.0167)
Observations	48,404	48,404	48,404

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Probit for Medium ICT Skills

Dependent Variable: Employment Status			
	(1)	(2)	(3)
	no controls	individual controls	household controls
Medium skills	0.4575***	0.2312***	0.2932***
	(0.0139)	(0.0172)	(0.0186)
Years education		0.0655***	0.0681***
		(0.0017)	(0.0018)
Language Barrier		0.0011	0.0267
		(0.0532)	(0.0535)
Age		0.0034***	0.0033***
		(0.0005)	(0.0005)
Female		-0.0502***	-0.0506***
		(0.0117)	(0.0117)
Urban		-0.4325***	-0.4240***
		(0.0133)	(0.0137)
Household computer			-0.0380
			(0.0341)
Household other devices			0.0489***
			(0.0172)
Household Internet			-0.0886***
			(0.0166)
Number of other people working in the household			-0.0088
			(0.0061)
Year 2007		0.0990***	0.0607***
		(0.0167)	(0.0183)
Year 2008		0.0814***	0.0639***
		(0.0163)	(0.0165)
Year 2009		0.0026	-0.0102
		(0.0166)	(0.0166)
Observations	48,404	48,404	48,404

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Probit for Advanced ICT Skills

Dependent Variable: Employment Status			
	(1)	(2)	(3)
	no controls	individual controls	household controls
Advanced ICT skills	0.4440***	0.2230***	0.2731***
	(0.0164)	(0.0185)	(0.0197)
Years education		0.0694***	0.0723***
		(0.0016)	(0.0017)
Language barrier		0.0289	0.0576
		(0.0531)	(0.0534)
Age		0.0029***	0.0027***
		(0.0005)	(0.0005)
Female		-0.0495***	-0.0496***
		(0.0117)	(0.0117)
Urban		-0.4311***	-0.4242***
		(0.0133)	(0.0137)
Household computer			-0.0224
			(0.0340)
Household other devices			0.0462***
			(0.0172)
Household Internet			-0.0860***
			(0.0166)
Number of other people working in the household			-0.0096
			(0.0061)
Year 2007		0.0972***	0.0614***
		(0.0167)	(0.0183)
Year 2008		0.0790***	0.0629***
		(0.0163)	(0.0165)
Year 2009		0.0051	-0.0060
		(0.0166)	(0.0166)
Observations	48,404	48,404	48,404

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Education gap between people with and without **basic ICT skills**

	Age Group								
Year	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60
2007	3.54	5.54	5.66	5.54	5.90	5.82	6.34	7.36	8.25
2008	2.91	4.83	5.44	5.59	5.93	5.46	6.49	6.77	7.83
2009	3.21	5.75	5.79	6.11	5.86	6.09	6.63	7.41	8.48
2010	2.84	5.25	5.79	5.47	6.29	6.18	6.59	7.50	8.03

Table 8: Education gap between people with and without **medium ICT skills**

	Age Group								
Year	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60
2007	2.67	5.38	5.69	6.04	6.23	6.73	7.06	8.02	8.68
2008	2.42	4.64	5.84	6.15	6.57	6.25	7.05	7.58	8.95
2009	2.33	5.35	6.23	6.49	6.38	6.37	6.98	8.14	8.79
2010	2.33	5.06	6.06	5.86	6.78	7.32	7.06	8.17	8.25

Table 9: Education gap between people with and without **advanced ICT skills**

	Age Group								
Year	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60
2007	2.15	4.67	5.48	5.76	5.65	6.79	8.56	9.66	9.66
2008	2.05	3.90	5.23	5.50	6.01	7.04	7.05	8.84	8.84
2009	1.90	4.41	5.16	5.87	5.97	5.98	7.27	8.63	8.63
2010	1.99	3.90	5.03	5.22	6.12	6.62	7.09	7.17	7.17

