

Financial development, the structure of capital markets, and the global digital divide

Charles Amo Yartey*

African Department, International Monetary Fund, 700 19th Street NW, Washington, DC 20431, United States

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Abstract

This paper examines the extent to which financial development and financial structure may explain cross-country diffusion of information communication technology (ICT). Using panel data for 76 emerging and advanced countries for the period 1990–2003, it finds that credit and stock market development tends to foster ICT diffusion, but financial structure does not appear to have any significant relationship with it. The conclusions, which are consistent with what theory might predict, highlight the role of financial development in the market for knowledge-based products. The finding that financial development is an important determinant of ICT diffusion implies that countries with underdeveloped financial markets may sink even further to the information-poor and noncommunicating side of the global digital divide.

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1. Introduction

The global economy is being driven by greater integration of world markets and the spectacular growth of information and communication technologies (ICTs). Recent events, especially the acceleration of productivity in the United States since 1995, have increased interest in this area; certainly, the acceleration seems to be connected with more investment in ICTs (Chinn and Fairlie, 2004). Interest in the global diffusion of technology has also been increased by arguments that ICT might contribute to the spread of knowledge diffusion by making communication more efficient and might even allow developing countries to leapfrog traditional methods of increasing productivity (Steinmueller, 2001).

The problem, however, is that in many countries technological diffusion is hampered by the limited capacity of networks to carry large amounts of knowledge swiftly and the limited access of individuals even to networks

* Tel.: +1 202 623 7713; fax: +1 202 589 7713.

E-mail address: cyartey@imf.org

in which knowledge products are minimal (Adriani and Becchetti, 2003). In this direction, the development of financial markets may affect both ICT diffusion and its impact on economic growth. In particular, well-developed financial markets can make it easier to finance projects designed to increase the capacity of networks and the quality of peripherals.

In this paper, we seek to advance current understanding of the determinants of ICT diffusion. In particular, we examine how financial development and financial structure may explain diffusion of ICT across borders. Using a panel of 76 emerging and advanced countries for the period 1990–2003, the paper addresses two main questions:

1. What is the role of financial development and financial structure in explaining cross-country diffusion of ICT?
2. What kinds of financial system or capital market organization are most conducive to fostering use of ICT in the economy?

The role of finance in promoting technological development has long been controversial. Hicks (1969) argued on the basis of economic history that the British industrial revolution was made possible by the availability of finance. He believed that the large-scale capital requirements of the industrial revolution could only be met by capital market institutions that permitted the pooling of small individual savings into a large fund for industrial development. Robinson (1952), however, saw finance as responding passively to technological innovation and development, stating that “where enterprise leads, finance follows” (p. 123).

This debate has taken a new turn with the emerging emphasis on the importance of financial structure for technological development. This new paradigm has been motivated by the emerging role of technology companies in the stock market-based financial system of the United States (Jorgenson, 2001).¹ The United States has not only experienced fast growth of ICT industries but has also witnessed successful ICT adoption in many areas of the economy (Singh et al., 2001, 2005). It has been suggested that the major reason the US leads in ICT and Japan and Europe lag has been the encouragement the US stock market has given to ICT. Recent theoretical papers based on endogenous growth models emphasize the capacity of the stock market to promote innovation and technical progress through such devices as venture capital funds. More specifically, the stock market provides a mechanism through which market participants pool their collective knowledge to assess competing new technological inventions. The market is therefore better able to finance the most promising technologies than banks, which do not benefit from the collective wisdom of numerous participants.²

Previous works have examined the nature and determinants of the global digital divide (e.g., Dasgupta et al., 2001; Kiiki and Pohjola, 2002; Chinn and Fairlie, 2004; Dewan et al., 2004). However, none of these has made a serious effort to understand the extent to which finance can explain cross-country diffusion of ICT. Here we are aligning our work with previous efforts but working to expand the results. Whereas many studies are limited to one or two ICT indicators (typically personal computers [PCs] and the Internet) studied over relatively short periods, our analysis covers four indicators over a comparatively long period, 1990–2003. Further, we conduct our empirical analysis, in a panel data framework and using dynamic panel data analysis techniques.

The remainder of the paper is organized as follows. The next section discusses the role of financial development and financial structure in the diffusion of technology. Section 3 discusses the growth of ICT and documents cross-country differences in ICT diffusion. Section 4 discusses the methodology of the paper. Section 5 presents the panel regression results. Section 6 draws conclusions.

¹ The United States, for instance, has many banks that are small relative to large corporations and play a limited role in corporate governance, and a well-developed stock market with an associated market for corporate control. In contrast, Germany and Japan have fewer banks but theirs are relatively larger and are said to play a central governance role.

² Let me emphasize here that although the US is apparently the leader in information technology, remarkable progress has been made by other industrial and developing countries where the capital markets are very different from those in the US.

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