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BOOK REVIEWS

Innovation and economic development: the impact of information and communication technologies in Latin America, edited by Mario Cimoli, André A. Hofman and Nanno Mulder, Cheltenham, UK and Northampton, MA, Edward Elgar, 2010, xi + 271 pp., US$115.00 (hardback), ISBN 978-1-84980-241-3

This book is part of an on-going research project, sponsored by the Economic Commission for Latin America and the Caribbean (ECLAC), for the purpose of measuring the economic effects of information and communications technologies (ICT) in this region of the world. In 10 numbered chapters by different authors, plus an introductory essay by the editors, it offers both theoretical and empirical contributions to the debate on ICT and their impact on productivity growth and economic development.

To measure the effects of investments in ICT, many of the chapters use some variation on the standard 'growth-accounting' approach, as pioneered by Solow (1957) and later modified by Jorgenson and Griliches (1967) and others. Chapters 1, 3, 4, 5 and 6 are all based explicitly on this approach, which is concerned with determining how much of a country's GDP growth can be attributed to use of factor inputs such as capital and labour (suitably adjusted for quality changes). The part that cannot be so attributed is then interpreted as the change in so-called 'multi-factor productivity' (MFP), or simply 'technical progress' for short. (Though 'progress' in this context suggests increasing productivity, it should be noted that measured changes in MFP can actually be negative, implying a *decline* in a country's overall productivity or economic efficiency. For a dramatic illustration of this effect see Figure 5.3 on p.129 of this volume, which shows what happened throughout the entire Latin American region during the 1980s, the so-called 'lost decade'.)

The other chapters are described by the editors as reflecting what they call an 'evolutionary-structuralist' (E-S) approach, which differs from the growth-accounting framework insofar as the latter assumes that MFP increases exogenously, whereas 'the E-S approach enters the "black box" of technical progress and analyses its microeconomic dimensions' (p.6). As stated in the introductory essay:

> The E-S approach explains the development and the characteristics of a technological learning path. It starts from an historical interpretation of technical change and organizational change, assuming that technologies and organizational structures and behaviours tend to co-evolve. It identifies persistent asymmetries among countries in the production system in order to account for those processes by which technological gaps and national institutional diversities can jointly reproduce themselves over rather long spans of time. In this regard, ICT are analyzed as a force of technical progress that may change the actual technological trajectory, and thereby the techno-economic paradigm of the economy. (pp.5–6)

Compared to the growth-accounting studies, which all follow more or less the same analytical format, the E-S based chapters tend to be more methodologically

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eclectic. Nonetheless, all of these chapters, regardless of the basic theoretical framework, point to a common conclusion. As the editors note from the very outset:

> The book concludes that both approaches are complementary in their analysis of the role of ICT in economic growth, productivity and structural change in Latin America … *Accelerating the adoption and efficient use of ICT is essential to any strategy of structural change and productivity growth*. (pp.2–3, italics added)

I have emphasised the last sentence in this quotation because it highlights what I find most disconcerting about this book. Indeed, unless I have read it very carelessly, I cannot see how that overall conclusion can be supported by the empirical evidence offered herein.

This is not to say that I disagree with the empirical analyses or generally found them lacking. Quite the contrary. They are competent studies of the problems they address, and they should be useful to readers interested in these issues. Many of the chapters are peppered with charts and tables that provide interesting (and sometimes surprising) bits of information, and all of them provide up-to-date references to the relevant literature. Space considerations will not allow for a detailed discussion of each separate chapter, though I will refer to some of them in what follows. I will mostly devote the rest of this review to a discussion of the disconnect I perceive between: (a) the book's conclusions regarding the contribution of ICT to productivity growth; and (b) the empirical evidence on display.

The most glaring example of this disconnect is Chapter 6 by Nauro Campos, who goes out of his way to make the case that ICT have had an important effect on economic growth in Latin America. To do so, he tries to measure the impact of one aspect of ICT, namely telephone penetration (both mobile and fixed-line), by estimating growth-regressions for a large sample of countries. He concludes from this exercise that

> ICT are an important growth determinant in the Latin American region: their adoption is positively and significantly associated with higher rates of per capita GDP growth … we believe that our results suggest that the impact of ICT in Latin America has been substantial and that there are sufficient grounds to qualify it as robust. (pp.151, 154)

A closer reading of the actual results, however, suggests no such thing. He estimates two different regression models. In the first one the coefficients on both mobile phone and fixed-line penetration are positive and statistically significant, but only the impact of fixed-line penetration is large enough to be regarded as economically significant. This in itself is a surprising result, since fixed-line telephony seems rather 'low tech' compared to the newer mobile phone technology. Even this effect, however, disappears in the second specification, where the coefficients on mobile phones and fixed-lines are both quite small, and in no way can they support the claim for a major impact on GDP growth. This misleading assessment of the evidence stands in sharp contrast to Chapter 5 (Claudio Aravena *et al*.), where the authors are much more realistic in reporting their results:

