

INTERNATIONAL TRADE AND ECONOMIC GROWTH IN SOUTH AFRICA

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International trade has for a long time been hailed as an engine of growth, in the terminology of Robertson (1938) and this feature of international trade has been particularly evident during the post-World War II period. During the mid 1970's the long post-War period of sustained growth in world merchandise trade has merely brought the world trade-output ratio back to its 1913 level, as has been indicated by Krugman (1995). World trade has since then maintained this upward trend. A particular feature of the world economy is that the growth rate in merchandise trade is exceeding world output by a considerable margin. Despite these seemingly positive growth aspects of international trade the empirical evidence on the effects of trade on economic growth appears to be mixed. As indicated by Edwards (1993) in his review of this literature, the ambiguous results are related to conceptual and empirical shortcomings. In his review of these issues Temple (1999) confirmed the empirical ambiguity but emphasised that the gains from international trade, or openness, would probably be most favourable to countries already specialising in manufacturing exports. From this exposition it would appear that the most favourable gains from trade would come from intra-industry trade. We will return to this aspect later on. Edwards (1998) conducted research on data for 93 advanced and developing countries and succeeded in steering clear of many ambiguities that plagued previous research. He discovered a positive relationship between trade and economic growth. Frankel and Romer (1999) investigated the relationship between growth and trade while explicitly eliminating problems of causality and measurement errors. They applied geographic characteristics of the sample countries to explain trade and this featured as an instrumental variable in determining the effect of trade on income, or economic growth. They concluded that trade had a positive effect on income or growth by stimulating investment in physical and human capital. Moreover, trade appears to increase output for given levels of capital.

At the macroeconomic level trade liberalisation, as opposed to trade volume, appears to be positively related to economic growth in South Africa in terms of the results reported by Loots (2000). In a similar direction Roberts (2000) demonstrated that over the period 1992 to 1997 trade liberalisation increased South Africa's trade ratio but a direct relation between this and economic growth appears to be doubtful.

The purpose of this paper is to revisit the analytical framework of the trade versus growth discussion and to determine the transmission mechanism or channels through which trade and economic growth are linked. It would appear that, for South Africa, some linkages are more efficient or effective than others. Before we elaborate on this analytical framework some observations on the stylised facts are in order.

1. THE STYLISED FACTS

The sustained growth in world trade since World War II is characterised by several developments, which require closer attention.

Firstly, we distinguish the liberalisation of trade as well as goods and financial markets, particularly during the 1970's and 1980's. Closely related to these developments is the emergence of new trading blocks in Western Europe, South East Asia, North and South America as well as in Africa. In terms of static international trade theory, these developments have most probably resulted in trade creation, *i.e.*, the replacement of expensive domestic production by cheaper imports from a member of the newly established trade block or customs union. One would also identify cost-reducing effects as has been suggested by the new dynamic theories of international trade (Corden, 1972). Cost reducing effects imply that an existing source of supply within a customs union becomes cheaper owing to lower average cost to the firm that takes over the production for the customs union following the trade-creation effect.

Secondly, the opening up of Eastern Europe following the fall of the Berlin wall has been an important trade-expanding factor. This has enabled the traditionally trading nations of "Mittel Europa" to re-enter international trade on a significant scale. Closely related to this are the liberalisation of the Chinese economy and the emerging role of this country in international trade and capital flows. During recent years China played an important role in stimulating trade in commodities while becoming a major beneficiary of foreign direct investment.

Thirdly, the remarkable growth in manufacturing industry, during the period under review, is probably the single most important factor responsible for the expansion in world trade. It should be stressed that the importance of manufacturing industry in this context is the result of a very sophisticated form of specialisation in the sense that countries specialise in narrow product ranges within particular industries (Grimwade, 1989:90). This intra-industry trade has become a major component of world trade, particularly amongst developed countries where product differentiation features prominently. The sharp rise in the share of the Newly Industrialising countries in South East Asia in world trade since the 1970's is largely explained through intra-industry trade. In developed countries this could account for as much as 80 to 90 per cent of trade (Grimwade, 1989:106-111).

