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# Uneven Development and the Terms of Trade: A Theoretical and Empirical Analysis

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**UNEVEN DEVELOPMENT AND THE TERMS OF TRADE:  
A THEORETICAL AND EMPIRICAL ANALYSIS**

A Dissertation Presented

by

**BILGE ERTEN**

Submitted to the Graduate School of the  
University of Massachusetts Amherst in partial fulfillment  
of the requirements for the degree of

**DOCTOR OF PHILOSOPHY**

September 2010

Department of Economics

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## **ABSTRACT**

### **UNEVEN DEVELOPMENT AND THE TERMS OF TRADE: A THEORETICAL AND EMPIRICAL ANALYSIS**

SEPTEMBER 2010

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Despite the voluminous literature on North-South macroeconomic interactions and the key role of terms of trade variations in growth transmission from one region to another, a significant research gap persists for two reasons. First, there has been very little empirical work on testing of the relationships between growth patterns and terms of trade movements. Second, the empirical studies dedicated to testing the Prebisch-Singer Thesis (PST) focused on testing the long-run tendency for the terms of trade of primary commodities to deteriorate and neglected the joint nature of the predictions arising out of a complete formulation of PST.

This dissertation seeks to properly specify the PST, provide a generalization of it to the case of imbalanced trade, and extend it to a three-region framework through a structuralist North-South model. Multiple paths of growth divergence/convergence and terms of trade deterioration/improvement emerge depending on the structural changes influencing the income-elasticity differentials. I carry out two sets of empirical analyses. First, I use aggregate data on North-South terms of trade indices to test the presence and

significance of a downward trend. Second, I use panel data analysis and rolling regressions to show the evolution of income-elasticity differentials. The results suggest that the growth rates of developing countries during the 1980s declined in both absolute and relative terms partly as a result of the downward trend in terms of trade and partly as a result of income elasticity differentials reflecting the productive and technological asymmetries between the developed and developing economies.

However, these structural asymmetries have not remained constant: the results show that they changed both over time and over cross-sections of different groups of countries. In general the countries that diversified towards manufactured exports had better chances of eliminating the elasticity differentials, and thus attaining relatively higher rates of growth.

The cross-country study is complemented by a comparative case study of Turkey and Malaysia. The results show that industrial and trade policies, if carefully designed and effectively implemented, can counter potential costs of external market dynamics while taking advantage of the opportunities for advancing dynamic comparative advantages.

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## CHAPTER 1

### WIDENING UNEVEN DEVELOPMENT IN AN INTEGRATED WORLD

#### 1.1 The Problem

During the 1980s and 1990s, after decades of pursuing state-led development strategies that emphasized autonomy, most of the developing countries moved to open their markets in the pursuit of the promise of globalization. Greater integration into the global markets through trade and investment flows was expected by many mainstream economists to be a recipe for closing the income gap between the poor and the rich nations. The more favorable capital-output ratio in the poorer countries meant that the scarcity of capital in relation to labor and natural resources would yield a higher marginal productivity, ensuring a rapid catch-up process once the barriers for capital and trade inflows were eliminated. Moreover, latecomers could use the existing technology ready made for them by the industrial countries without incurring costs of technological innovation. Theory of comparative advantages created a prediction that international free trade is mutually beneficial for all trading partners regardless of their levels of technological development or the types of commodities they specialize in. Yet the great majority of developing countries experienced neither a substantial rise in their standards of living nor a convergence in their per capita income levels to the developed world, despite the fact that they had opened up their trade and financial systems to the global market. The most successful developing countries, on the contrary, tended to be rather cautious in pursuing trade and financial reforms. My dissertation investigates the economic and political dynamics behind the failure of integrationist strategies to generate global income convergence, and explores its implications for the future development

policies. To these ends, I investigate the process of global growth divergence, the trends in the North-South terms of trade as an indicator of distribution of gains from international trade, and the role of the developmental state in encountering the external constraints to growth with a comparative case study of Turkey and Malaysia.

## **1.2 The Setting**

Nobel Prize winner Robert Lucas (2000) has predicted that the diffusion of technology will enable income distribution across nations to narrow and make everyone “equally rich and growing” by the year 2100. While it will take nine more decades to see if Lucas’ previsions come true, the trend is essentially in the opposite direction with unprecedented widening of income inequality among countries driven substantially by the poor economic performance of the countries at the bottom end. The broad pattern is one of divergence not only between advanced and developing countries, but also between the leading exporters of manufactured goods among developing countries and the rest of the developing countries that remain commodity-dependent and experience growth collapses.

From a long-run historical viewpoint, convergence between the earlier industrialized regions of the world around 1820—Western Europe and its Western offshoots (the United States, Australia and New Zealand)—and the rest of the world has never happened. The relatively more advanced regions of the world in 1820 continued to grow faster in terms of per capita income throughout the nineteenth and twentieth centuries. There is a broad consensus in the economic history literature that today’s massive income inequality across countries is the outcome of the “great divergence” in national incomes that began in the late eighteenth century, and that the present inequality

is either the legacy of Western industrialism or Western colonial imperialism, or both (Arrighi *et al.* 2005).

In the aftermath of the Second World War, the persisting income inequalities across countries had not widened much due to the broad-based economic growth of the golden-age of capitalism that tended to include most developing countries. This trend was reversed during the 1980s and 1990s as the international inequality increased sharply between developed countries and all developing country regions, except for East and South East Asia. This polarization in world income distribution has been argued to take the form of “twin-peaks” (Quah 1996) with the disappearance of “middle class” countries (Milanovic 2005) from the overall pattern. The only promising aspect in global income distribution has been that the fast-growth of China led to a decline in overall international inequality after 1980. However, the exclusion of China results in a large rise in world inequality from 0.48 to 0.57 measured with Theil decomposition since the year 1980 (Ocampo and Vos 2008: 16).

The generalized downturn in the growth of the developing world in the 1980s has partly been an outcome of major external shocks: the sharp rise in real interest rates, which distressed many developing countries disproportionately, and a steep and prolonged decline in the terms of trade of non-oil exporting developing countries. This decline was, in part, an outcome of the rising cost of borrowing and the resulting debt crisis, all of which created an “export desperation” (Sarkar 1994) to increase foreign exchange earnings.

The impacts of these shocks on developing countries differed according to the differences in regional dynamics and in the economic policy designs. While Malaysia

was largely insulated from these adverse trends in the global developments thanks to the FDI inflows from other Asian economies that were experiencing rising costs, other developing countries were not as fortunate. Turkey, for instance, experienced a major debt crisis during the late 1970s and had hardly any choice in adapting austerity measures of the International Monetary Fund (IMF) in 1980. The comparison of Malaysia and Turkey provides an ideal study of the role of state policies in affecting development outcomes. Although Malaysia had only half of the per capita income relative to Turkey in 1960, its sustained economic growth over the last five decades allowed it to achieve a higher income level in PPP-terms. The selective development strategies coupled with electronics boom in global markets allowed Malaysia to shift its technological base from natural resource-based to high-technology manufactured exports. In contrast, the generalized and non-selective nature of industrial policies in Turkey in addition to the less favorable external conditions produced a much less significant structural change.

