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Working Group on Youth Employment

Integration of ICT into Education to Reduce Skills Mismatch

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Abstract

With the arrival of the digital era more and more digital skills are required at more and more workplaces. The research paper establishes a negative relationship between skills mismatch on the labour market with the integration of information communication technology (ICT) into the education system. The short-term feature of political cycles incentivises short term investments, whereas educational reforms are long term investments. This would mean that no democratically elected government would ever invest in educational reform and digitalisation. However, we can see some countries investing more intensely in ICT integration into the education system than others. The paper brings political as well as macroeconomic explanatory variables that might influence the willingness and ability of a government to reform and integrate ICT into its education system. The explanatory variables include spending on education, GDP per capita, political stability and absence of violence, voice and accountability, government effectiveness, regulatory quality, rule of law, and control of corruption. Finally, the paper recognizes that the different extent of skills mismatch in EU countries could be a result of other factors as well besides the educational curriculum. Such factors include the decentralized quality of the labour market and the more centralized quality of education centres, the various speed of industry evolvment in different member states, the lack of resources to search for a job in the field.

Why is it self-evident that digital skills are needed these days?

In Europe, the integration of digital skills into the school curriculum has been a main focus of both the EU as an institution and the member states (European Commission, 2019). The integration of teaching digital skills in the school curriculum is a key way to reduce skills mismatch between the education system and the labour market in the European Union. Digital skills are essential in more and more workplaces and this positive trend of digital skill necessity is expected to be growing, for example with the production of millions of data every year. Data is being collected from people on social media platforms, on occasions of shopping, on occasions of liking anything on the internet, when listening to certain type of music, when watching certain types of videos, series, movies etc. However, this large amount of data is worthless without processing. Knowing people's personality traits can help firms with market research when introducing a new product, can help them or others advertise, or influence people's opinion and behaviour any other way. For this reason, the labour market is in demand for digitally equipped people.

In this essay we take the increasing need for digitally skilled people as given and will take it as a proxy for skills mismatch. The higher the integration of ICT into education the lower the skills mismatch will be.

Level of integration of ICT into the education system

Some EU member states have managed to integrate digital skill education into the school curriculum better than other EU countries, although we would expect government to invest in little in long term goal, is in the EU, they are all on a fairly short term mandate. The paper proposes political as well as macroeconomic explanatory variables that might have led to better or worse integration of digital skills in the education system. These are GDP per capita, public spending on education, political stability and absence of violence, voice and accountability, government effectiveness, regulatory quality, rule of law, and control of corruption.

Some governments and countries have less money than others. Digital education is more expensive than any traditional form of education already integrated into the education system. Computers and internet have to be purchased which is a large investment for the government and its national schools. Rich countries can afford to and do spend more money on education than poorer countries. Here we looked at the relationship between money spent on education as a percentage of GDP and the success of integrating ICT into the education system. We hypothesize that the more money is spent on education, the more computers and better internet can and will be bought, leading to better digital skill education of students and therefore leading to less skills mismatch on the labour market (Albert, 2016).

Besides the macroeconomy, political factors are also key determining policies in a country. This paper uses the six main political indicators for measuring the different aspects of governance set up by the World Bank on the Worldwide Governance Indicator Project (2018). These are political stability and absence of violence, voice and accountability, government effectiveness, regulatory quality, rule of law, and control of corruption. Political stability and absence of violence refers to the perception of citizens of the probability that unconstitutional or violent forces, will overthrow or destabilize the government. The higher this indicator is, the more stable a country is perceived by its citizens. The voice and accountability index measures the extent to which citizens perceive they can participate in selecting their government, as well as their perception of the extent of freedom of expression, freedom of association, and a free media. The higher a countries' index is, the more people are satisfied with their political freedom in the country. The government effectiveness index measures the quality of the public services of a country and ability of the government to maintain these public services. The regulatory quality index measures the confidence of citizens in rule makers to implement regulations helping private sector development. The rule of law index measures the trust of the citizens in the rule of law, and their trust in public agent to abide by those laws. Control of corruption measures the perception of citizens about to what extent public power is exercised for private gains. The higher the score of each country, the better the

citizens perception of these qualities (*The Worldwide Governance Indicators*, 2018). A government that is less likely to be overthrown by unconstitutional forces, listens to citizens voices more, more able to implement regulations, amore able to promote private sector development, and uses public power to its private gains less is expected to be more likely to be able to implement changes needed for less skills mismatch. Therefore, we would expect to see political indicators to have a positive correlation with ICT integration into the education system.

