Trade-Orientation and Manufacturing Productivity in Developing Countries: A Survey of the Literature

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INTRODUCTION

An inward-oriented trade regime extensively rely on tough import barriers in the form of high tariffs and quantitative restrictions (QRs include not only the quotas but also the value limits on the imports through foreign exchange allocation or by the requirement that importers provide their own foreign exchange), and overvalued exchange rates. The high tariffs and QRs discourage imports of competitive products and grant monopoly power to local producers. While the overvalued exchange rates (Krueger's (1978) and Bhagwati's (1978) synthesis volumes for the NBER research on Foreign Trade Regimes and Development concentrate on the exchange control and its impact on the overall growth), on the other hand, discourage exports and encourage excessive use of capital intensive technology. Thus one would expect that the net effects of restrictive trade regime - to introduce a home market bias - would be negative on productivity growth due to the following reasons. First, it eliminates a nation's comparative advantage and attract resources towards production of protected products for which the size of domestic market is small. As a result, the benefits of economies of scale are lost. Besides, industries which require a large scale operation and mainly relay on export markets will not be developed. Even if these industries are established their capacity can not be utilised fully due to the small size of domestic market. Hence production and productivity growth are lost. Second, restrictions together with overvalued currency create a shortage of foreign exchange which prevents uses of imported inputs and technologies, leading to a fall in output, exports and hence results in a lower productivity. Since the domestic market is shielded from the external

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competition, producers of import substitutes (IS) are not forced to reduce costs, exposed to the best management practice an technology, leading to a fall in productivity.

On theoretical ground an outward-oriented trade regime influences the level of productivity through output growth, export expansion and ensuring reliable supplies of imported inputs and technologies. Output growth permits to enjoy the benefits of economies of scale, while export expansion enables to adopt best management practices and obtain first hand information about competitive products. Access to imported inputs and technologies allows to improve the quality of products and reduce costs. These are the channels through which productivity improvement takes place in and outward-oriented trade regime. However, empirical findings on outward-orientation and productivity growth are not vivid. Pack (1988) notes 'there is no clear-cut confirmation of the hypothesis that countries with liberal trade policies benefit substantially from greater growth in technical efficiency' (p. 353). This may be due to the quality of data and methodological limitations. Thus, there is a need to review the literature to improve our understanding about trade-orientation and productivity growth and sources of productivity growth as trade liberalization is a major component of Structural Adjustment Program in developing countries (DCs). The paper is organized as follows: First, it critically examines the empirical literature on trade-orientation and productivity growth in developing countries (DCs), and then we present concluding remarks.

TRADE-ORIENTATION AND MANUFACTURING PRODUCTIVITY

Although the link between trade-orientation and domestic manufacturing has recently attracted economists' attention, only a few studies have examined the impact of trade-orientation on the manufacturing productivity growth in DCs (Krueger and Tuncer for Trukey (1982), Handosuna Nishimizu and Page for Egypt (1986), Golder for India (1986), Tsao for Singapore (1985), Chen and Tang for Taiwan (1990), Ahluwalia for India (1992), Athukorala for Sri Lanka (1994), Akrasane and Winbooncutikula for Thailand (1994) Brown and Dominguz for Mexico (1994) and Bonelli for Brazil (1994). On country, attention is largely directed to the two issues: First, the structure of protection and its impact on the manufacturing sector (Literature are too many to be cited. See Kirkpatrick (1987) for the recent survey of the literature). Second, the effects of trade policy reforms on the overall economy (Papageorgiou et al., 1991).