### **1.3 The Hypothesis**

Throughout the process of writing this dissertation, my central working hypothesis has been that patterns of international specialization and the path-dependency associated with these patterns perpetuate the specialization of developing countries in the production of commodities with lower technological content (relative to those produced by developed countries), and thereby, result in widening uneven development between developed and developing countries. One could expect that these productive patterns should have changed in response to the price signals from global markets. After all, the North-South terms of trade have deteriorated substantially, especially after the mid-1970s. However, in the context of the existing barriers to acquire new production

techniques and to human capital formation coupled with adverse external conditions, this price signal remained for the majority of the South ineffective. In fact, it was those countries in the developing world taking “relative prices wrong” and pursuing all kinds of selective price adjustments, subsidies, and promotions that could effectively realize dynamic comparative advantages and sustained growth rates. I split this hypothesis into two different hypotheses:

(i) The global demand for the goods produced by developing countries grows at a slower pace relative to that for the developed country exports, implying a lower income-elasticity of demand for the developing countries’ exports. The differential in income elasticities, in turn, gives rise to a joint hypothesis widely-known as the Prebisch-Singer Thesis (PST): either the relative prices of tradables from developing countries deteriorate over time, or the developing countries have to grow at a slower pace. PST holds under the assumption of trade balance, the relaxation of which results in a generalized PST. Accordingly, the sustained capital inflows over long periods of time render the predictions of PST less likely.

(ii) My second hypothesis is that effectively implemented trade and industrial policies at the national level can help counter the adverse effects while taking advantage of the positive effects of external economic relations. A continuous effort to acquire technological capabilities and skills is necessary to move up the technology ladder and thereby reduce the income-elasticity differentials that tend to constrain growth especially when the relative price adjustments are slow.



## 1.4 The Methodology

I pursue a combination of history of economic thought, theoretical modeling, empirical investigation, and analytical comparative analysis in this dissertation. First, I begin with a history of economic thought on growth and development in trade models, tracing the analytical differences between static and dynamic conceptions of gains from trade. This allows me to distinguish between the doctrine of comparative advantages and the structuralist approach to the interaction between trade and development, and reconsider the arguments of “unequal exchange” and “immiserizing growth” from this point of departure. Based on these conceptions, I critically review the modeling literature on North-South macro-interactions, paying special attention to the region that acts as the engine of growth in the world economy, the dynamics that result in the production of uneven development, and the role of the terms-of-trade in transmitting the macroeconomic ramifications from one region to another.

Second, I employ time-series econometric techniques to test for whether the data generating process underlying the North-South terms of trade is trend-stationary, and to measure the long-run trend rate. I conduct a disaggregated analysis for different developing country groups’ terms-of-trade indices after combining indices from a number of *UNCTAD Handbook of Statistics*. These different groups include non-oil exporters, which are composed of major exporters of manufactured goods and the remaining developing countries. The latter is then geographically grouped under developing countries in America, Africa, West Asia, and other Asia. I have also examined two additional groups: the least developed countries (LDCs), and the highly indebted countries (HICs) terms of trade. This empirical examination differs from most of the

literature by its focus on “country” terms of trade instead of “commodity” terms of trade, and thus effectively illustrating the impact of the specialization pattern on the trends in terms of trade. It is also a proper index of measuring the degree of unequal exchange between developing and developed countries from a dynamic point of view. Moreover, I conduct tests of structural change—both exogenous and endogenous—to identify the break points in data, and to estimate the rates of trend improvement/deterioration in pre- and post-break periods. Finally, I estimate a dummy variable model to measure the impact of different variables on the occurrence of the structural break at this specific point in time.

Third, I use theoretical modeling techniques to present my analytical arguments in a clear and consistent fashion. Beginning with a simple formulation of PST, I extend this model by relaxing the assumption of balanced trade. However, it needs to be stressed that the trade balance is a binding constraint for the majority of developing countries that experience high levels of real interest rates to maintain capital inflows that tend to be very speculative and de-stabilizing for these economies. Running large current account deficits as a share of GDP is thus not a sustainable option for developing countries that need low-interest rates for higher levels of investment in the real economy and less financial speculation for the same reasons. In the next step, I use a structuralist North-South model that is consistent with the PST and can illustrate several key points: (a) the income-elasticities of exports are a positive function of the relative levels of manufacturing GDP and the level of technological content of the manufactured exports; (b) a policy variable can influence the long-run outcome significantly through its impact on the growth of the manufacturing sector as a share of total GDP; (c) a process of

‘Kaldorian traverse’ as a cumulative causation process between industrialization and economic growth might allow a ‘high-quality’ catching-up for the countries that combine selective industrial policies with technological upgrading and productivity improvements; (d) a failed industrialization attempt and ‘market-friendly’ forms of structural reforms can also be illustrated as a process of lagging behind where the elasticity differentials persist in the long-run. I extend the model to demonstrate forces of interaction between the fast-growing and industrializing countries and the rest of developing countries that might lead to a fallacy of composition effect. In particular, I focus on the tendency for the former to crowd-out the latter both through supply-side and demand-side channels that sustain the widening of North-South divergence in the context of an increasing catching-up of a relatively small portion within the South.

Fourth, I employ a variety of estimation techniques to investigate the extent of income elasticity differentials for a sample of 51 developing countries over the period 1960 to 2006. These include the dynamic fixed effects model, the GMM, and the dynamic OLS (or DOLS) model. In the latter estimation, Pedroni cointegration tests are used to test for the presence of cointegration, and panel data unit root tests are used initially to test for the presence of a unit root in the variables included to the model. I run the regressions separately for the major exporters of manufactures and the remaining developing countries to illustrate the differences in closing the gaps in income-elasticities. Furthermore, I estimate the elasticities for different time-periods to illustrate the changes in elasticity differentials over time.

Fifth, I provide a historical overview of different phases of industrial policies pursued in Turkey and Malaysia, and their impact on patterns of specialization, structural

change, and technological composition of manufactured exports. This structural comparative analysis is complemented with an empirical investigation of the impact of trade liberalization on price and income elasticities of exports and imports. The estimation techniques used in this part follows the methodology of the previous section. Overall, I reject the typical neoclassical assumptions in textbooks that the income elasticities in trade functions are uniform, and that the balance of payments constraint is an irrelevant factor in determining long-run paths of growth.

### **1.5 The Contribution**

I study the trends and structural breaks in North-South terms of trade over the period 1960-2006. I then study the implications of the joint hypothesis resulting from PST, and test the structuralist assumption of asymmetric income-elasticities. To get a more detailed perspective at the national level, I study the role of the developmental state in the comparative case study of Turkey and Malaysia.

First, this dissertation contributes to the controversial literature on terms of trade movements in general and on North-South terms of trade in particular. It shifts the focus from commodity to country terms of trade by demonstrating the increasing relevance of the latter in the context of the increasing dominance of manufactured goods in the export composition of developing countries. The finding of trend deterioration for the major exporters of manufactures supports the widely-accepted view that manufactured goods are not immune to falling prices (UNCTAD 2005, Kaplinsky 2006). This supports the findings on manufacture-manufacture terms-of-trade as well. It also contributes to the literature on the LDCs and HICs by illustrating that these countries suffered from adverse terms-of-trade movements the most—which might partly account for their low rates of

growth and high rates of debt accumulation respectively. The finding of trend-stationarity of the data generating process of the terms of trade indices supports the view that the inferences based on trend coefficients are valid.

