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TITLE: TECHNOLOGICAL KNOWLEDGE AND HUMAN CAPITAL EMBODIED IN FINAL GOODS AND SERVICES

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ABSTRACT:

The international competitiveness of modern economies heavily relies on their ability to produce innovative goods and services. However, there are many different ways to identify whether a product is indeed innovative. One way is to identify the technological knowledge that is embodied in goods and services in more detail. Another way is to account for the human capital that is needed to produce the considered goods and services. Depending on the chosen indicators the identified innovativeness of one and the same product can differ considerably. In order to circumvent this problem the presented study takes two different indicators into account. One indicator reflecting the industry-specific generation of technological knowledge is defined by patent activities. Following this common approach, patent applications define a proxy for innovation activity, despite the shortcomings that are extensively discussed in the literature. It could be concluded that analyses based on patent applications offer a good opportunity to account for explicit, codified knowledge. At the same time they neglect the importance of implicit knowledge to some extent. Therefore, the academic working hours embodied in the considered goods and services are used as an additional indicator that reflects a product's innovativeness. In order to account for direct and indirect technological knowledge and human capital embodied in final goods and services, sectoral patent data and academic working hours respectively are analysed with the input-output technique. Following this approach, some products simultaneously score high or low with regard to the level of both qualified human capital and technological activities, while for other goods and services these two indicators might strongly diverge. This, in turn, points to different basic mechanisms of knowledge generation in different industries. In a last step, a more detailed picture of these mechanisms is given by the construction of a patent input-output matrix that provides information on technological knowledge embodied in products generated by one industry and absorbed by the same or other industries to produce their own goods.