2. TRADE AND ECONOMIC GROWTH

Intra-industry trade is explained in terms of a theoretical framework that emphasises the similarities between countries. Moreover, economic structure, income levels, consumer tastes and close geographic proximity are converging elements in this exposition. The theoretical framework is not reliant on the assumption of perfect competition but based on imperfect markets where economic agents are price-makers as opposed to price-takers. Contrary to the homogeneous products of perfect competition these markets are known for differentiated products that are good substitutes. Increasing returns to scale within a framework of product differentiation opens up opportunities for product specialisation. The exploitation of economies of scale, associated with niche markets is the driving force behind intra-industry trade as emphasised by Krugman (1994). Imperfect competition and the existence of economies of scale are important linkages between trade theory and endogenous economic growth models. In this exposition economic growth is an endogenous outcome of the economic forces at work within a decentralised market system. There are different categories of endogenous growth models and for our purpose

we emphasise those models that focus on technology as the key to long-term growth but with the main tenet that individuals and firms deliberately create technological change. The economic growth process is part and parcel of the economic system and it is no longer an exogenously determined process as in neo-classical economics. In this analysis the assumption of perfect competition has to be abandoned since producers charge a price in excess of their marginal cost in order to cover the cost of the initial investment in new technology. This approach emphasises the importance of temporary monopoly power as a driving force in the innovation process, because successful innovators would be in a position to charge monopoly profits. In due course their innovations become public goods and they have to maintain their profits by embarking on new innovations. This exposition is associated with the contributions of Romer (1986,1990, 1994), Stern (1991) as well as Blackburn and Hung (1996).

Following Romer, knowledge could be characterised as a special type of good in the sense that it possesses the properties of a public good, *i.e.*, the use of knowledge by one person does not exclude its use by others. By contrast, a private good carries a price, which can exclude economic agents from consuming it. Technological change is a major driving force behind economic growth and its implementation depends on the interaction between different sectors in the economy. Romer explains the process within the context of three sectors. Technological change becomes an endogenous process as it occurs within the system. Knowledge is a public good which is accessible to all economic agents who can use it over and over again at no additional cost. Knowledge could be applied and interpreted in different ways and through this process new products or technologies are created. These are differentiated products that are unique in themselves and their owners are in a monopolistic position, earning monopolistic profits, albeit for a temporary time period. It should be noted that economic agents in such cases are price-makers as opposed to price-takers. An important feature of these growth models is that the exploitation of knowledge and the development of new technologies augment the other factors of production so that economic growth is enhanced. The latter is possible because with the aid of new knowledge more output is produced with the same number of units of productive input. In the final analysis the process of augmentation is a function of the quality of people, or human capital.

This exposition can be formalised by introducing an aggregate production function

$$Y = K^\alpha (AL_Y)^{1-\alpha}; \quad 0 < \alpha < 1 \quad (1)$$

Where Y denotes units of real output, K and L_Y are capital and labour inputs respectively. A denotes the stock of ideas while α is a parameter. In the neoclassical approach to economic growth the production function (1) adheres to constant returns to scale in K and L_Y for a given level of ideas or technology A . The situation changes remarkably if we allow A to be independent inputs. This opens the possibility for increasing returns to scale. These elements become evident by considering a production function for ideas

$$dA/dt = \delta H^{\lambda} A^{\varphi} \quad (2)$$

where H is human capital inputs in the production of ideas, δ , λ and φ are parameters with $\delta > 0$. When $\lambda = 1$ the production of ideas is not experiencing duplication effects *i.e.* researchers do not overlap in developing similar or identical new ideas. When $\lambda < 1$ there are retarding duplication effects. With $\varphi > 0$, productivity in research increases with the stock of ideas and with $\varphi = 0$ the opposite is true. Following Jones (2002) we assume that $0 < \varphi < 1$ because these values of φ will simultaneously accommodate empirical evidence and allow for knowledge spillover effects in the production of ideas. This will also accommodate the importance of knowledge spillover effects as discussed by Lucas (1988).

Finally it is assumed that the two activities of labour, *i.e.*, the units employed in the production of output, L_Y , and the units producing ideas, H , comprise the total labour force, *i.e.*

$$L_Y + H = L \quad (3)$$

Moreover, $H/L = s_R$ and $L_Y/L = 1 - s_R$. In terms of this exposition the long-term growth rate is a function of the parameters of the production function for ideas as well as the population growth rate that determines the supply of researchers. It is evident that technological progress has been endogenised while we have abandoned the assumption of constant returns to scale.

Endogenous economic growth models have made substantial progress in explaining economic growth, *i.e.*, the analysis of growth has proceeded beyond neo-classical growth theory where the economic growth process is exogenously determined. Therefore, neo-classical growth models had very little to say about policy proposals. In endogenous growth models technological progress is, unfortunately, the by-product of a complicated process involving different sectors, with human capital just about automatically ensuring technological progress. It is not surprising that the exponents of these growth models have encountered problems in establishing empirical support for these envisaged processes, as has been argued by Pritchett (1996) and again elegantly articulated by Temple (1999) in his survey of this literature.