Second, by analyzing the PST as a *joint* hypothesis that predicts terms of trade deterioration in the steady-state and growth divergence when the terms of trade remain constant, this dissertation makes interventions on the interpretation of the PST and its empirical testing. PST has been misinterpreted and misapplied even by serious students of the hypothesis that have largely neglected its joint nature and argued for a secular tendency for the terms of trade to decline independent of the growth rates and/or productivity changes.

Third, this dissertation makes a contribution to the literature on structuralist tendencies for the reproduction of uneven development. It provides a statistical analysis of the magnitude of the income-elasticity differential, and how it changes between different types of developing countries according to their patterns of specialization, and how it changes over time for each group of developing countries given the extent of their dynamic gains from trade.

Fourth, by analyzing the relation between industrial policies and economic performance in external markets for Turkey and Malaysia, this dissertation contributes to the policy debates in economic development literature, particularly to the relationship between industrial policy, technological development, and export performance. It tests the differential impact of trade liberalization on the income elasticities of exports and imports, and provides some explanation about the differences in trade deficit outcomes in Turkey and Malaysia.

## **1.6 Conclusions of the Dissertation**

The theoretical review of the literature on North-South interactions gives insights into the main channels of growth transmission from more to less advanced regions, and the mechanisms of adjustment to growth cycles in the world economy. From this perspective, the terms of trade movements between the North and the South are of crucial importance. An empirical investigation of North-South terms of trade trends shows that the terms of trade have turned against the South (excluding oil exporters), especially since the late 1970s and increasingly in the 1980s. A host of factors were responsible in the emergence of this adverse trend, including the slowdown of the engine of growth in the North, the “export desperation” resulting from the debt crisis, and the increasing openness of developing countries after the 1980s.

As noted in the hypotheses, and as established through empirical analysis, this dissertation examines the evolution of terms of trade in relationship to the evolution of income-elasticity differentials, relative growth rates of national income, and growth rates of trade imbalances. First, despite the conventional predictions that increased integration to global markets through rising trade flows would increase the rates at which developing countries grow and catch-up, the growth rates of developing countries during the 1980s declined in both absolute and relative terms partly as a result of the downward trend in terms of trade and partly as a result of income elasticity differentials reflecting the productive and technological asymmetries between the developed and developing economies. Second, these asymmetries are not constant: they change both over time and over cross-sections of different groups of countries. In particular, the countries specialized in the production of manufactured exports have succeeded in eliminating the

elasticity differentials, and thus attaining relatively higher rates of growth. Patterns of international specialization are, therefore, an important determinant of long-run outcomes of growth divergence and terms of trade movements. Third, the strategies that have worked for a group of successful developing countries may not work for the South as a whole. In particular, efforts undertaken by individual developing countries to improve their competitive export capacity by devaluation or by specializing in income-inelastic exports may be frustrated through a deterioration in the terms of trade if it takes place simultaneously in several countries, i.e. the fallacy of composition effects. Fourth, a comparative case-study of Turkey and Malaysia shows that industrial and trade policies, if carefully designed and effectively implemented, can counter these costs from external market dynamics and take advantage of the opportunities for advancing dynamic comparative advantages through shifting towards the production of manufactures with greater technological content and scope of increasing returns.

### **1.7 Plan of the Dissertation**

The remaining part of the dissertation is further divided into five chapters, i.e. chapters 2-6. Chapter 2 presents theoretical literature review on growth and development in trade theories and North-South models of trade and growth interactions. Chapter 3 presents an empirical analysis of the trends in North-South terms of trade. Chapter 4 provides a theoretical exposition of PST and an empirical analysis of its joint predictions on terms of trade movements and patterns of growth divergence based on panel data composed of 51 developing countries from 1960 to 2006. Chapter 5 presents the case-study of Turkey and Malaysia as a comparative historical analysis of the role of state

policies in their industrialization. Chapter 6 presents the conclusions and policy implications of the dissertation.



## CHAPTER 2

### THEORETICAL BACKGROUND ON UNEVEN DEVELOPMENT AND THE TERMS OF TRADE

#### 2.1 Growth and Development in Trade Models

##### 2.1.1 Theory of Comparative Advantage

The theory of comparative advantage, which was first introduced by David Ricardo and later widely embraced by classical and neoclassical theorists of trade, is the basis of the notion of static gains from trade. Suppose that there are two countries A and B both with capability to produce commodities X and Y. The basic proposition of classical trade theory is that if country A has comparative advantage in producing commodity X, and country B has comparative advantage in producing commodity Y, it will be *mutually beneficial* for country A to specialize in the production of X and for country B to specialize in the production of Y, and for outputs of X and Y in excess of domestic needs to be traded freely, and the international relative price ratio will lie between the autarchic domestic relative prices in the two countries. The concept of comparative advantage is represented by the relative opportunity-costs, measured by the marginal rate of transformation between one commodity and another. Assuming perfect competition, the domestic price ratio between two commodities will be equal to the marginal rate of transformation. If this were not the case, there would be an incentive for the producers to switch their production from one commodity to another in order to take advantage of the relatively favorable price ratio. Hence, the change in the relative prices induced by free trade would lead to a reallocation of resources along the lines of comparative advantage.

Similar to most micro-welfare theories, the comparative advantage theory is a static one based on restrictive, and often unrealistic, assumptions. It is blind to the conflict between short-run allocative efficiency and long run growth. The key assumptions of the theory include the existence of full employment in each trading country—in the absence of which there would be no opportunity cost involved in increasing the production of commodities; the prices of resources and goods are assumed to reflect their opportunity cost; the perfect competition is assumed to exist; and the factor endowments are presumed to be given and unchangeable. In short, the theory of comparative advantage takes into account neither the potential negative effects of terms of trade changes in the presence of low price elasticities of demand nor the dynamic feedback effects which trade itself might have on comparative advantage.

In the context of developing countries, which are concerned with long-run development, prioritizing short-term efficiency as suggested by the comparative advantage doctrine is unreasonable. It has been argued by several development economists that the efficiency gains from free trade are unlikely to offset the tendency in a free market for the position of developing countries to deteriorate with respect to the developed countries. In short, free trade creates a disadvantageous position for the developing countries mainly due to the nature of the commodities that these countries produce and trade. Under these circumstances there is a case for protection, since a change in the structure of production and exports of developing countries requires policies of infant-industry protection.

### 2.1.2 Structural Approaches to Terms of Trade

Raúl Prebisch (1950) and Hans Singer (1950) were among the first development economists to question the mutually beneficial gains from international division of labor based on comparative advantage. Their structuralist view of international trade enabled them to examine the relationship between trade and development from the standpoint of the balance of payments rather than just real resources. Their central argument was that the unfavorable impact of free trade on the terms of trade and balance of payments of developing countries far outweighs any advantages resulting from a more efficient allocation of resources. In other words, focusing on maintaining an efficient allocation of factors in production is very unlikely to produce the desired outcome of long-term growth in developing countries.

