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The impact of information technology outsourcing on productivity and output: New evidence from India

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Abstract

Neither the literature on outsourcing nor the literature on the impact of information technology (IT) have previously quantified the effects of IT outsourcing. This is a particularly important omission in India, which has an IT outsourcing industry that is well placed to bring world-class applications of the technology to domestic customers. This paper provides econometric evidence which shows that there is a strong positive impact of IT outsourcing on output and productivity in India. It also demonstrates that in aggregate, IT outsourcing makes a substantial contribution to economic growth.

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1. Introduction

There is now a strong consensus that information technology (IT) use has led to increases in productivity and output in the developed world. If use of IT has similar results in developing countries, any process by which successful applications of the technology can be brought to these countries is of considerable interest. A priori it seems possible that outsourcing deals between developing country firms and IT firms with experience in developed countries might provide such a process. So far though, there are only a few empirical publications that quantify the impact of IT use in developing countries and none of these evaluate outsourced IT. This paper is the first to occupy this gap in that it investigates the impact of IT outsourcing on output and productivity in India.

India is an interesting and pertinent case study because the country is host to a large, successful, and high profile IT outsourcing industry which has a great deal of experience working with Fortune 500 and Global 2000 client firms in the United States (U.S.) and Europe. This means that if IT outsourcing does indeed offer a means to improve output and productivity, Indian firms, perhaps more than firms in any other developing country, are well placed to take advantage of it. Importantly, a very large amount of data appropriate for investigating the impact of IT outsourcing is also available for India. The analysis described in this paper uses a panel dataset which comprises over 33,500 observations on Indian firms, from both manufacturing and services sectors.

The analysis begins with a newly designed production function which has been constructed to take account of IT outsourcing alongside other inputs. Estimates of the parameters of this function reveal that there is a large and significant elasticity of output to IT outsourcing, and that it is robust to the use of techniques that correct for endogeneity. Following on from this conclusion, a second stage analysis sets out to investigate the impact of IT outsourcing on productivity. This uses a stochastic frontier model to create a measure of technical efficiency, and then analyses what impact IT outsourcing has on this measure. Again the work finds a positive and significant elasticity. Finally, a third stage analysis applies the estimated output elasticity to total domestic purchases of outsourced IT from the Indian IT sector. This results in an estimate of the impact that these purchases have on economic growth in India. At 1.3 percentage points of economic growth per year, this estimate is large enough to be comparable to the total output impact of IT in the U.S. in the 1990s.

The remainder of the paper is laid out as follows. Section 1 provides a brief overview of relevant literature; Section 2 describes the data; Section 3 covers the methods and findings on output; Section 4 the methods and findings on productivity; Section 5 reports the estimated impact on economic growth; and Section 6 concludes.

2. Related Literature

Literature which evaluates the impact of IT has now converged on the conclusion that there were strong impacts on output and productivity in the developed countries in the 1990s and 2000s. Figures 1 and 2 provide a selected summary of these studies. Figure 1 shows the number of percentage points of GDP growth attributable to IT in the U.S. It summarizes the results of 8 separate analyses which all use the same methodology but examine different periods, with the findings arranged from left to right by the start date of the period under consideration. The chart shows that IT adoption was responsible for an impressive acceleration in economic growth in the 1990s, and that by the end of that decade, IT use was contributing almost 1.4 percentage points of GDP growth per annum. Figure 2 illustrates the share of GDP growth attributable to IT in the U.S. and other developed countries. It indicates a norm of between 10% and 30% throughout the 1990s.

Until recently, strong impacts of IT use such as these had not been identified outside the developed world. It is only within a young literature which uses econometrics on firm-level data, often with several different countries included, that any impacts have become visible at all (Commander, Harrison, and Menezes-Filho, 2011; Motohashi, 2008; World Bank, 2006). These recent papers are encouraging signs, but as yet they do not constitute a clear consensus that IT use is important in developing countries, and none of these studies investigate the impact of outsourced IT.

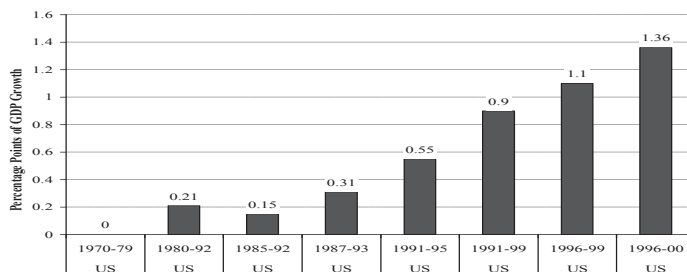


Fig. 1. GDP growth per annum attributed to IT in US.

Sources: Jorgenson, Ho, and Stiroh (2007:9), International Monetary Fund (2001:106,116), Oliner & Sichel (1994), Jorgensen & Stiroh (1995), Sichel (1997), Jeong, Jeong, and Shin (2002), Crafts (2001), Daveri (2001), Oliner & Sichel (2000)

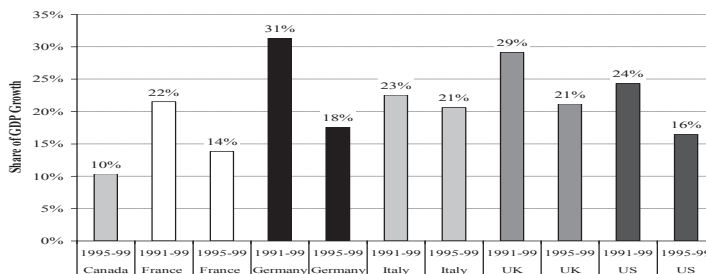


Fig. 2. Share of total GDP growth attributed to IT use in developed countries.

Notes: Adapted from Colecchia (2001); Daveri (2001); World Development Indicators (2010).

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