Since the productivity improvement is a yardstick of economic growth, economists have recently made attempt to explain the channels through which trade policies influence total factor productivity (TEP) growth. However, in this regard some economists (Bhagwati (1978),

Krueger (1978), Greenway and Num (1988) and Syrquin (1986) have measured the factor productivity in a conventional way i.e, labour productivity (GDP/ total labour force), and capital productivity (GDP/ investment). But this is not a real measurement of productivity as it measures only the relation of one factor to output growth. For example, labour productivity considers relation of labour to output growth ignoring the contribution of other factors of production. In fact, labour productivity may improve as a consequence of increase in capital- labour ratio and therefore, it is not the actual improvement in labour productivity. Thus, the concept of TFP is increasingly used in the literature as a measure of source of growth. The empirical studies examining the link between trade-orientation and TFP growth can be grouped into two categories: (a) Cross-country studies and (b) Country studies.

Cross-country Studies

Cross-country analysis (See for example, Kavoussi (1984), Feber (1982), Pack (1984), Nishimizu and Robins (1984), IMF (1982) and The World Bank (1987) have made statistical comparison to see if differences in growth performance are related to differences in trade policies. These studies have found that the productivity growth is directly related to trade-orientation. In outward-oriented countries as exports expand, both the resource allocation and externality effects lead to an economy-wide productivity and output growth. On a theoretical level, there are at least three explanations for this correlation. One emphasizes the benefits of economies of scale, while the others emphasize the x-efficiency (competition) and the access to imported inputs and technologies.

Trade-Orientation and Allocative Efficincy

To examine the link between trade-orientation and allocative efficiency Pack (1984) compares TFP growth of Isrell and Philippines' industries with that of the US. He finds a lower TFP in Israel and Philippines' industrial sector compared with the US because of a lower level of production caused by the inward-oriented policies. Pack findings thus, suggest a strong link between trade liberalization, output growth and productivity improvement. Bergsman (1974) calculates an x-efficiency loss of 6.8 percent for Brazil; 0.4 percent for Malaysia, 2.2 percent for Mexico, 5.4 percent for Pakistan, 2 percent for Norway and 2.6 percent for Philippines due to their projectionist policies. He concludes that 'open economies show lowest costs of misallocation. The costs of misallocation seem to be lower in larger and more industrialised countries and higher in countries with smaller domestic market for protected production' (p.420). Bergsman findings thus, indicate a link between economies of scale and efficiency which can be achieved through opening the foreign trade sector.

Nishimizu and Robins (1984) using the gross output production function in which output growth is a function of labour, capital and intermediate inputs, compare TFP growth in the manufacturing industries of Korea, Turkey, Yugoslavia and Japan. They find that if growth is decomposed into due to domestic demand expansion, export expansion and import-substitution, the variation in TFP growth reflects that export expansion leads to a higher TFP through economies of scale and that import substitution results in a lower level of TFP. This lead them to conclude that there is a positive link between outward-orientation and TFP growth. Nishimizu and Page (1990) in a cross-country study find that productivity growth is also influenced by the manner in which domestic producers are protected (e.g. QRs vs tariffs) and by the market orientation of the sectors (e.g private vs public). They indicate a low or a negative TFP growth under QRs than in tariff regime.

Batchelor (1980) using cross-country data for 1964-71 tests "Verdoorn's Law" (P.J. Verdoorn (1949), using a linear regresion of productivity growth on the manufacturing output growth in a sample of developed countries during the interwar period, found that any growth in ouput generated a further increase in productivity. This led him to conclude that there is a link between economies of scale and productivity gains which is known as Verdoorns' Law), and confirms a link between output growth and productivity improvement. According to him an outward-oriented development strategy encourages a large scale production, leading to lower costs and productivity growth. While Kaldor (1967) finds that "Verdoorn's Law" i.e., productivity improvement due to economies of scale is highly correlated to the manufacturing and construction sector and does not hold in any other sector. Balassa (1967) argues that cost reductions in one industry (i.e., productivity growth in one industry) have a cumulative effect on the whole economy through input-output linkages and through the effects of higher incomes on the demand for goods. Ikemoto (1986) in the productivity analysis of 10 Asian countries (These countries are: Japan, Singapore, Honk Kong, Taiwan, Malaysia, Korea, Philippines, Thailand, Indonesia and India) for the period of 1970-80 finds that to a certain level of technology "Verdoorns' Law" exists but as the possibility of technological innovations becomes exhausted the contribution of productivity becomes small regardless of output growth. He finds a higher productivity growth in those countries which relay extensively on the imported technology than the countries where the use of imported technology is not much. This indicates that an outward-orientation trade regime improves productivity by enabling the use of superior technology developed in the other parts of the world.