Data analysis

In our analysis, we have considered three different levels of schooling from primary education to tertiary education (*2nd Survey of Schools: ICT in Education*, 2019) and correlated them with the proposed explanatory variables. The European Commission prepared a survey-based file for EU member states with 10 categories for ICT integration into the education system. Each category has various fields such as proportion of highly digitally equipped schools, distribution of schools based on internet speed, teachers' / parents' confidence in their digital skills, etc. To be able to read the data well and to be able to make correlation analysis with all the explanatory variables from our hypotheses, a single indicator had to be found for each education level, namely for primary, secondary and tertiary education. As the fields of the ICT data are very different the aggregate of these indicators was found by ranking each field and then adding these rankings together, giving an

overall ranking to the country for each education level.

In the data analysis, we have found GDP per capita to have weak or moderate negative correlation with ICT integration into the three education levels. The country's GDP per capita has a weak negative, -0.09 correlation with ICT integration into primary education. However, this correlation grows stronger but is still negative with secondary and tertiary education, they are -0.295 and -0.25 respectively. We have found the second explanatory variable, public spending on education as a percentage of GDP to have a moderate, positive correlation with all three levels of education from primary to tertiary education, with 0.4, 0.41, and 0.35 respectively. The macro economic factors in the paper seem to have a stronger correlation with ICT integration into the education than any of the proposed political factors.

Political stability and absence of violence has a weak correlation with integration of ICT into the education system, from primary to tertiary education, 0.15, 0.04, and 0.051 respectively. Similarly to voice and accountability, where the strength of the correlation stays between 0.05 and 0.13 in all three education levels, with a positive correlation in the case of primary education and a negative correlation in the case of secondary and tertiary education. This means that the more voice and accountability there a is in a country, the more integrated ICT is into primary education, but the less integrated it is in the rest of the educational categories. This pattern of better governance having a positive relationship with ICT

integration into primary education is visible across all political explanatory variables. In all but one cases better governance indicators are negatively correlated with ICT integration into secondary and tertiary education. The exception has been mentioned above is political stability and absence of violence. When all six political indicators were aggregated in a country and correlated with the three education levels, the results do not change. The aggregate has weak, positive correlation with ICT integration into primary education, and weak negative with secondary and tertiary education, 0.144, -0.05, and -0.14 respectively.

Other possible explanations of skills mismatch

However, skills mismatch may not only be the result of the education curriculum but could be the result of other factors as well. For example, as most companies recruit from a pool of workers within the region (Cabus & Somers, 2017), if education centres are not as dispersed as companies are, then companies may not find people with the necessary skills within the region. This could result in a skills mismatch within the region. A solution for that is moving companies near education centres where student receive the skills necessary to work for the company.

Another possible explanation could be that some governments are more stable than others, in a way not explicitly accounted for above. We would expect more stable and thus longer lasting governments to be able to implement longer term reforms. Whereas we

would expect less stable governments to pay less attention to longer term reforms such as education reform to reduce skills mismatch. According to Keman and Müller-Rommel (2012b) the survival rate of governments in Western Europe is significantly higher than in Eastern Europe due to higher polarisation and stronger rivalry in parliament. This could be one reason for less ICT integration into education in Eastern Europe than in Western Europe. However, short lived governments exist in western Europe as well, such as the average time spent in government in Italy is 11 months since WW2. However, when the time spent in government exceeds a certain length, the effect could be reverse. This may be because too long time spent in government may be a sign of democracy being built down by the ruling party, and the people having less say in politics. At that point the betterment of the education system may lose its priority position, as there is less incentive for the ruling party to satisfy the population to stay in power (Bueno de Mesquita & Smith, 2011).

Another alternative reason for the variation of ICT integration into education is realizing the importance of digital skills or rather, prioritizing other occupations such as training skilled manual workers. In some European countries low skilled manual workers are lacking, therefore governments often start training programmes primarily aimed at low skilled manual workers.

Naturally, there could be other explanations of the level of integration of ICT into the education

system such as other sorts of power struggles preventing digital skill integration.

Conclusion

Skills mismatch has a lot of influencing factors. This paper uses the introduction of ICT into the school curriculum as a proxy for measuring skills mismatch in an EU member state. The paper analysed what can determine the level of introduction of teaching digital skills in schools

and concluded that, the wealth of the country as well as amount of money spent on education are likely determinants, as well as the stability of the government could have an effect on ICT integration into the education system, ultimately leading to less skills mismatch in the economy.

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