The original formulation of the Prebisch-Singer argument was composed of two different but complementary hypotheses. One of these hypotheses was concerned with the impact of varying income-elasticity of demand for commodities on the terms of trade of the developing countries, while the other complementary hypothesis was based on the asymmetries in the labor and product markets of the centre and the periphery in the world-economy. These hypotheses conceptually differ from one another because in the former case, the downward pressure on relative commodity prices results from the changes in the goods market (and directly leads to a deterioration in the *barter* terms of trade); in the latter case, the pressure results from changes in the factor markets (with a direct effect on *factoral* terms of trade) with further possible impacts on product prices. The deterioration in the factoral terms of trade, in the latter case, affects the barter terms

of trade only indirectly, through the changes in relative production costs and in producer markups.

In a seminal article, Prebisch (1951) formulated the first hypothesis based on the fact that the relative size of the primary sector tended to decline with economic growth. This tendency, Prebisch explains, is an outcome of the low income elasticity of demand for unprocessed agricultural goods, the replacement of raw materials by synthetic substances, and the rising efficiency of production in primary products. According to Prebisch, the tendency for the primary sector to contract has very important implications at the world level since, for historical reasons, industrialization was concentrated in the center countries, creating an international division of labor in which the periphery supplies raw materials to the center. Under these circumstances, changes in productive structure generate a systematic bias against the developing countries. In particular, two predictions follow: either the developing countries will grow more slowly or the relative abundance of the commodities which they produce will tend to reduce the relative international prices of those commodities. These predictions will be developed analytically in chapter four.

The second hypothesis was introduced by both Prebisch and Singer to explain why the fruits of technological progress are unequally distributed between the centre and the periphery. According to this hypothesis, in the case of productivity improvements in manufacturing, the benefits are distributed to the producers in the form of higher income, while in the case of primary commodities, they are reflected in lower prices. Whereas the center countries are able to retain improvements in productivity through higher wages, those of the periphery are compelled to “export” technological changes in their export

sectors through a deterioration in the factorial terms of trade, i.e. relative prices adjusted for productivity. This asymmetric result is a combination of the functioning of both the goods markets—monopolistic price setting in markets of manufactures—and the labor markets—greater organization of industrial workers. These divergences in institutional setting are further aggravated when the international division of labor is taken into consideration. As Prebisch emphasized, the weaker demand for primary commodities leads to a displacement of the workers out of this sector. Yet the displaced workers are not easily employed in other expanding sectors (thus the assumption of full employment is not fulfilled) due to the problems of late industrialization and the restrictions on the migration of workers to the industrialized center. As a result, a surplus of labor is generated in the developing countries, which lowers the relative wages of the developing-country workers and leads to a deterioration of the developing countries' terms of trade. If the exports of the developing countries are price inelastic, the income terms of trade – that is, receipts from exports relative to imports – will also fall, widening the income gap between the advanced and developing countries.

The emphasis on excess supplies of labor, which as we mentioned was crucial in Prebisch's analysis, gained further attention with the seminal works W. Arthur Lewis (1954) and Arghiri Emmanuel (1972), who likewise examined effects of wage differentials on terms of trade. Let us now examine the effect of incomplete specialization introduced by Lewis on terms of trade and leave Emmanuel's study of 'unequal exchange' to the next section.

Lewis employed a Ricardian model in a two region world with complete specialization. One region, call it the North, produces food and steel while the other

region, the South, produces food and coffee. Outputs of commodities are fixed proportions of the labor inputs required to produce them. The terms of trade between the North and South are given by the rate of exchange between steel and coffee, which depends on the technical coefficients of production in the North and South due to the assumptions of linear transformation curves and tradability of all three goods. In other words, the relative price of steel and coffee is predominantly supply-determined since the wage rates in the tradable sector of both regions depend on productivity in the food sector in both countries. Thus, the changes in growth rates of labor productivity in each sector relative to the other determine the direction of change in the terms of trade. Lewis (1969) introduces the stylized facts about these changes by stating that productivity growth is greater in food than in steel in the North, whereas it is greater in coffee than in food in the South. As a result, a unit of food is worth increasingly more coffee in the South while it is worth increasingly less steel in the North. This implies that a unit of coffee exported by the South is worth less and less steel over time, which is to say that the terms of trade of the South vis-à-vis the North has a secular tendency to deteriorate over time.

An improvement in productivity of coffee or steel production reduces the relative price of coffee or steel in the same proportion as long as the productivities in the food sectors stay the same. Consequently, the full benefit of the productivity improvement in steel or coffee is passed on to the importing country through cheaper imported goods. The exporting party benefits only to the extent that coffee or steel is consumed at home. If domestic consumption of the export commodity is negligible and the whole purpose of production is to sell abroad, technical progress in the export sector does not provide any significant benefits as the purchasing power in terms of imports does not change. Thus, it

might be more desirable for the South to promote technological change in the food sector in order to raise real incomes directly and prevent the decline in its terms of trade (Findlay 1984: 192). It is important to recognize that this implies turning away from international trade based on ‘comparative advantage’ to focus on a more domestically oriented development strategy.

### 2.1.3 Theory of Unequal Exchange

The theory of unequal exchange developed by Emmanuel (1972) is based on two assumptions: (a) capital is mobile across national borders, which creates a tendency for the rates of profit to equalize internationally; and (b) the real wage rates are exogenously determined through differences in institutional structures, i.e. labor unionization, state policies, etc. Following Findlay (1984), we will briefly explain Emmanuel’s conception of unequal exchange using the model developed by Bacha (1978).<sup>1</sup> Suppose that there is complete specialization where the North produces steel and the South produces coffee, with  $q^N$  the output of steel per unit of labor in the North,  $q^S$  the output of coffee per unit of labor in the South,  $w^N$  and  $w^S$  the real wages in North and South respectively, both fixed in terms of steel,  $p$  the relative price of coffee in terms of steel, and  $r$  the common rate of profit. The rate of profit is given by:

$$r = \frac{q^N - w^N}{w^N} = \frac{pq^S - w^S}{w^S} \quad (2.1)$$

which allows us to express the terms of trade of the South vis-à-vis the North in terms of real wages and productivities:

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<sup>1</sup> For a very interesting contemporary approach to unequal exchange in global manufacturing markets, see Heintz (2003).

$$p = \frac{w^S}{w^N} \frac{q^N}{q^S} \quad (2.2)$$

According to Emmanuel, exchange is equal when the double factorial terms of trade equals to one. In other words, equal exchange results from equality of the amount of foreign labor embodied in imports to the amount of domestic labor embodied in exports.

To see this, let us write the double factorial terms of trade,  $f$ , as follows:

$$f = \frac{pq^S}{q^N} = \frac{w^S}{w^N} \quad (2.3)$$

Note that  $f$  is equal to unity if and only if  $w^S = w^N$ . Emmanuel argues that, due to institutional reasons, the real wages are lower in the South,  $w^S < w^N$  and therefore,  $f < 1$ . Thus unequal exchange, biased against the South, is a situation in which the commodities worth a day's labor in the South are exchanged for commodities worth less than a day's labor in the North. In his own words, "inequality of wages as such, all other things being equal, is alone the cause of unequal exchange" (Emmanuel1972).

