

Skills, Information Technology and Productivity

or

The role played by ICT skills in firm productivity

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When studying the effects on firm productivity from information technology (IT) the subject can be approached from at least two angles. The one considers the intensity of IT in the factor inputs of the firm production, the other the dissemination and the ability to use the technology.

In a production function approach, including the inputs capital, labour and intermediates each could be considered to have certain IT intensity through the share of IT capital, proportion of IT intensive higher educated employees and the kind of intermediate goods or services used. Information on both IT investments and details on intermediates are scarce but data on investments in IT human capital are available for at least some countries that participated in the Eurostat ICT impacts project, as well as indicators of the firm use of IT. Even if human capital cannot be separated into type, it still plays an important role when studying the effects on productivity from the dissemination of IT or from its interaction with IT.

The literature tells that there is a relationship between human capital (skills) and productivity. There is also a link between IT and productivity. IT can affect productivity either directly or through the human capital. If these relationships hold, human capital is expected to affect productivity at least to some extent. However this does not necessarily encompass all types of higher skills. Another series of literature found links between the IT effects on productivity over the organisational changes. This gives further fuel to the importance not only of human capital, but of the right type of human capital for productivity.

In this paper the purpose is to shed some deeper light on the effects on productivity from the quality and type of the labour input to the firm production for a selection of countries and industries. The effects will be investigated both on their own and together with the firm IT usage on the matched production survey datasets in Finland, Norway and Sweden. A discussion will also follow about the advantages of using real skills in the analysis instead of different proxies, like wages.

Although the causality is not known, firms with many highly educated employees also tend to have high capital, high wages and a high proportion of employees with access to PCs and fast Internet connections. As expected, initial results showed that high skills affect productivity both directly and to a certain degree indirectly. For the labour productivity the type of skills seems to be of greater importance, in this case with stronger effects from high IT skills than for the total factor productivity, where general high skills are almost more or equally important. Services firms do generally have more to gain from improvements in skills than manufacturers. The use of wages as a proxy for real skills has its obvious limitations since it gives more or less the same estimates for both labour and total factor productivity, tends to increase when estimated on a sample biased towards larger firms (which in turn have higher production, productivity, capital, skills and wages). The statistical implication is that fully linked education and production registers would immensely improve these kinds of impact analyses.