A comparison by the IMF (1992) concerning the trade orientation and growth performance of 41 developing countries demonstrates that during 1975-89, the outward-oriented countries achieved significantly higher growth in their GDP and in total factor productivity than the countries

pursuing inward-oriented trade policies. A similar analysis done by the World Bank (1987), based on the work of Chenery and others (1986), demonstrates that the more outward-oriented is the trade regime, the greater is the contribution of TFP to GDP. For example, in Hong Kong and in Korea TFP contributes 42.3 and 47 percent to GDP respectively while in the least outward-orientated countries its share is much lower (22.7 percent). However, the experience of many Latin American countries, during the late 1960s and early 1970s, does not support this hypothesis. Except in Colombia, a declining trend in TFP was recorded in Argentina, Brazil, Chile, Mexico, Peru and Venezuela since they liberalised their trade regimes in the early 1960 (Havyrlyshyn (1960)).

Country Studies

Although cross-country analysis had established strong links between trade-orientation and productivity growth, in a case study type analysis of individual country (country study) these links are not robust. A country study provides more conclusive evidence to the correlation between trade policies and productivity gains as it has advantages of controlling country specific situations.

Trade-Orientation and Productivity Growth

Krueger and Tuncer (1982) research for the Turkish manufacturing industries supports the hypothesis that trade-orientation of a country has a significant impact on the manufacturing productivity growth. They use a gross output production function in which output growth is the function of growth in labour, capital and intermediate inputs. Krueger and Tuncer find an improvement in the manufacturing productivity in Turkey when trade regime was liberal and a fall in productivity during restrictive trade regimes. They found no tendency among the highly protected industries to improve their productivity and the government owned industries exhibited a lower productivity than the private sector industries. In a similar study Kim an Park (1985) find a strong association between open trade policy and productivity growth in the Korean manufacturing sector. They find a high residual (52 percent of growth) during 1963-72 when the trade regime was liberalised. The residual fell to 20 percent during 1972-82, when Korea again emphasised import- substitution policies to protect intermediate inputs capital goods industries during the 1970s (cited in Havyrlyshyn (1990)).

On the contrary, Tsao (1985) finds that in the Singaporean manufacturing sector TFP growth was eight-tenth of one percent during the 1980s with many subsector showing negative TFP growth. Despite open trade policy of Singapore, the country could not establish a robust relationship between openness and productivity growth. Chenery (1986) also finds a similar result in the case of Singapore for the post-1960 period.

He suspects that the rapid increase in the stock of capital may have caused no change in TFP (cited in Balassa 1988).

Economies of Scale, Competition and Productivity Growth

In the Korean manufacturing sector Kim (1984) finds a negative link between the level of protection and manufacturing productivity growth and a positive link between the net export growth and productivity growth. Furthermore, his study demonstrates no link between the level capacity utilisation and TFP growth, but a strong association was observed between the economies of scale and TFP growth. Akrasane and Wibooncutikula (1944) find a high level of productivity in export-oriented industries in Thailand during 1963-86. While the import competing industries experienced a declining trend in their productivity, especially towards the latter period when the level of protection had substantially declined. This indicates that trade restrictions protect intefficient industries, leading to poor productivity.