#### **2.1.4 Immiserizing Growth**

The growth of a country that is experiencing technological progress and/or factor accumulation might increase the supply of its exports and its demand imports simultaneously. This would lead to a deterioration in its terms of trade unless the rest of the world grows at the same pace or faster. If the deterioration in the terms of trade generates a loss of real income greater than the increase in real income due to growth itself, the country will actually be made worse off –immiserized– by growth. Hence, the concept of "immiserizing growth" refers to a situation in which the growth of an economy results in a significant worsening in its terms of trade which leaves the economy



with a net loss of real income in post-growth period. Figure 2.1 depicts a case of immiserizing growth. As the production possibilities curve moves outward, the point of production moves from  $E$  to  $E'$ . Yet, the shift in terms of trade line from  $CE$  to  $C'E'$  lowers the social welfare as indicated from the downward movement from  $C$  to  $C'$ .

Bhagwati (1958) argued that a country is more likely to experience immiserizing growth if it is large enough to have monopoly power in international markets, which enables it to influence international relative prices substantially. In contrast, in the case of a small country, the changes in a single country's export supply and import demand due to economic growth will not lead to any significant change the world price ratio. Only when the single country is one of the only producers of the export commodity (or buyers of the import commodity), would the change in its export supply affect the price of the commodity. For countries with monopoly power in international markets, Bhagwati recommended an optimal trade policy that would counteract the deterioration in the terms of trade. This could involve imposing an import tariff or export tax. Note also that another implication of Bhagwati's analysis of immiserizing growth is that countries with no monopoly power cannot, by definition, experience immiserizing growth. Therefore, the optimal trade policy for them is to get rid of all protective measures and pursue free trade.

The case of small-country experiencing 'immiserizing growth' was developed by Johnson (1967), complementary to Bhagwati's original thesis. In the figure below, we see that a small economy placed a production subsidy on commodity Y (or a production tax on commodity X) and thereby increased the relative prices above the marginal rate of transformation. As the biased growth takes place towards the production of good Y, the

increased degree of distortion makes the country worse off at a lower level of social welfare (indicated by the movement from  $C_0$  to  $C_1$ ). Thus, Johnson concludes that the optimum policy is the removal of production taxes and opening up to free trade if the country is small enough not to be able to influence world prices. In the formulations of Bhagwati and Johnson, the analysis of immiserizing growth provides a basis for the neoclassical critique of market interventions underlying industrial policies.

The weak points of Bhagwati's argument fall into two categories: (a) whether having monopoly power in world markets is a necessary condition for terms of trade deterioration as a result of economic growth; (b) whether the only basis for implementing optimal trade policies is the existence of monopoly power. The first point requires both historical and theoretical examination. Historically, during the post-war period, the countries which saw their terms of trade fall were not the ones that had monopoly power such as the United States. Instead, the relative prices of export commodities (such as food and raw materials) from the Latin American countries deteriorated sharply. International food or raw material markets were, however, far from being monopolistic. Several producers from each country were in harsh competition with each other. Yet competition did not rescue them from being immiserized. Their terms of trade worsened not as a result of having monopoly power but rather due to the fact that additional per capita incomes were being spent on more sophisticated commodities such as manufactures. Thus, as theoretically demonstrated by Prebisch and Singer, low income-elasticities of primary products can become a mechanism for terms of trade deterioration, regardless of whether the growing country has monopoly power or not.

The second weak part of the argument is concerned with the reasons for implementing a trade policy other than free trade. Bhagwati argues that this is only justified when the trading country has monopoly power in the world markets.<sup>2</sup> Note that, in Bhagwati's world, there is no difference between exporting computer chips or potato chips. His theory (and of course neoclassical theory in general) is totally indifferent to the different types of commodities that a country specializes in. As long as it has comparative advantage in its export commodity, both of the trading partners—and the world as a whole—gains. If we imagine a situation in which rising incomes are increasingly spent on computer chips and proportionately less on potato chips, the resulting worsening in terms of trade for the potato chips-exporting country would be another basis for protection. Indeed, this was the line taken by Prebisch and other structuralist development economists. The case for protection of manufactured goods produced by developing countries is greater, when the demand for existing primary products is expected to grow less and their price elasticity is low. The case is even stronger when the internal elasticity of demand for manufactures from the outside world is high and the likelihood of retaliation by other countries is low.

## **2.2 Uneven Development in the Context of North-South Models**

The literature on uneven development in the context of North-South models is an application of the growth models developed in the 1950s and 1960s for the analysis of international trade. It is similar to the structuralist analysis of uneven development in the

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<sup>2</sup> Another way to think of Bhagwati's argument is to take the whole South as a region having monopoly power over its export and/or import markets. In that case, due to its monopoly power, Bhagwati would recommend the South to pursue an optimal trade policy that would counteract the deterioration in its terms of trade.

sense that the structural differences between the central and peripheral countries are central to the construction of the North-South models.

Dutt (1990) devotes a chapter in his book *Growth, Distribution, and Uneven Development* to classifying different types of North-South models based on the different types of closures assumed for each region in the dynamics of growth and distribution. For example, Findlay's model fits into the category of Neoclassical North with a Lewisian (or Neo-Marxian) South. In this category, Dutt also introduces his own model of uneven development which assumes, similar to Findlay (1980, 1981) full employment growth in the North at a given rate, and a fixed real wage in the South. The differences between Dutt's and Findlay's models come from the fact that the latter assumes factor substitution while the former assumes fixed coefficients; and the former has two social classes, workers and capitalists, who have different propensities to save, whereas the latter does not distinguish between different classes in the North and assumes the same saving behavior by all Northerners (Dutt 1990: 163).

While there is no need to compare and contrast every single North-South uneven development model, it is nevertheless important to know the main lines of distinctions. Table 2.1 provides a list of these models according to the types of closures assumed to characterize the North and the South. In closures having a neoclassical, neo-Keynesian, or Kaleckian North (irrespective of the closure type in the South), the growth rate of the South is driven by the growth rate of the North, i.e. North is the engine of growth that drives the whole system. Only in models with a Lewisian North, is the growth rate of North constrained by the South's growth. However, assuming that the North has

unlimited supplies of labor is a somewhat unrealistic assumption since labor is often the scarce factor of production in the North.

### **2.2.1 The Solow-Lewis Model**

Findlay (1980, 1981) employed a neoclassical model of growth in the North linked to a Lewis-type model with unlimited supplies of labor and consequently a fixed real wage in the South.<sup>3</sup> In both regions production functions are assumed to be neoclassical with constant returns to scale in the two outputs. In addition, Findlay assumes complete specialization where the North produces and exports only manufactures while the South produces and exports only primary products. Manufactures are used for both consumption and investment while the primary products are used only for consumption.<sup>4</sup> There is full employment in the North, whose growth rate is determined by the growth of the labor force and the rate of Harrod-neutral technical change.