> Although there appears to be a significant positive relationship between [ICT] technology penetration and productivity, the coefficient is too small to account for the variations of productivity … although it was possible to significantly relate the evolution of

> factor productivity to a set of ICT variables, these variables proved to play only a limited role in its determination. (pp.135–36)

In the case of telephone penetration, the small likely impact of ICT can be appreciated even without an econometric model just by looking at some of the data reported in Chapter 10 (also written by Nauro Campos). In Table 10.1 (p.247), Campos compares data on what he calls 'teledensity' (number of telephone lines, fixed plus mobile, per 100 inhabitants) across several regions of the world from 1990 to 2008. The growth in this number for Latin America is simply astounding: from 6.3 in 1990 to 97.9 in 2008, a more than 15-fold increase in less than two decades. For comparison, the average increase over the same period for developed countries was from 46.1 to 150.7, a 'mere' 3.2-fold increase (see also Table 2.5 on pp.62–63, for data on individual countries). If ICT really had the impact that Campos claims for them in Chapter 6, one might have expected an expansion of this magnitude to somehow show up in major productivity gains. In fact, in economic terms Latin Americans today are not much better off than they were in 1990.

One big difference, of course, is that today they have a lot of cell phones. This has been a great benefit to consumers, and is mainly the result of the wave of privatisations and deregulation that took place during the 1990s (Gutierrez and Berg, 2000; Ros, 2003). Telephone penetration was so low up to around 1990 because the phone companies in Latin America were all extremely inefficient state monopolies, with long waiting times for fixed-line installation (in addition to poor quality and high costs for calls). Waiting times for installation were often so long that in many countries there were secondary markets for fixed phone lines, which were transferred from one owner to another and were often purchased as investments, with owners renting them out. (This is mentioned in passing on p.250 as 'anecdotal evidence for Brazil', but I can attest from personal observation that this practice was quite common in many other countries as well.) The situation today is, of course, much better, and that is all to the good. What I am questioning, however, is whether this tremendous increase in telephone penetration had any special productivity effect on the overall economy, over and above what one might have expected from equivalent capital investments in any other sector.

Throughout the book one gets the sense that the authors all feel that ICT investments are somehow more productive than other types of investment, and that the Latin American region should make an effort to cash in on the benefits of this new wave of technological innovation. It is often suggested, for instance, that as a share of total investment, ICT investments are too low in this region (pp.5, 96–97, 106–7, to cite just a few examples). It is not clear to me, however, why we should be concerned at all about how much is invested in ICT assets (or in any other type of asset, for that matter), and it is especially hard to justify such a concern within a growth-accounting framework. Indeed, in traditional growth-accounting the *amount* of capital is all-important but the *mix* of capital assets has never been a major concern because, under the assumptions of conventional economic theory, firms will allocate their investments in such a way that the marginal return per dollar invested will be equal for all asset types. To increase ICT investment would require either: (1) increasing total investment; or (2) increasing the share of ICT capital in total investment. The total investment rate (i.e. investment as a percentage of GDP) is somewhat lower in Latin America than in the rest of the world, and many things would be better in this region if it were higher, but this is not the problem we are

dealing with here. On the other hand, for any given level of total investment, to increase the ICT share would require reducing investment in other types of capital assets; but why should an additional dollar invested in ICT assets be more growth-enhancing than an additional dollar's worth of, say, buildings or roads? The authors assembled here all seem to think that should be so, but I am not convinced by the evidence they provide.

The studies collected in this volume offer many insights about the impact that ICT innovations are having in the modern world, and about the ways in which those technologies are being disseminated throughout Latin America. As descriptive analyses they are often quite informative, and the authors and editors are to be commended, but they should stick to the facts. They are at their best when they are not trying to push particular development strategies or policy agendas.

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Soft innovation: economics, product aesthetics, and the creative industries, by Paul Stoneman, New York, Oxford University Press, 2010, 384 pp., US$95, ISBN13: 9780199572489

Stop press! Innovation is not just about manufacturing products and processes – though if you were a passing Martian you could be forgiven for thinking that it was, to judge by the overwhelming volume of literature about the subject. Most of what we have learned about innovation and how to manage it has come from studies in this domain – with one or two notable exceptions. The idea that innovation might also occur in services, the public sector or in the 'third sector', or that it might be concerned with creating social as well as economic value, has not had too much coverage until comparatively recently, despite Schumpeter and a host of other theorists pointing out the multiple ways in which change can take place.

Of course, the pattern has shifted significantly in the past 10 years and there is now growing recognition of the relevance of what the UK's National Endowment for Science, Technology and the Arts (NESTA) calls 'hidden' innovation. If we are to develop 'knowledge economies', then we have to consider knowledge-based innovation and its deployment in a wide range of services (as Ian Miles and col-