Another deficiency of endogenous growth models is that the system relies on an exogenous effect, which is usually associated with an increase in demand in the final goods sector, which is supposed to operate under perfectly competitive conditions where market participants are quantity adjusters. Market participants pass the effects of the disturbance on to the intermediate goods sector that is supposed to operate under conditions of imperfect competition. Here price-makers bid up the price in the research sector in order to induce the production of new designs that are applied in the production of intermediate goods that eventually produce the final goods. These new intermediate goods generate monopoly profits for their owners who continue their bidding for new designs until the system settles down at an equilibrium. Exogenous disturbances and adjustment towards equilibria that satisfy different conditions in the different sectors bring this analysis too uncomfortably close to neo-classical economics. Dynamic processes of the real world cannot be captured by these smoothly adjusting mechanisms

where equilibrating forces overrule the economic process and where adjustments occur in a timeless vacuum.

Economic growth in open economies can nonetheless be formulated without being hampered by the discouraging results of endogenous growth models. The reason for this is that the intellectual discipline of analysing economic events in terms of imperfect competition has a much longer history in international economics than in economic growth. It is probably because of this fact that international economics has been susceptible to Austrian views, especially when it comes to a dynamic analysis of the economic process. Following Krugman (1994) one could develop an endogenous growth model for an open economy that does not suffer from the deficiencies discussed above. The dynamic elements of the model are inspired by Schumpeterian dynamics within a typical period analysis. We abandon the sectoral approach of endogenous growth models. Innovation is part and parcel of the market process because it signifies a particular kind of human behaviour, which could be promoted by market incentives. Under the assumption of monopolistic competition, monopoly profits are the incentives to individuals or firms, including multinationals, to introduce new production technologies. In this Schumpeterian framework there is little room for equilibrium economics because the Schumpeterian entrepreneur is actively looking for new opportunities – the so-called “neue kombinationen” – that are exploited or developed in order to gain monopoly profits in the next period. We are, therefore, in a position to develop a framework where human behaviour drives the dynamic process of change and this behaviour is induced by market incentives. Market participants are continually assessing and analysing the information disseminated by markets while they carefully weigh their own assessment against market incentives through active processes of the mind so that they may finalise their plans of action (Lachmann, 1986:26-29). As we have already indicated, these incentives are monopoly profits. We can now abandon the idealistic process of endogenous growth analysis where new technologies occur as if their introduction is secured by the mere existence of human capital or population growth. Moreover, we are no longer dependent on exogenous shocks in the final goods market to generate an innovative process. The magnitude of the incentives as well as the quality of human capital, become important aspects of the new framework but the system is driven by human action. We emphasise that the monopoly profits in question are of a temporary nature because in due course, in the period analysis, the innovations become public goods. By then the new knowledge no longer commands monopolistic profits and its application by one person does not exclude its use by another. As public goods, these innovations enhance real wealth because new technologies and products are trading at lower prices.

3. THE TRANSMISSION FROM TRADE TO GROWTH

If we apply this exposition to an open economy it follows that an internationally integrated economy constitutes a substantial increase in demand and simultaneously offers more potential for economies of scale than a closed economy as has been argued by Ethier (1982). Economic growth in terms of supply-side effects is achieved in the exploitation of economies of scale in the production of niche products. This production will generate monopoly profits in terms of our period analysis that will disappear through

time but the process will be repeated through subsequent time periods. The *first* channel transmitting economic growth through trade is economies of scale that are directly related to the monopoly profits in the production for niche markets. These scale effects can be illustrated by rewriting the production function (1) above as follows:

$$Y/AL_Y = (K/AL_Y)^\alpha = k^\alpha$$

i.e.
$$Y/L = y = k^\alpha A(1-s_R)$$

Investment is described by the following expression

$$dK/dt = sY - dK$$

Where s is the savings ratio while d denotes capital depreciation. The percentage change in capital is

$$(1/K)dK/dt = sY/K - d$$

therefore
$$(1/k)dk/dt = sy/k - d - n - g_A$$

where $(1/k)dk/dt = (1/K)dK/dt - (1/L)dL/dt - (1/A)dA/dt$, while n and g_A denote the growth rates in population and ideas. Thus

$$dk/dt = sy - (d + n + g_A)k$$

And in the steady state $dk/dt = 0$ which renders the following expression for k by substituting from the production function:

$$k = [s/d + n + g_A]^{1/1-\alpha} \quad (4)$$

The steady state output is given by

$$y = [s/d + n + g_A]^{\alpha/1-\alpha} A(1 - s_R) \quad (5)$$

From (2) for $\lambda = 1$ and $\varphi = 0$ we obtain

$$(1/A)dA/dt = \delta H/A = \delta s_R L$$

$$\therefore A = \delta s_R L / g_A$$

The steady state output becomes

$$y(t) = [s/d + n + g_A]^{\alpha/1-\alpha} (1 - s_R) \delta s_R / g_A L(t) \quad (6)$$