In contrast, the growth rate of the South is not limited by the labor force due to the abundant reserves of unemployed or underemployed workers in the subsistence sector. Instead, it is constrained by the rate of capital accumulation which depends on rate of profit and saving in primary sector. Yet the only means by which the South can obtain the necessary capital goods is through imports from the North (which is the only producer of

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<sup>3</sup> Findlay described his own work as providing a framework within which the arguments of Prebisch and Singer could be assessed. Ever since the Prebisch-Singer hypothesis, Findlay argued that “the movement of terms of trade between these regions [the North and the South] has been regarded as a key index of the distribution of benefits from the international division of labor and the development prospects for the South” (1980: 1).

<sup>4</sup> These last two assumptions are also retained in models with Keynesian/Kaleckian-type North combined with a Lewisian South, such as Taylor (1983), Dutt (1990).

manufactured investment goods). As a result, the terms of trade play an extremely important role in affecting the rate at which the South can acquire capital goods and sustain its capital accumulation and growth. Since Findlay assumes unitary income elasticities of demand for both manufactures and primary commodities, the growth rate of the South equals to the growth rate of the North in the long run. The long run adjustment mechanism works through the movements in the terms of trade, which adjusts the Southern rate of growth to the exogenously given growth rate of the North.

Findlay (1980, 1981) also shows that there is not much that the South can do to increase its growth rate since a rise in its saving rate or productivity has only the effect of turning the terms of trade against it. On the other hand, increases in the Northern saving rate or productivity also leaves the Northern growth rate unchanged and therefore does not change the growth rate of the South. The only mechanism that can lead to economic growth in the South is an increase in the exogenous growth rate of the North.

### **2.2.2 The Kalecki-Lewis Model**

In contrast to the exogenously determined growth rate in models with neoclassical closure for the North, the Keynesian closure for the North assumes that the firms, facing an uncertain future, have a desired accumulation function, which makes their investment depend positively on the profit rate as seen from Table 2.1. The position of the function depends on the expectations of firms about the future state of the economy, representing what Keynes referred to as animal spirits. This implies that either Northern investment or saving rate must be set equal to Southern rate of investment, and then, in turn, the South's saving rate must adapt to the North's growth rate through adjustment in the terms of trade

(Darity, 1990: 819). The major difference of the Kalecki-Steindl closure for the North from the Keynesian one is that the former assumes that the firms' desired accumulation is not only a function of the profit rate but also the output-capital ratio, i.e. capacity utilization. Similar to the Keynesian North, the South follows a dependent growth path which is conditioned by the speed of development in the North. This condition holds whether the South has a Lewisian structure or a Kaleckian one as seen from Table 2.1.

It is important to note that Northern economic growth—in both Neoclassical North- and Keynesian North- Lewisian South models—is determined by its own macroeconomic dynamics, without being conditioned by its terms of trade or Southern dynamics. The North is, therefore, the major force that drives the world economy, to which the developing economies adjust. The terms of trade, on the other hand, is precisely the mechanism through which the economic growth of the developed economies is transmitted to the rest of the world. Hence, when the engine of growth speeds up, the Southern terms of trade improve to let the capitalists in the South accumulate at a higher rate. In contrast, when the engine slows down, this is reflected by a worsening in terms of trade of the South, and therefore, a contraction in its growth.

In the long run, the fundamental determinant of the terms of trade of the South is, therefore, the growth rate of the North: the exogenously given growth rate of the labor force in the case of a neoclassical Northern economy, or the desired accumulation function in the case of a Keynesian-type Northern economy.

### **2.2.3 The Lewis-Lewis Model**

Kaldor (1976, 1979) observed that the assumption of unlimited supplies of labor for the export sector of the South in Lewis's model implicitly includes the assumption that the supplies of land and/or natural resources were also unlimited in the South. In case of limited supply of land and/or natural resources, Kaldor argued that the central conclusions of Lewis's model (or any model a Lewisian South) would no longer hold. When the North starts to grow faster and as a result increases its import demand from the South, the constraints on land/natural resources in the South would lead to rising primary commodity prices, which would turn the terms of trade against the North. As a result, the terms of trade becomes a policy problem for the North in the Kaldorian model. Formalizing Kaldor's model, Molana and Vines (1989) show that the low price elasticity of agricultural goods could be a source of cycles in the terms of trade, which as Kaldor maintained, "tends to set up perverse cycles in world industrial activity" (1989: 452).

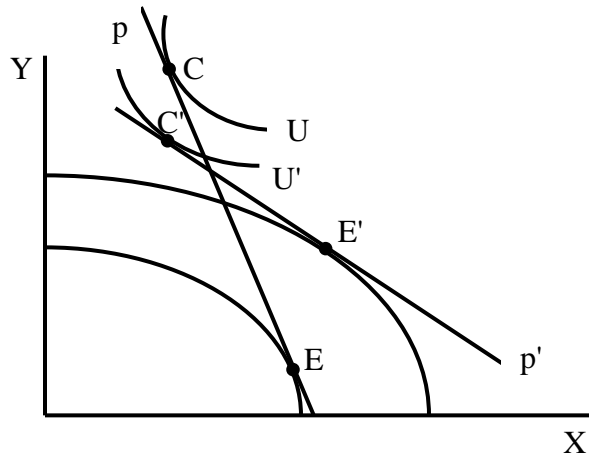
According to Kaldor (1976), trade relations in the international context generate a deflationary bias. This is because the fall in the prices of primary goods, in the case of a surplus in primary production, reduces the purchasing power of the primary-goods-exporting countries which is a demand constraint on the advanced countries' output. On the other hand, a shortage of primary products leads to an increase in their prices, which puts upward pressure on money wages. As a result, inflation increases and governments pass anti-inflationary policies which have contractionary impacts on output and employment in the world-economy. As a policy suggestion, Kaldor proposed a focus on price stabilization policies since the unpredictable changes in terms of trade could be a major obstacle for growth of industrial activity in the North.



## 2.2.4 North-South Models of Technological Gaps

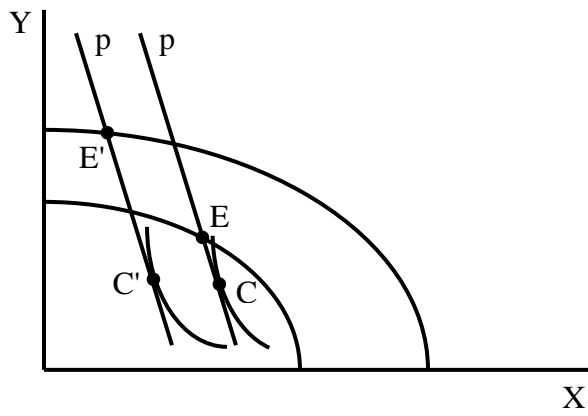
Formalizing the seminal contributions of Gerschenkron and Abramovitz, the new generation of technology gap models such as Fagerberg (1988, 1994) and Verspagen (1993) sought to explain growth rate differentials based on the ways in which technology gets created, disseminated, and becomes general knowledge. From this perspective, the creation and spread of technical knowledge as captured by Schumpeter's metaphor of 'creative destruction' in capitalism is the major determinant of the differences in growth rates. According to Fagerberg and Verspagen, the ability to acquire technical knowledge depends on the initial state of economic and institutional structures. The process of absorbing technological spillovers from abroad and the adoption of new production processes become important determinants of the speed at which developing countries close the technology gap with the developed world. Other contributors to the technology-gap models, such as Targetti and Foti (1997), Castellacci (2002), and Leon-Ledesma (2002) developed export-led post-Keynesian models where the linkages between manufacturing growth and productivity reinforce each other through Kaldor-Verdoon law. Multiple dynamic paths emerging from these models suggest that there is no *a priori* condition for divergence from or convergence to the advanced countries. Depending on the progress of accumulation of technological knowledge, both diverging and converging dynamics may occur. Botta (2009) also follows this line of technology-gap models, paying explicit attention to the ways in which changing productive structures affect the accumulation of knowledge in the developing countries. We will consider this model in detail in chapter 4.

