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An empirical analysis of Sri Lanka's Manufacturing Productivity slow-down

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ABSTRACT

This paper analyses empirically the changes in Sri Lanka's manufacturing productivity during a period of regime shift from import substituting industrialisation to export-oriented industrialisation. We have used a varying coefficients stochastic production frontier model on a balanced panel data set to shed light on the effects of trade liberalisation on Total Factor Productivity which incorporates both changes in Technical Efficiency and Technical Progress. The results of the empirical validation of the stochastic production frontier model reveal that there were two distinct phases of output and productivity growth under each of the two trade liberalisation episodes that occurred during 1978–88 and 1988–97, respectively. The analysis carried out in this paper decomposing Total Factor Productivity into Technical Progress and Technical Efficiency also reveals that during early years of each episode, perspiration or factor inputs was the driving force of increased output growth giving way to 'inspiration' or technical progress as each phase matured. The stochastic production frontier empirics reported in this paper together with negative feedback effects emanating from the political turmoil and the prolonged ethnic conflict virtually brought the growth of foreign direct investment to a grinding halt in late 1980s, when the election of new right-wing government appears to have given a shot in the arm to overcome the paralysis of technical progress that seem to have contributed to the productivity slow-down in Sri Lanka's manufacturing sector in the eve of the new millennium.

1. Introduction

The objective of this paper is first to investigate the productivity gains achieved by the manufacturing sector in Sri Lanka after policy reforms in 1977 when Sri Lanka shifted from an import substituting industrialisation (ISI) policy to an export-oriented industrialisation (EOI) policy. These policy reforms were aimed at encouraging Foreign Direct Investment (FDI) which brought in the magic package of technology, export marketing and new management practices that enhanced technical efficiency and productivity while cutting down on x-inefficiency. The enhancement of manufacturing industry productivity through increase in technical efficiency and technical progress was vital to the sharpening of Sri Lanka's competitive edge manufacturing exports after 1977.

In this context, the existing empirical studies on Sri Lanka provide insufficient evidence on Technical Efficiency (TE) and Technical Progress (TP). For example Athukorala (1996) and Kelegama, Samararatne, and Knight-John (1999) used the Solow

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residual (Solow, 1957) as a proxy for Total Factor Productivity (TFP) without decomposing it into TE and TP as we have done in this paper. It has been argued that using TFP is flawed and misleading as it fails to highlight the important interactions between TP and TE. As Nishimizu and Page (1982) point out, high rates of TP can coexist with deteriorating TE performance and vice versa. The changes in TP (adoption of technology or innovations) is captured by shifts in the production frontier, while improvements in TE (catching-up), achieved by choosing the best practice method of applying technology, is represented by firm's moving towards the optimal production frontier. Hence, the policy measures aimed at improving TFP growth might be ill-directed if the interaction of these two components is not understood correctly.

The rest of the paper are organised as follows: Section 2 briefly reviews Sri Lanka's transformation since liberalisation in 1977. Section 3 discusses the data and variables used in the empirical validation of the stochastic production frontier model and its coefficients which produce the coefficients of the optimal production function. Section 4 discusses the procedure for decomposition of TFP. Section 5 presents the empirical evidence of Sri Lanka's Manufacturing Productivity slow-down. Section 6 concludes the paper.

2. Brief review of Sri Lanka's economic transformation

At independence in 1948, Sri Lanka was predominantly an agricultural economy with a plantation based export sector. The industry sector was comparatively small and was not operating efficiently due to a number of structural and other bottlenecks such as lack of appropriate technology and capital, and shortage of intermediate inputs. Under the ISI strategy operating until 1977, the public sector enterprises dominated the industry/manufacturing sector. These industries were heavily dependent on imported inputs, and were operated below capacity mainly due to lack of imported inputs, which resulted from foreign exchange restrictions on imports enforced over time. These restrictions were severe during the 1970–77 period.[1] Towards the end of this period, the electorate, looking for a change, returned the right-wing United National Party (UNP) to power in mid-1977. With over 80 per cent of the seats in Parliament, the new government seized the opportunity to introduce far-reaching economic and political reforms.[2] These economic policy reforms not only shifted Sri Lanka away from the diminishing dynamics of an ISI strategy to an EOI strategy, but also became made it the poster boy for the implementation of the 'Washington Consensus' or the brand of free market capitalism that US wanted to export to developing countries.

In line with these reforms, privatisation decimated state owned enterprises and the private sector emerged as the dominant force in manufacturing in Sri Lanka in the early 1980s. FDI increased form a mere US$ one million at the beginning of policy reforms in 1977 to US$ 175 million by 2000 reaching a peak of US$ 433 million in 1997. The annual growth rate of manufacturing output, which had dropped to 1.6 per cent during the most regulated period (1970–77), picked up and recorded a 12.5 per cent growth rate by mid-1980s. The completion of some mega infrastructure projects by the government further facilitated the transition process.[3] The employment generation in the manufacturing sector recorded an increase from 117,500 at the time of policy reforms to about 522,700 by the turn of the century. In the meantime, private sector contribution to manufacturing employment increased from about 50 per cent to 94 per cent over the same period (Bandara, 2004).

These changes brought about a structural transformation in the economy. As can be seen in Table 1, the share of agriculture in GDP, which stood at 29.1 per cent in 1977 declined to 20.5 per cent in 1994, and further declined to about 16.8 per cent by 2000, while the share of manufacturing in GDP, which stood at 15.5 per cent in 1977 surpassed agriculture in 1995 and continued to increase to 22.5 per cent by 2000.

Further, the share of agricultural exports which stood at 79.3 per cent in 1977, continued to decline, and reached 18.1 per cent by 2000, while the share of industrial/manufacturing exports, which stood at 14.2 per cent in 1977, surpassed the share of agriculture by 1986 and continued to increase reaching 78 per cent by the turn of the century.[4] The services sector contribution to GDP also increased from 50 per cent in 1977 to 52 per cent by 2000 facilitating the growth in the manufacturing/industry sector.[5]

However, the sustainability of manufacturing growth in the country has been subject to debate for two main reasons (Athukorala, 1996; Karunaratne & Bandara, 2004; Kelegama et al., 1999). First, Sri Lanka's market share for manufacturing exports in general, and wearing apparel in particular, has been threatened by stiff competition posed by new entrants to the

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[2] The main political reforms include: establishment of the executive presidency with sweeping powers, and the change of electoral system from 'first-past-the-post (FPTP)' to a democratic 'proportional representation' (PR) system through the change of constitution. These political reforms helped to command a reasonable political stability, particularly during the first wave of liberalisation (1978–88), facilitating the economic reforms.

[3] Major projects include establishment of Free Trade Zones (FTZs), improvements in the existing road and telecommunication systems, and Mahaveli River Development project that boosted the hydro-power generation and irrigation in the dry-zone in the country. It is generally accepted that Sri Lanka's underperformance economically, in the pre reforms period in particular, has been due in no small measure to lack of investment in major infrastructure development projects.

[4] See Athukorala and Jayasuriya (1994) and Athukorala and Rajapathirana (2000) for a comprehensive analysis of industrial transformation and macroeconomic issues of the Sri Lankan economy.

[5] It might be useful to compare Sri Lanka's structural transformation to that of other Asian economies. However, we believe it is not within the scope of this paper. Instead, we have produced a comparison of manufacturing contribution (as a percentage of GDP) in South Asian countries (see Appendix 1). It shows that Sri Lanka's manufacturing sector has continued to make an outstanding contribution to its economy.