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Trade arrangements, productivity growth and firm level technical efficiency in textiles and clothing industries of Australia and Bangladesh 1972-1998

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**TRADE ARRANGEMENTS,
PRODUCTIVITY GROWTH AND
FIRM LEVEL TECHNICAL
EFFICIENCY IN TEXTILES AND
CLOTHING INDUSTRIES OF
AUSTRALIA AND BANGLADESH
1972-1998**

A thesis submitted in (partial) fulfilment of the
requirements for the award of the degree

DOCTOR OF PHILOSOPHY

From



UNIVERSITY OF WOLLONGONG

by

I.K.M. MOKHTARUL WADUD
B.A. (Honours), M.S.S.

Department of Economics
2001

DECLARATION

I, I.K.M. Mokhtarul Wadud, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy, in the Department of Economics, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

I.K.M. MOKHTARUL WADUD

15 January 2001

ABSTRACT

With inter-country differences in comparative advantage and the resultant perceived significance for product specialization, trade-based development strategies have become the key to ascending the development ladder. The role played by the textiles and clothing industries during the embryonic stages of such a process is enormous, but was limited through protective measures, such as the Multi Fibre Arrangement (MFA) adopted by the net importer developed economies. With the ongoing globalisation process under the auspices of the World Trade Organization (WTO), small players in the world market such as Australia and Bangladesh have been faced with severe policy questions. In view this, the impact of globalisation, microeconomic reform and firm-level responses have remained vastly under-investigated and this thesis is a novel attempt to bridge this knowledge-gap.

Public policy regimes and microeconomic reform in textiles industries have been examined and compared in the two economies with a third country, Thailand, chosen because of its intermediary development status, to facilitate comparative evaluation of performance of these industries. Dynamic comparative advantage and product life cycle hypothesis has been analysed with estimation of revealed comparative advantage (Balassa, 1965) for selected developed and developing economies. Subsectoral performance has been evaluated with productivity measured using both parametric and non-parametric techniques. Tornqvist's (1936) non parametric superlative index with underlying flexible form translog function, as popularised by Diewert (1976, 1978), has been used to index output, input and TFP growth for the three economies. Estimation of the Cobb-Douglas production function has revealed input elasticities, returns to scale and the rate of technical change.

For firm level analysis of technical efficiency, a parametric measure of frontier function has been used based on the stochastic frontier approach developed by Aigner, Lovell and Schmidt (1977) and Meeusen and Van den Broeck (1977) with the parameterisation technique of the variances due to noise and inefficiency suggested by Battese and Corra (1977). Cobb-Douglas stochastic frontier production functions have been estimated in the error component model with alternative assumptions of half normal and truncated normal distributions of the inefficiency term for a cross section of Australian textiles and clothing firms in 1998 obtained from the Textiles, Clothing and Footwear (TCF) benchmarking database.

To analyse factors determining variation in technical efficiency across firms, conventional two stage analysis that suffers from a contradictory distributional assumption of technical inefficiency, where technical efficiencies are predicted first and then regressed against various firm specific factors has been substituted for single stage estimation following Battese and Coelli (1993, 1995) where the inefficiency components are the functions of a vector of firm specific factors (explanatory variables). Panel data for Australian and Bangladeshi firms was accommodated in this inefficiency effect model measuring Hicks neutral technical change and time varying technical efficiency over 1995 to 1998. Among other firm-specific characteristics such as age, size and ownership pattern, that were common to both Bangladesh and Australia, additional variables such as export orientation (or openness), proportion of non-production to total workers, effective rates of assistance (ERA) and research and development (R&D) were included for Australian firms to capture the effects of recent microeconomic reforms. Based on predicted firm specific technical efficiency, measures of technical change, scale effects and technical efficiency was aggregated under non constant returns to scale to obtain TFP changes for each individual firm and for firms in various product categories.

The major findings of this study are, (i) Developing economies have made great strides in achieving dynamic revealed comparative advantage in textiles trade over the last two decades. However, some developed economies also have made significant improvement in comparative advantage thereby engendering increased competitiveness among the trading nations. Bangladesh has a strong comparative advantage in clothing trade whereas Australia has improved but is yet to have a clear comparative advantage in clothing. (ii) Over time, labour productivity growth has been strong in both the Thai and Australian industries while this has been only moderate in Bangladeshi clothing and low in its textiles industries. Evidence from factor proportions indicated that since the early 1970s, Australian industries became predominantly more capital intensive as did Thailand, to certain extent, as opposed to Bangladesh where rising employment especially in the clothing industry reduced the pace of absorption of higher capital proportions. (iii) Despite export performance and a good trend rate of growth over the period, productivity growth has been slow in Australian and Bangladeshi industries in recent years. For Australia the process was found to be energized by falling ERA, as this indicated policy shifts, especially for the clothing industries; (iv) The analysis at the firm level suggested that larger and more profitable Australian firms are technically more efficient than small and medium enterprises that had considerably lower efficiency. In Bangladesh, clothing firms were found to be more efficient than the textile firms.

(v) Analysis of composition of TFP revealed that technical efficiency changes significantly contributed to the overall TFP of Australian and Bangladeshi firms with some contribution from scale effects and a negligible impact of technical change. (vi) Empirical estimates of the inefficiency effect model showed that several firm specific variables such as Age and Size had significant positive influence on technical efficiency of Australian textile firms. Further, significant negative influences on efficiency from capital intensity were detected for Australian textile firms. Both textile and clothing firms in Australia with higher proportion of non production to total workers were found to be significantly less efficient and vice versa. Efficiency was found to be lower for older textile firms and higher for newer clothing firms in Bangladesh. Larger and privately owned textile firms in Bangladesh were found to be significantly more technically efficient than the smaller firms and firms under government ownership.

Several policy implications emanate from the findings of this study. It is evident that increased competitiveness has been the major consideration with the beginning of the liberalization process of the textiles trade and with there is considerable scope to reap the benefits of the fully integrated regime beyond 2005 if both Australia and Bangladesh augment their comparative advantage based on high quality and low cost processes, respectively. Adequate measures have to be taken to take care of the distressed productivity growth in both textiles and clothing industries in Australia as evidenced from the mid 1980's and in textiles industry in Bangladesh in recent years. There is enough scope to improve efficiency level of textiles firms in Bangladesh and small and medium textiles and clothing firms in Australia, which would help the productive performance of these firms and industries. For technological improvement, care has to be taken to use existing technology more efficiently for Australian firms while for Bangladesh there it could be recommended that older and obsolete plants be replaced by the newer ones. To ensure effective microeconomic reform, it is necessary that benefits be appropriately channelled to the individual producers with a stronger institutional base and transparency of policies and the policy variables such as the ERA reevaluated. New and small firms need to be assisted in Australia and excess non-production workers have to be identified and curtailed. For Bangladesh, adequate technical assistance to older textiles firms have to be accorded and to the new entrants in the clothing industry to keep pace with acquired efficiency and profitability. It could be feasible for both Australia and Bangladesh to emphasize the clothing industry more given the ample potential to enhance efficiency, productivity and export and the need for a better performing sub sector beyond 2005.

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