**Figure 2.1** Immiserizing Growth I



Source: Author's representation.

**Figure 2.2** Immiserizing Growth II



Source: Author's representation.

**Table 2.1** North-South Models

Alternative Closures for the North								
South	Neoclassical		Lewis		Neo-Keynesian		Kalecki-Steindl	
<b>Lewis</b>	South: (1) $r_S = p f_S'$ (2) $g_S = s_S r_S$ (3) $V_S = \bar{V}_S$	North: (1) $g_N = n$ , $L_N = L_0 e^{nt}$ (2) $g_N = g_S$ in stable equilibrium path, which means: $p = n / s_S f_S'$	South: (1) $V_S = \bar{V}_S$ (2) $p = p(r_S)$ $p' > 0$ .	North: (1) $V_N = \bar{V}_N$ (2) $r_N = (s_S / s_N) r_S$	South: (1) $V_S = \bar{V}_S$ (2) $g_S = s_S r_S$ $r_S$ (2) $p = p(r_S)$ $p' > 0$ .	North: (1) $g_N = g_N(r_N)$ $g_N' > 0, g_N'' < 0$ (2) $g_N = s_N r_N$ (3) $g_N = g_S$ in equilibrium.	South: (1) $V_S = \bar{V}_S$ (2) $g_S = s_S r_S$ $r_S$ (2) $p = p(r_S)$ $p' > 0$ .	North: (1) $g_N = g_N(r_N, l/k_N)$ (2) $g_N = s_N r_N$ (3) $g_N = g_S$ in equilibrium. (4) $V_N = V_N(r_N)$
	1. Findlay (1980, 1981) 2. Dutt (1990) 3. Burgstaller-Saavedra-Rivano (1984) 4. Burgstaller (1985) 5. Ziesemer (1995)		1. Vines (1984) formalized Kaldor (1979) 2. Thirlwall (1986) 3. Conway and Darity (1985) 4. Dutt (1990) 5. Brewer (1985) 6. Molona and Vines (1989)		1. Dutt (1990) 2. Darity (1990)		1. Taylor (1981, 1983, 1986) 2. Dutt (1988, 1987, 1990, 2002) 3. Darity (1990)	
<b>Kalecki-Steindl</b>							South: (1) $g_S = s_S r_S$ (2) $V_S = V_S(r_S)$	North: (1) $g_N = g_N(r_N, l/k_N)$ (2) $g_N = s_N r_N$ (3) $g_N = g_S$ in equilibrium. (4) $V_N = V_N(r_N)$
							1. Dutt (1984) 2. Darity (1987)	
<b>Neo-Keynesian</b>			South: (1) $g_S = g_S(r_S)$ $g_S' > 0, g_S'' < 0$ (2) $V_S = V_S(r_S)$ Dutt (1990)	North: (1) $g_N = s_N r_N$ (2) $g_N = g_S$ in equilibrium.				
<i>Notes:</i> The letters denote the following variables: $r$ rate of profit, $p$ the terms of trade of the South vis-à-vis the North; $f'$ the marginal product of capital; $s$ the rate of savings of capital owners; $L$ the supply of labor; $n$ the growth rate of labor supply; $V$ the real wage; and $k$ the capital-output ratio.								

## CHAPTER 3

### NORTH-SOUTH TERMS-OF-TRADE TRENDS FROM 1960 TO 2006

#### 3.1 Introduction

The gains that an individual country can reap from international trade depend on the changes in its volume and product composition of trade, and the movements in its relative prices of tradable goods. As a measure of these movements, the trends in the barter terms of trade (the evolution of a country's export prices relative to import prices) play a crucial role in determining the distribution of gains from trade between trading partners.<sup>5</sup> An upward trend, for example, indicates a rising price of exports relative to imports, which can result in a higher net export revenue as long as the volume effects of this relative price change is low. Thus, improving terms of trade would increase net export earnings as long as the price-elasticities of exports and imports are low. By contrast, a deterioration in the terms of trade of a country might result in relatively low gains from trade if its adverse effect is not offset by an increase in its net export volume. Still worse, the gains from trade might turn into real income losses if the negative impact from terms-of-trade deterioration outweighs the positive impact from the increase in the volume of exports. Therefore, the gains from trade do not accrue automatically and are far from being equally distributed, depending on the movements in the terms of trade and changes in export/import volumes.

Singer (1975) called for shifting the debate on the terms of trade from a focus on types of *commodities* to types of *countries* as empirically more relevant and theoretically

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<sup>5</sup> The term "terms of trade" always refers to the "barter terms of trade" unless otherwise is stated.

more important. Analyses of trends in primary commodity prices relative to manufactures have a tendency to lose their empirical relevance in a world where the export composition of developing countries is increasingly dominated by manufactures. Nevertheless, few studies have actually focused on the empirics of terms of trade between developing and developed countries. From a theoretical standpoint, it is not possible to capture “unequal exchange relations”<sup>6</sup> between the periphery and the center merely by using the relative prices of primary commodities, nor is it possible to evaluate the extent to which gains from technological improvements in the periphery are exported abroad.<sup>7</sup>

This chapter empirically examines the evolution of the terms of trade of developing countries vis-à-vis developed countries. Beginning with a review of the literature on terms-of-trade debates, we highlight the distinctions between “commodity terms-of-trade” and “country terms-of-trade” and the importance of the choice of different time periods and different statistical estimation techniques to the results. The rest of the chapter presents an analysis of the autoregressive dynamics of the North-South terms-of-trade series, including a test of time trends. A disaggregated analysis of terms-of-trade trends for a large number of developing country groupings provides evidence of substantial terms-of-trade deterioration over the time period 1960-2003/6. The concluding section presents a brief summary of the findings.

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<sup>6</sup>This concept is used in the way it was developed by Sarkar and Singer (1991). It is concerned with the relative distribution of gains from trade between the center and the periphery.

<sup>7</sup>For evidence, see Lall (1998).