Brown and Dominguez (1984) using the Kendrick index estimate TFP for the Mexican manufacturing industries during 1984-90. The Kendrick index of TFP measurement assumes that growth in value added is a consequence of growth in labour, capital and technical changes which is a very restrictive assumption. During the period of analysis in which substantial liberalisation had taken place in Mexico, TFP grew at 4.8 percent annually. However, this figure must be interpreted with caution, because they use the stock of capital as a measure of capital input rather than the service of capital which assumes full utilisation of installed capacity. This may have resulted in the overestimation of capital input, leading to underestimation of TFP growth. Mexican manufacturing sector suggests a higher productivity growth in those small scale export-oriented firms which have attracted foreign participation. This indicates that an outward oriented strategy by encouraging foreign participation introduces new technology and better management practices, leading to productivity growth. They find a positively link between output growth and TFP, however neither external trade nor the trade regime variables turned out significant.

In the Brazilian manufacturing sector Bonelli (1972) finds a higher TFP during an outward-oriented trade regime and over 50 percent of the variance in TFP growth was explained by output growth. Furthermore, he finds that about 40 percent of the variance in TFP was explained by output growth allocated to export growth which led him to conclude that export expansion has a positive impact on productivity growth, while the impact of import substitution was less clear. On the contrary, Handoussa et al. (1986) find that a partial liberalisation of trade regime (The domestic market was secured for the IS industries, but the imports of intermediate inputs were substantially liberalised, leading to better utilisation ·of installed

capacity in the IS sector) in Egypt substantially improved TFP in the import-substitution industries but not in the export-oriented industries because exports were based on the processing of the locally available natural resources. They find that in import-substitution industries TFP grew at 2.4 percent annually during 1973-79, while it declined at 1.91 percent annually in the export-oriented industries.

Chen and Tang (1990) using manufacturing data from Taiwan for 1962-82 investigate the relation between TFP growth, output growth (economies of scale) and export expansion (competition). They found that holding the scale of output constant, the impact of export expansion on productivity growth was statistically insignificant. This led them to conclude that in Taiwan output growth has superior power in explaining productivity growth than the export growth. even though export growth is the best way of achieving economies of scale, especially when the size of domestic market is small.

Using Jiangsn Province manufacturing industries data, Prime (1992) investigates the link between productivity growth and change in economic policies in China. He examines data for 1953-88 and finds a substantial improvement in productivity in the early 1980s when reforms were introduced in China. The growth in productivity was largely due to relatively faster growth in collective industries than in state industries. However, like many other studies undertaken in DCs this study fails to measure capital input in the form of services of capital and labour input in the form of hours worked.

The World Bank (1993) found that in Korea, the highly protected industries such as, iron and steel had lower levels of TFP while the less protected industries like textile and clothing had high rates of TFP during 1966-85. The sectoral TFP growth rates of the Malaysian industries also showed a similar trend during 1973-89. TFP growth rates in promoted sectors such as, nonelectrical machinery, paper and paper products, iron and steel and transport equipment were lower than in textile and apparel a non-promoted sector. However, in Japan highly promoted sector namely, chemical and the metal working complex had unusually a high TFP between 1960-79 (The World Bank (1993), pp 324-325). In short, there is no apparent relationship between the sectors promoted or protected and TFP growth. However, in the Indian manufacturing industries Goldar (1986) finds a significant negative relationships between TFP growth and IS and a significant positive relationships between TFP growth and output growth. He finds that 1 percent higher growth in output was associated with about 0.5 percent higher growth in TFP. While a 10 percent higher contribution of IS to change in output was associated with about 0.6 percent lower annual growth rate in TFP. This led him to conclude that economies of scale and competition are two important sources of TFP growth in the Indian manufacturing industries.

Ahluwalia (1991) finds a negative TFP growth in the Indian manufacturing sector during a restrictive trade regime (1970s) and an improvement in productivity after the mid 1980s when trade policy reform began. She concludes that TFP was low during 1970s mainly due to excess restrictions in trade and payment systems and decline in infrastructure investment. She finds productivity growth was the dominant source of growth in value added (output growth) since the mid 1980s which increased from 5 percent per annum during the period of industrial drift to 7.5 percent per annum in the first half of 1980s mainly brought about by an increase in infrastructure investment and liberalization of trade regime. However, her findings must be interpreted with cautions as she uses a value added production function which does not consider intermediate inputs in the estimation of TFP. Since intermediate inputs are important in the sectoral TFP especially in developing countries, it is misleading to work on the value added production function. Although this is an issue (whether a value added production function or a gross production function to be used), Nishimizu and Robinson (1984) believe that estimate of TFP with a gross production function gives better insights (in the gross output production function the technical change factor applies equally to all factors of production, where as in the value added production function the technical shift factor applies only to capital and labour)