Table 10: Probit for Basic ICT Skills

Dependent Variable: Employment Status			
	(1)	(2)	(3)
	no controls	individual controls	housekols controls
Basic skills	0.4410***	0.2110***	0.2436***
	(0.0121)	(0.0163)	(0.0174)
Years education		0.0501***	0.0525***
		(0.0017)	(0.0018)
Difference of education from age group		0.0211***	0.0252***
		(0.0018)	(0.0019)
Language Barrier		-0.0392	-0.0189
		(0.0533)	(0.0535)
Age		0.0044***	0.0045***
		(0.0005)	(0.0005)
Female		-0.0520***	-0.0521***
		(0.0117)	(0.0117)
Urban		-0.4408***	-0.4310***
		(0.0133)	(0.0137)
Household computer			0.0533
			(0.0341)
Household other devices			0.0521***
			(0.0171)
Household Internet			0.0923***
			(0.0166)
Number of other people working in the household			-0.0067
			(0.0061)
Observations	48,404	48,404	48,404
Year Controls	No	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Probit for Medium ICT Skills

Dependent Variable: Employment Status			
	(1)	(2)	(3)
	no controls	individual controls	household controls
Medium skills	0.4575***	0.1972***	0.2574***
	(0.0139)	(0.0172)	(0.0186)
Years education		0.0655***	0.0681***
		(0.0017)	(0.0018)
Difference of education from age group		0.0227***	0.0258***
		(0.0018)	(0.0019)
Language Barrier		0.0012	0.0264
		(0.0532)	(0.0535)
Age		0.0033***	0.0032***
		(0.0005)	(0.0005)
Female		-0.0504***	-0.0503***
		(0.0117)	(0.0117)
Urban		-0.4343***	-0.4262***
		(0.0133)	(0.0137)
Household computer			0.0380
			(0.0341)
Household other devices			0.0485***
			(0.0172)
Household Internet			0.0872***
			(0.0166)
Number of other people working in the household			-0.0088
			(0.0061)
Observations	48,404	48,404	48,404
Year Controls	No	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12: Probit for Advanced ICT Skills

Dependent Variable: Employment Status			
	(1)	(2)	(3)
	no controls	individual controls	household controls
Advanced skills	0.4440***	0.1782***	0.1963***
	(0.0164)	(0.0185)	(0.0197)
Years education		0.0521***	0.0523***
		(0.0016)	(0.0017)
Difference of education from age group		0.0239***	0.0274***
		(0.0018)	(0.0019)
Language barrier		0.0281	0.0569
		(0.0531)	(0.0534)
Age		0.0028***	0.0027***
		(0.0005)	(0.0005)
Female		-0.0487***	-0.0492***
		(0.0117)	(0.0117)
Urban		-0.4324***	-0.4275***
		(0.0133)	(0.0137)
Household computer			0.0233
			(0.0340)
Household other devices			0.0461***
			(0.0172)
Household Internet			0.0852***
			(0.0166)
Number of other people			-0.0095
working in the household			(0.0061)
Observations	48,404	48,404	48,404
Year Controls	No	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13: Basic ICT Skills Interactions

Dependent Variable: Employment Status				
	(1)	(2)	(3)	(4)
Basic skills	0.4163***	0.2162***	0.2361***	0.0093
	(0.0176)	(0.0258)	(0.0276)	(0.0476)
Years education		0.0507***	0.0562***	0.0599***
		(0.0019)	(0.0020)	(0.0020)
Education Difference		0.02777***	0.0259***	0.0225***
		(0.0019)	(0.0020)	(0.0021)
Language Barrier		-0.0948	-0.0753	-0.1356**
		(0.0578)	(0.0582)	(0.0590)
Age		0.0491***	0.0519***	0.0497***
		(0.0018)	(0.0019)	(0.0019)
Female		-1.2641***	-1.3099***	-1.3089***
		(0.0184)	(0.0190)	(0.0192)
Urban		-0.4753***	-0.4330***	-0.4416***
		(0.0197)	(0.0203)	(0.0203)
Household computer			0.2015***	0.1185**
			(0.0533)	(0.0534)
Household other devices			0.0591***	0.0453**
			(0.0222)	(0.0223)
Household Internet			0.1432***	0.1617***
			(0.0341)	(0.0303)
Number of other people working in the household			0.1200***	0.1207***
			(0.0090)	(0.0090)
Basic x Institute				-0.0218
				(0.0371)
Basic x Courses				0.0201
				(0.0463)
Basic x Work				0.4378***
				(0.0645)
Basic x Books				-0.0870
				(0.0617)
Basic x Experience				0.0489
				(0.0364)
Basic x Friend				-0.0404
				(0.0340)
Observations	24,124	24,124	24,124	24,124
Year Control	No	Yes	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14: Medium ICT Skills Interactions

