

Chapter 14

International ICT Spillover

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ABSTRACT

Recent developments in information and communication technology (ICT) have affected all economic activities across the world. Although there is ample evidence for the direct impact of ICT on productivity, the spillover effect of ICT has so far not been sufficiently investigated, especially in the international context. This chapter discusses ICT and its spillover effects on labor productivity using an empirical growth model and panel data for 69 countries over the period 1992-2006. The results show that ICT and its spillover have positive impacts on productivity worldwide, but the effects are much stronger in developed countries than those in the less developed countries.

INTRODUCTION

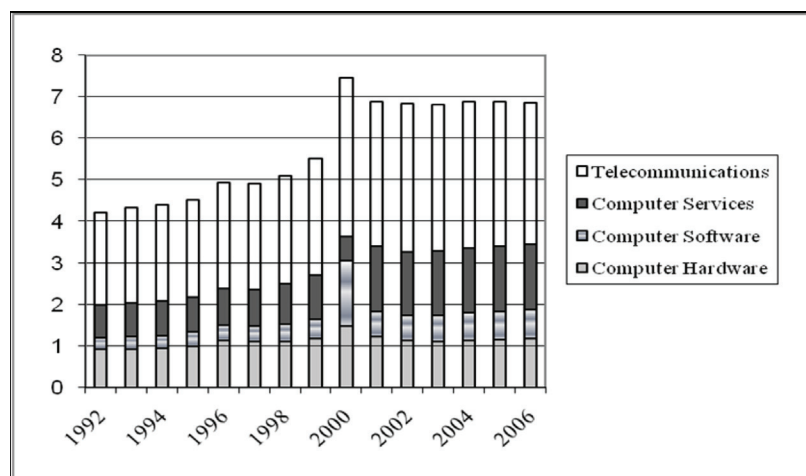
For the past two decades, the ICT investment has been steadily increasing in many countries across the world. The global investment in ICT on average has increased from about 3 percent of GDP to about 8 percent for the period 1992-2006 (figure 1). In the same period, the labour productivity and total factor productivity have increased noticeably, particularly in the developed and some developing countries. Despite the earlier skepticism, the direct contribution of ICT

investment on the recent productivity rise is now widely recognized in the literature (Jorgenson, 2001 & 2005; Oliner and Sichel, 2000 & 2002; Pilat and Van Ark, 2002; Stiroh, 2002; Stiroh and Jorgenson, 2000; Gordon, 2000).

The direct or capital deepening, effect of ICT on productivity is observed by the fact that the rapid technological progress in ICT capital has led to lower quality-adjusted prices and increasing output. However, ICT is a general purpose technology and its effect on productivity goes beyond the capital deepening effect (Lipsey *et al*, 2005). ICT is a form of knowledge and network capital that can improve overall productivity across dif-

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Figure 1. World ICT Spending by its Components (1992-2006) – percent of GDP



ferent sectors in the economy by its effects on organization, management, and human capital. ICT as knowledge capital is a non-rival good; the use of ICT products, such as software by one person does not need to detract its use by others. ICT also disrespects geographical distance, i.e. its products such as internet can be transmitted at a negligible cost (Quah, 2001). As network capital, ICT has a characteristic which implies that with more firms adopting it, the more the benefit that would accrue to existing ICT user firms without the latter bearing extra costs. Lee U Wen and Der Weil (2003), Arvantis (2005), Bartel and Shaw (2007) and Moshiri *et al* (2008) using firm-level data in different countries show that there is a positive and significant effect of ICT spillover on firms' productivity.

The idea of ICT spillover can be generalized to the international level. ICT tackles some of the main barriers to economic growth in less developed countries (LDCs), namely the lack of knowledge and information, scarce human capital, inefficient resource management and governance. ICT can help improve the standard of living in the LDCs not only by allowing them to produce ICT goods and services, but also by providing easy access to information and knowledge along with facilitating the use of other technologies. The investment in

ICT would also bring about higher educational attainment, better training, more skilled labour and, in general, higher level of human capital (Tallon and Kraemer, 1999, Mansell, 2000, and Wolf, 2003).

ICT distribution in the world is still polar. Not only the technology frontier and research and development in ICT remain merely in the developed world, but also ICT use is largely limited to the developed and some developing countries (OECD outlook, 2004.) As Figure 2 shows, the average ICT spending per GDP in North America is twice as much as that in Middle East.

Table 1 also shows a large disparity in ICT stocks between developed and less developed nations. Although the ICT distribution across the globe has become less unequal since 1993, a gap still remains large. For instance, for every 100 people having access to ICT in developed countries, there are only 4 to 6 persons that can use different forms of ICT in low income countries. This numbers in low-mid income countries are in the range of 11 to 30 people and in up-mid income countries 32 to 47 persons.

Although a large body of literature exists at the individual country or the regional level about ICT effect on the economy, little is known about the ICT effects at the international level. Most

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