Nardir (1970) believes that restricting TFD analysis to only two factors is a source of bias. He goes on to say that 'in most industry studies value added data are used as a measure of output on the assumption that the ratio of raw materials to total output remains constant. The evidence, however, suggests that this ratio is not constant for the whole economy nor for the various industries. Generally, it has declined due to improvements in technology, better inventory management, and substitution of both raw materials and primary inputs. The omission of materials from the production function often leads a positive bias in estimates of returns to scale and affects the elasticity of substitute between capital and labour. For example, in some sectors, such as the construction, a substantial part of productivity improvement may occur due to better quality of material supplied by other industries' (pp. 1153). Thus, it is unfortunate not to consider intermediate input in the productivity analysis. The analysis of TFP based on the value added production function is, therefore, not a reliable methodology.

INCONSISTENCY OF EMPIRICAL FINDINGS

Theoretically a link between trade policy and productivity growth exists, although the findings are generally weak and ambiguous especially in the country studies (Pack (1998 and 1992) and The World Bank (1993)). This is not accidental because there are some problems associated with the estimation of TFP itself. First, TFP indices are based on the methodology which assumes equilibrium situation. It means factors are paid according

to their marginal product (or opportunity costs). Thus, interpretation if TFP in disequilibrium situation gives ambiguous results (Ahluwalia 1991). Second, apart from the methodological limitations, problem also arises due to the lack of sufficient data on capacity utilisation and hence the calculation of TFP is often based on the assumption of full capacity utilisation. Often capital is measured in terms of capital stock and the variation in capacity utilisation is ignored which gives misleading information (Nadir 1970). This had been noticed in the calculation of TFP for Korea. For example, Nishimizu and Robinson's (1984) research, which estimated capital services on the basis of capital stock, found rapid TFP growth in the Korean manufacturing sector during 1960-77. But Kim and Know's (1970) study, which considered the actual rate of capacity utilisation in estimating TFP for the Korea manufacturing, found a lower TFP growth. The TFP growth rate was even lower when variation in employment hour per week was also included, Both studies cover some common years. Thus, in the absence of adequate data at disaggegated level, which is often the case in many developing countries, estimation of TFP can give an ambiguous result.

Even thought there are some problem in estimating TFP, it still gives a useful insight into the link between trade-orientation and productivity growth in the absence of any other alternative framework. It is worth quoting Pack (1988)' in empirical literature of trade liberalization greater emphasis is placed on the distorting effects of interventionist polices while productivity aspect is almost neglected. Despite the difficult data and econometric problems attendant on estimating the factor biases in productivity performance may have greater value than further refinements in measurements of the impact of government intervention'.

CONCLUSION

On theoretical ground one could argue that an outward-oriented trade regime improves productivity through three main channels namely, output expansion, export growth and import liberalization. Output expansion would capture the benefits of economies of scale and hence reduces per unit costs, leading to productivity growth. While export growth would improve efficiency thought learning by doing, competition (X-efficiency) and exposure to better management practices. Import liberalization would enable to obtain best technologies and inputs, leading to productivity improvement. But despite an increase in the number of studies are not vivid. This is not accidental and may be associated with data limitations in developing countries and different methodologies applied. Besides, institutional facilities may have some role in differences in productivity in different countries. As Nelson (1981) notes that productivity is not only influence by the technologies but also by the culture of the organisation which determines how the distinct inputs are combined, physical characteristics of the material inputs etc. Even though these

things are difficult to measure they must be considered while interpreting the result of productivity alalysis.

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