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Human Capital and the Diffusion of Personal Computers, 1990-2002

A large body of literature examines the relationships between computers and labor demand, especially the demand for skilled workers. This paper, by contrast, examines how the supply of skilled workers affects the demand for technology. Using data from a very large sample of establishments, this paper first documents the tremendous and persistent cross-city variation in the use of personal computers, even after controlling for the industry composition of cities. We then find that the share of workers who are college educated accounts for over half of the cross-city variation in computer use in both 1990 and 2002. The relationship between technology use and human capital is robust to using instruments for college share (such as the presence of a land-grant college and historical patterns of immigration) and when first differences are used. Other factors, such as the size of the IT producing sector (a potential source of spillovers), the presence of highly ranked computer science departments, the share of the workforce that are computer programmers, and other characteristics of the labor force have some limited effects on local technology adoption. However, the share of the workforce that is college educated – the supply of general human capital – is by far the most important factor. These results are consistent with models of directed technological change (Acemoglu 1998) and models in which production technique is adapted to the supply of skills (Beaudry and Greene, 2001).