Chapter 23
Solving the Paradoxes of the Information Technology Revolution: Productivity and Inequality

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ABSTRACT

The research on the digital divide usually analyzes the differences between those who have access to information technology and those who have not. This approach typically considers information technology a homogeneous set of technologies. In this chapter, we will break this assumption establishing different subsets of information technologies according to their impact on the task productivity and the firm's demand for high skilled labour. This new focus reveals that depending on the information technology used by the firm to perform a given task, the demand for high skilled and low skilled workers may vary and consequently their wages and income, producing in some cases a new and till now unobserved digital divide.

INTRODUCTION

The Industrial Revolution in the eighteenth century changed the shape of the world. The adoption of new inventions and methods of production triggered a spectacular climb of productivity and wealth that lasted for years. Nowadays, nobody denies the benefits and the economic growth due to the new economic framework created by the Industrial Revolution. However, the Industrial Revolution shown also a dark side in terms of pollution, unregulated urbanization, physical and moral degradation of the population, as well as the increase in power and wealth inequality. Towards the end of the twentieth century the invention of the microprocessor by Ted Hoff, Intel engineer, and some other engineers from the Japanese firm Busicom may have started a new Revolution: The Information Technology Revolution. As well as the Industrial Revolution, the redesign of business processes and production methods as well as new inventions, such as the mobile telephone or the Internet, characterized the current Information Technology Revolution. Moreover, the Information Technology Revolution that

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is still in process may have some impact on both the productivity and the wealth distribution.

Access to Information Technology varies widely. A consistent amount of research (see for instance some cross-country analyses in Hiroshi, 2005; Demoussiss and Giannokopulos, 2006; Greenstein and Prince, 2006; Chinn and Fairlie, 2007) shown that income, gender, ethnicity or education among other factors explain this variability in the access and use of Information Technology. These factors may act as barriers to access to the technology and create a divide between the social groups with access to the new technologies and those groups without it. This phenomenon has been defined as Digital Divide and has received a great deal of attention in the academic and political world. The fact that Digital Divide may increase the income gap between workers with computer literacy and workers without it explains this interest. Lack of access to Information Technology may prevent disadvantaged individuals from overcoming the over-riding cause of their disadvantage, which is low income. The persistence of a Digital Divide is not only an impediment to the development of individuals and regions, but it may also worsen the gap between low-income and high-income communities. For instance, in words of the International Labour Organization (2001) "the employment aspirations and productivity potential of millions of workers won't be realized if the Digital Divide problem is not solved". In this chapter we will not revise the causes of the Digital Divide but its effects on income distribution. We will address the relationship between the Digital Divide and the Income Divide between high and low skilled workers. We will study how the use of Information Technology in productive tasks may shift the demand for high and low skilled workers and consequently may widen or shrink the income gap between these two groups of workers.

To address this task we must first explain the link between access to and use of Information Technology and income. Trying to simplifying the phenomenon the economic rationale behind the income effects of Digital Divide is the following: having better technology, in our case Information Technology (IT), and more capital tends to raise the marginal productivity of labour and therefore the demand for IT labour and its wages (i.e. income). In the initial stages of development of a technology only high skilled workers tend to have computer literacy. The reason is that high skilled workers usually have higher income levels, so they can afford IT education as well as IT products and services. Comparing to low skilled workers, workers with more skills and income will have better chances of accessing and learning to use information technology sooner. From this statement we could infer that having better access to IT, high skilled workers tend to have a higher likelihood of further increasing its productivity, and consequently will tend to receive higher wages increases than those individuals without access, use and knowledge of these new technologies. This effect, already largely studied, will be out of the scope of this chapter. However, we believe that this dynamic will work for a certain period especially in the developed economies, but with the time the prices of the new technology will tend to diminish and an increasing proportion of low income workers will start having IT access and literacy.

We will go one step further in the study of Digital Divide considering what will happen when most workers in a community or society will have access to Information Technology. So, our main proposition will be that even assuming that basic IT literacy is homogenously distributed among the workers population (for instance, in several countries there is already almost universal access to mobile technology, see ITU, 2008) Information Technology use wont have a neutral effect on the income of low and high skilled workers. As we will discuss below, we will consider the Information Technology as a heterogeneous set of technologies with different effects on the demand for skills and consequently on the income divide between unskilled and skilled workers. From our