Thus along a balanced growth path per capita output is proportional to the world population. The larger world economy generates scale effects that are directly explained in terms of the non-rival nature of ideas (Jones, 2002:110).

As has been indicated above, the production for niche markets generates a demand for capital goods that are produced by the intermediate goods sector that operates under monopolistic competition. The profit (π) maximisation problem of such a firm amounts to the following:

$$\text{Max}_x \pi = p(x)x - rx$$

where the first term on the right hand side describes total revenue and the second term refers to total cost while r is the return on capital or the rental price for capital goods (Jones, 2002 : 113-114). The first order condition for profit maximisation is

$$p(x) + xp'(x) - r = 0$$

where the prime denotes the first order derivative with respect to x . This firm, as we have already argued, is a price maker and thus we obtain the following expression for the price:

$$p = r/\alpha.$$

Under perfect competition we obtain from the production function (1) that the rate of return for capital is

$$\partial Y/\partial K = r = \alpha Y/K$$

and the price for the price taker amounts to

$$p = \alpha Y/K$$

For the monopolistic firm we have

$$r = \alpha^2 Y/K \neq p$$

and for $\alpha < 1$ it follows that under increasing returns to scale the monopoly firm pays less to capital than the corresponding return under perfect competition and constant returns to scale. The difference is allocated to researchers to compensate them for the creation of new ideas (Jones, 2002 :118). Monopoly profits appear to be an important incentive for the exploitation of economies of scale that are so important in an open economy as indicated by (6) above.

An important feature of endogenous growth in an open economy is the opening up of opportunities in the production of intermediate goods. Under trade liberalisation the production of intermediate goods can be expanded in terms of the comparative advantage

of different countries. The supply of inputs at lower costs is a particular feature of these open economy growth models. Lower costs or efficiency gains comprise the *second* channel through which trade generates economic growth.

The *third* channel is associated with the fact, that in due course, innovations become public goods. This is implicitly implied by the well-known product cycle hypothesis by Vernon (1966). In this sense we distinguish the so-called technology cycle where technologies in developed countries that have approached the public goods domain could be adapted and applied in developing countries. In this sense the application of foreign technologies through learning by doing on the shop floor becomes an important aspect of technology transfer from trade to economic growth (Nordas, 1966).

4. ASSESSING THE TRANSMISSION CHANNELS

The effectiveness of the different growth transmission channels in the South African context will now be explored.

Economies of scale

As indicated by Tsikata (1999) as well as Edwards and Schoer (2002) it would appear that South Africa did experience a restructuring of manufacturing industry following trade liberalisation during the 1990's and there is evidence of the exploitation of niche markets, particularly in the chemical industry. South Africa has nevertheless been unsuccessful in achieving sustained export restructuring into growing and dynamic world markets. That means that our trade reforms in favour of intra-industry trade appears to be disappointing as is evident from Isemonger (2000). The incomplete trade reform process in South Africa could explain another reason for this disappointing performance.

Although effective protection rates should be interpreted with caution as discussed, for instance, by Edwards (1993) and Holden (2001) it appears that our trade liberalisation during the 1990's has been partial or incomplete in terms of effective protection rates as indicated by Fedderke and Vaze (2001). They have demonstrated definite trade liberalisation in certain sectors of manufacturing industry but in others the effective protection rates have remained constant or have increased. More importantly is the fact that our trade reform is incomplete since our tariff liberalisation has made little progress since 1996 (Cassim, Onyango and Van Seventer, 2002). Despite substantial progress in tariff reforms we are still burdened with a large number of different tariff rates (bands). There is still considerable scope for simplifying the tariff structure in terms of South Africa's commitment to the WTO, *i.e.* to reduce the almost 50 bands to six categories. Furthermore, our foreign trade is still burdened by an anti-export bias.