Dependent Variable: Employment Status				
	(1)	(2)	(3)	(4)
Medium skills	0.4343***	0.1879***	0.2068***	0.0600
	(0.0205)	(0.0272)	(0.0293)	(0.0564)
Years education		0.05032***	0.0519***	0.0513***
		(0.0019)	(0.0019)	(0.0020)
Education Difference		0.0251***	0.0229***	0.0239***
		(0.0019)	(0.0020)	(0.0020)
Language Barrier		-0.0653	-0.0440	-0.1334**
		(0.0575)	(0.0580)	(0.0589)
Age		0.0476***	0.0503***	0.0519***
		(0.0018)	(0.0018)	(0.0019)
Female		-1.2695***	-1.3161***	-1.3037***
		(0.0184)	(0.0189)	(0.0192)
Urban		-0.4680***	-0.4272***	-0.4417***
		(0.0196)	(0.0202)	(0.0203)
Household computer			0.2160***	0.1371**
			(0.0534)	(0.0537)
Household other devices			0.0594***	0.0502**
			(0.0222)	(0.0223)
Household Internet			0.1506***	0.2049***
			(0.0275)	(0.0281)
Number of other people working in the household			0.1189***	0.1223***
			(0.0090)	(0.0090)
Medium x Institute				-0.0283
				(0.0433)
Medium x Courses				0.0214
				(0.0530)
Medium x Work				0.4106***
				(0.0722)
Medium x Books				-0.0650
				(0.0667)
Medium x Experience				-0.0098
				(0.0475)
Medium x Friend				-0.0669
				(0.0424)
Observations	24,124	24,124	24,124	24,124
Year Control	No	Yes	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 15: Advanced ICT Skills Interactions

Dependent Variable: Employment Status				
	(1)	(2)	(3)	(4)
Advanced skills	0.4406***	0.1282***	0.1373***	-0.0086
	(0.0243)	(0.0294)	(0.0294)	(0.0656)
Years education		0.0502***	0.0502***	0.0520***
		(0.0019)	(0.0019)	(0.0020)
Education Difference		0.0241***	0.0241***	0.0233***
		(0.0019)	(0.0018)	(0.0019)
Language Barrier		-0.0374	-0.0418	-0.1341**
		(0.0573)	(0.0573)	(0.0586)
Age		0.0467***	0.0485***	0.0528***
		(0.0018)	(0.0018)	(0.0019)
Female		-1.2695***	-1.2636***	-1.3011***
		(0.0184)	(0.0187)	(0.0191)
Urban		-0.4649***	-0.4623***	-0.4413***
		(0.0196)	(0.0202)	(0.0203)
Household computer			0.2294***	0.1353**
			(0.0531)	(0.0537)
Household other devices			0.0739***	0.0521**
			(0.0222)	(0.0223)
Household Internet			0.1483***	0.2039***
			(0.0274)	(0.0281)
Number of other people working in the household			0.1123***	0.1211***
			(0.0089)	(0.0090)
Advanced x Institute				-0.0127
				(0.0529)
Advanced x Courses				0.0210
				(0.0648)
Advanced x Work				0.4734***
				(0.0879)
Advanced x Books				-0.1094
				(0.0769)
Advanced x Experience				0.0254
				(0.0588)
Advanced x Friend				-0.0672
				(0.0516)
Observations	24,124	24,124	24,124	24,124
Year Control	No	Yes	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1