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Accounting for telecommunications contribution to economic growth: A study of Small Pacific Island States

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ABSTRACT

Noting the developments in the telecommunications sector in Small Pacific Island States (SPIS), this paper explores the effect of telecommunications on per worker output over the periods 1979–2012. We use the ARDL bounds procedure within an augmented Solow framework to explore the effects. Additionally, we examine the causality effect using the Toda and Yamamoto procedure. The results show that telecommunications contribute 0.33% in the short-run and 0.43% in the long-run to output per worker; a bidirectional causality between capital per worker and output per worker, and unidirectional causality from telecommunications to output per worker, and capital per worker, respectively, are noted. Subsequently, we emphasize the need for greater innovation and competition in the telecommunications sector, and linking cutting-edge communication technologies to key sectors to boost efficiency and productivity in the long-run.

1. Introduction

Telecommunication services have paved the way for greater advancement in technologies and shifted the digital frontier in many parts of the world. However, in a number of small and developing countries, telecommunications remain a growing sector which is undergoing major reforms in its effort develop to a level that it can efficiently interlink industries and speed-up production processes. In this paper, we examine the role of telecommunications viz. economic growth in the developing Pacific Island Small States (SPIS).

SPIS consists of Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Palau, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu, and Vanuatu (World Bank, 2014).[2] In many respects, the growth and development progress of these countries are constrained by a number of factors including, being sea locked, isolation from major markets, geographic standing, high cost of doing business, low economies of scale and vulnerability to natural disasters and emerging adverse

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[2] Papua New Guinea (PNG) is not in the definition of SPIS category given that PNG is large both in terms of geography and population size.

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climatic conditions.[3] However, in recent years, with the development of electronic and digital technologies, some of the barriers hampering development have been reduced. Amid these developments, the role of telecommunications has been pivotal.

The telephone services in the Pacific are crucial in enhancing communication and building network for various economic activities. Due to the nature of telecommunication services, which requires good infrastructure and locations for telephone lines to be placed, the expansion and use of the services have remained largely confined to urban and industrial areas. To support and speed-up economic activities, a number of small states are now opening up the communication sectors to competition and investment at the unilateral and regional levels. Although the phenomenon is only recent, the small states are now developing their telecommunication services and undergoing major reforms in its effort to expand and exploit the sector.

To our knowledge, there is no study done to explore the dynamics of telecommunications and economic growth in SPIS. The reasons for the gap in the literature includes: inconsistent and/or unavailability of data on telecommunication indicators for many (developing) countries; communications technology was in embryonic stage and hence was given a lesser priority and interest in the development agenda in the past; and there was no clear-cut method available to examine the macro-level effects of telecommunications. However with the help of the World Bank (2013, 2014) database which has recently published data on telecommunication indicators in SPIS as a group, we attempt to overcome these limitations and examine the growth effects accordingly. At the outset, we posit telecommunications technology to be a critical driver of growth which is likely to yield dividends in terms of productivity and efficiency gains if developed, managed and utilized appropriately. When the telecommunication services are augmented with mobile and wireless technology and effectively implemented in the key sectors of the economy, we expect further reduction in the factors impeding the flow of communication and trade, consequently causing scaling-up effect of major economic activities.

In regards to method, we adopt the augmented Solow (1956) model as the underlying framework. For analysis, we use the ARDL cointegration (Pesaran, Shin, & Smith, 2001), and the Toda and Yamamoto (1995) Granger-causality procedures, respectively. The rest of the paper is set out as follows. In Section 2, we present a brief literature survey followed by a summary of telecommunications development in SPIS in Section 3. In Section 4, we discuss the modelling techniques and present the respective results. Finally, Section 5 concludes.

2. A brief literature survey

The literature on the role of technology in speeding-up growth and development process dates back (implicitly) to the neo-classical growth theory (Solow, 1956) and became relatively more pronounced, if not explicit, in the modified growth models and recent studies (Katz, 2009; Minghetti & Buhalis, 2010; Romer, 1990). Admittedly, in early studies the definition of technology (or technological progress) was (implicit) not precisely defined. The basic assumptions of the conventional models were constant returns to scale, diminishing marginal productivity of capital, exogenously determined technical progress, and substitutability between capital and labour thus emphasizing the role of savings or investment ratio as crucial driver of short-run economic growth. Technological progress is considered a long-run phenomenon and exogenously determined. However, in the modified Solow model (Lucas, 1988; Romer, 1986), technological progress under the assumption of increasing returns to scale is broadly defined as new knowledge (Romer, 1990; Grossman & Helpman, 1994), innovation (Aghion & Howitt, 1992), public infrastructure (Barro, 1990), among other things (Rao, 2010; Kumar & Kumar, 2012; Kumar, 2014), and are treated as endogenous in the growth model.

Notably, the effect of technology is magnified when the latter include technology that supports communication, enhances productivity and improves the wellbeing of the society (Cronin, Colleran, Herbet, & Lewitzky, 1993; Datta & Agarwal, 2004;Lam & Shiu, 2010; Kumar et al., 2014; Shahiduzzaman & Alam, 2014). In this regard, development in technology (broadly defined) is expected to lower the cost of production, streamline supply chain processes, provides access to information in decision making and support consumers in acquiring quality products at competitive prices (Buhalis & Law, 2008; Porter, 2001).

In regards to the empirical evidences, a number of studies have focused on the technology-led growth (Tech-LG) hypothesis using cross-country regression techniques. For instance, Hardy (1980) considers 60 countries over the 1968–1976 periods and finds strong evidence that telephones contribute to the economic development. Madden and Savage (1998) examine a sample of 27 Central and Eastern European (CEE) countries over the period 1990–1995 and find a positive relationship between investment in telecommunication infrastructure and economic growth. Similarly, Roller and Waverman (2001) consider 21 Organisation for Economic Co-operation and Development (OECD) countries over a 20-year period (1970–1990) and find a positive causal relationship between investment in telecommunication infrastructure and subsequent economic performance. Thompson and Garbacz (2007) consider a panel of 93 countries for the period 1995–2003 and find that penetration rates of telecommunication services improves the productive efficiency of the world as a whole and particularly in some subsets of low income countries. Seo, Lee, and Oh (2009) analyse a panel of 29 countries in the 1990s and conclude that ICT investment has a positive effect on GDP growth.

[3] Some Small Pacific Island Countries such as Tuvalu, Kiribati, and some parts of Fiji, are witnessing the sea-level rise.