In terms of the significance of monopoly profits as a market incentive to stimulate the exploitation of economies of scale we signal the unstable and volatile rand exchange rate as an important disincentive in this area. It is important to distinguish between the long-term effect of the exchange rate regarding trade competitiveness and its short-term volatility. As has been argued by Walters and de Beer (1999) as well as Golub and Ceglowski (2002) the real effective exchange rate is important in determining the long-term competitiveness of South African exports. The spot rate is of direct importance in the short term since it appears to be inversely related to the net operating surplus of incorporated business enterprises. This means that a depreciating spot exchange rate of

the rand corresponds with a rising profitability and *vice versa*. The present unstable exchange rate of the rand, particularly during 1998, 2001, 2002 and 2003 (Bruggemans, 2003) is not conducive to economic growth in terms of this channel. Moreover, the volatile spot rate of the rand could, in the short term, jeopardise the long-term pattern of trade competitiveness as measured by the real effective exchange rate.

Efficiency gains

Efficiency gains are linked to reduced cost effects through foreign competition that eventually become evident in a falling rate of inflation in the domestic economy. Import penetration serves as a measure of the gains in this respect. Indeed, import penetration increased substantially during the 1990's as evidence of the opening up of the economy coupled with the supply of a large range of products at more competitive prices (Holden, 2002). Unfortunately sectoral measures of import penetration do reveal some ambiguous effects as argued by Fedderke and Vaze (2001). It is nevertheless true that for certain sectors trade liberalisation did increase foreign competition and in the case of those sectors that have seen higher effective protection rates, growth in import penetration has been positive. Efficiency gains are also evident in terms of the trade expansion following trade liberalisation in South Africa during the 1990's. On a sectoral basis Fedderke and Vaze (2001) reported that of the sectors with strong improvements in export orientation the majority faced substantial effective trade liberalisation. Moreover, the evidence submitted by these authors supports the conclusion that trade liberalisation did not have harmful import penetration or de-industrialisation effects. Efficiency gains are, therefore, evident in the growth process in South Africa.

Technology cycle

The technology cycle channel refers to the growth effects that derive from the profitable adoption and application of foreign technologies in domestic production processes. Learning by doing on the shop floor is an important aspect of this channel in transmitting technology gains but simultaneously improving the quality of human capital. South Africa appears to show a definite capacity of adapting foreign technologies. There is evidence of the successful adoption of computer-related technologies and the development of particular computer software packages that are internationally competitive (Strydom, 2003). This channel also refers to the transfer of growth effects that derive from outsourcing in production or the slicing up of the value chain as well as international outsourcing of services. Under the Motor Industry Development Plan South Africa has been able to benefit in terms of this channel by becoming part of the international production network of major international automobile manufacturers. In view of our rigid labour market and relatively high wage rates, as indicated by Nordas (1996), the growth transmission potential through this channel appears to be limited because of the relative competitive position of China and India. Moreover, a few qualifications regarding the motor industry are in order. As indicated by Black and Mitchell (2002) there is some concern about the sustainability of the export expansion in this industry. The export expansion scheme encouraged economies of scale and efficiency gains in respect of the manufacturing of automotive component suppliers. Unfortunately the bulk of the export expansion was generated by a particular segment of foreign owned firms. Moreover, in many instances these firms appear to be linked to

vehicle manufacturers. The problem is that these export expansions were associated with a small range of products, so called peripheral products. The efficiency gains in terms of automotive components might not be sustainable or disappointing in the long term.

In summary, the major growth effects that are transmitted through the economies of scale channel appear to be present in South Africa but limited in scope because of particular reasons that have been indicated. It could also be that the exploitation of economies of scale could still gain momentum in due course because of uncertain elements in the evidence. Efficiency gains appear to be the major channel of transmitting economic growth in this country. The technology cycle coupled with learning by doing shows potential, particularly in non-unionised labour market segments such as Information Technology and Communication.

5. CONCLUSION

Economic growth in open economies has featured prominently in many theoretical economic expositions. Empirical confirmation of the importance of this growth process has not always been encouraging. This paper argues that one reason for this ambiguity is the lack of understanding of the transmission mechanism that links trade with economic growth. Three different transmission channels have been developed within a framework that accommodates intra-industry trade in a system of price-makers as opposed to price-takers. The recent research on the South African foreign sector by several authors has been applied in our assessment of the transmission channels. The evidence shows that the channels through which trade generates growth have dissimilar growth effects. The challenge to economic policy is to eliminate the retarding effects in respect of certain channels and to enhance the efficiency of those who appear to be less efficient.

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