### **3.2 Empirical Debate on Terms of Trade Deterioration**

The controversy surrounding terms of trade deterioration is presented in four parts. The first subsection considers the ways in which the Ricardian view of terms of trade is a special case of the Prebisch-Singer hypothesis. The second subsection highlights the main turning-points of debate on the empirical studies prior to Grilli-Yang (1988), while the third one considers those studies subsequent to Grilli-Yang (1988). Finally, the last subsection examines the debate on manufacture-manufacture terms of trade beginning with Sarkar-Singer (1991).

Based on the observation of a secular decline in terms of primary commodities vis-à-vis manufactures since the last quarter of 19<sup>th</sup> century, Prebisch (1950, 1959) and Singer (1950) advocated industrialization for developing countries as a means to avoid exporting an increasingly greater volume of primary commodities in return for the same import bundle of manufactured goods, in which would imply a lower level of welfare for the major exporters of primary commodities in the long run. Even though Singer's subsequent study in 1991 challenged the strategy of industrialization as a way of escaping terms-of-trade deterioration, the central idea of a secular deterioration in the relative price of exports of developing countries relative to that of industrialized countries—mainly due to asymmetries in income-elasticities and labor markets—preserved its theoretical and empirical importance in economic development literature.

There has been a significant shift in theoretical analysis of terms of trade from 'commodity terms of trade,' international relative prices between commodities (primary-manufacture, or manufacture-manufacture), towards 'country terms of trade' or 'North-South terms of trade', the relative prices of developing countries' exports to developed

country exports (Singer, 1975). Yet an overwhelming majority of the previous research failed to give credit to the importance of this shift and ignored, for the most part, the movements in North-South terms of trade. It is one of the purposes of this study to contribute to this over-looked part of the literature.

### **3.2.1 The Ricardian View as a Special Case of the Prebisch-Singer Hypothesis**

Classical economists starting with Adam Smith<sup>8</sup> and more directly with Ricardo predicted that the terms of trade for primary goods as against manufactures would improve over the long run.<sup>9</sup> They justified this view based on two key ideas. First, the production of primary commodities is subject to diminishing returns because the amount of land used in production is fixed and additional inputs to this fixed amount of land would result in decreasing incremental growth of output. This places a supply constraint on agricultural commodities. The same logic applies to raw materials. Second, technological progress takes place more rapidly in manufacturing than in agriculture. Due to rapid technological change, costs would fall faster in manufacturing compared to primary production and the supply curve for manufacturing would shift right at a faster pace. The combination of these two factors—diminishing returns in primary production and rapid technological change in manufacturing—allowed Classical economists to

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<sup>8</sup> Adam Smith was actually sure that technical progress in manufacturing and industry was faster than agriculture and primary production because of the greater division of labor, introduction of machinery and increase in the “dexterity” of workers. In dynamic terms, his advice to governments was industrialization in order to obtain advantages of technical progress; while in static terms, his suggestion was to follow specialization in goods of comparative advantage and obtain thereby static gains in free trade (see Singer *et al.* 1992:141). Ricardo formalized Smith’s static vision with his theory of comparative advantage.

<sup>9</sup> Ricardo (1817), Malthus (1820), Torrens (1815, 1821), Mill (1848) are the most prominent studies of this prediction. This classical idea was later overtaken by neoclassical economists, such as Jevons (1865), Marshall (1903, 1926). Keynes (1912) also found this idea persuasive.

conclude that the price ratio of primary commodities to manufactures would increase over time.

As applied to the late nineteenth century and early twentieth century, however, Prebisch (1950) and Singer (1950) disputed the orthodox wisdom with the help of more recently published UN data on net barter terms of trade (NBTT) of United Kingdom from 1876-80 to 1946-47.<sup>10</sup> The NBTT series for the UK showed a steady improvement during this period. Given that the UK was the world's largest exporter of manufactured goods and importer of primary goods for most of the period, Prebisch came to the conclusion that the NBTT of primary products against manufactures had deteriorated worldwide (Prebisch, 1950). To support and explain these empirical findings that contradicted the classical view of terms of trade, Prebisch and Singer identified a number of factors that contributed to the observed deteriorating trend: (i) lower income elasticity of primary commodity exports compared to manufactured exports; (ii) capital-intensive technological progress in manufacturing that economized on the use of raw materials, and thus reduced the demand for them; (iii) the technological gap between advanced and developing countries, and the obstacles to gaining the necessary technical knowledge to industrialize in developing countries; (iv) different types of market structures in the export industries of industrialized and developing countries, specifically, monopolistic markets in the former and competitive markets in the latter<sup>11</sup> (Prebisch, 1950, 1959 and 1964, and Singer, 1950, 1975 and 1984).

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<sup>10</sup> This was the dataset used by Prebisch (1950). Singer (1950) revised the terms-of-trade series which was first provided by Folke Hilgerdt in a publication of League of Nations, 1945 (Singer *et al.* 1992).

<sup>11</sup> This point is refuted by Spraos (1983) based on the argument of general equilibrium in primary commodity markets and manufactured goods markets. However, it is reiterated by way of



Nevertheless, it is important to recognize that the Ricardian view of terms of trade is indeed a special case of Prebisch-Singer joint hypothesis. The terms of trade of primary commodities might increase if the manufacturing region grows at a much faster speed than the region exporting primary commodities. In that case, the effect of asymmetric income-elasticities might be overcome by the faster growth of the manufacturing region. As a result, the relative scarcity of primary commodities might push up its terms of trade.

Diakosavvas and Scandizzo (1991), Sarkar (1986b), and Spraos (1980) raised some objections to the evidence of deterioration in terms of trade suggested by Prebisch and Singer, which is summarized by Razzaque *et al.* (2007a) as follows: (i) using the UK terms of trade series to draw conclusions about the overall relative price of primary commodities might be inappropriate and result in misleading evidence; (ii) the time span is arbitrary; (iii) the data is inadequate to reach long-run conclusions; (iv) other important variables are omitted from the analysis; (v) quality improvements of the commodities traded are not taken into account; (vi) the developing countries are not the only exporters of primary commodities.

The first issue regarding the appropriateness of UK terms of trade has been thoroughly discussed by Spraos, who reached the conclusion that "...the evidence of Britain's NBTT to an inference about the relative price of primary commodities vis-à-vis manufactures in world trade was not misleading as to direction though it gave an exaggerated impression of the magnitude of deterioration" (1980: 113). Sarkar (1986b) agrees with Spraos and argued that NBTT of UK served as a justified "proxy for the terms of trade of the industrial region vis-à-vis the agrarian region of the world" (1986b:

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modeling competitive and monopolistic market structures and providing their estimations by Bloch and Sapsford (2000).

361). In the subsequent studies of NBTT for primary products, this point was no longer a concern since much better sources of data were available.

The last issue raised by the critiques — that developing countries are not the only exporters of primary products — does not change the fact that the NBTT for primary products has deteriorated over time. However, it changes the implications that Prebisch and Singer drew from the terms of trade deterioration. For example, it makes it problematic to argue that the gains from trade between the ‘center’ and the ‘periphery’ were unevenly distributed, favoring the former at the expense of the latter. Therefore, the terms of trade for developing countries as a whole would serve as a better measurement for the distribution of gains from trade across regions.

Another concern of the critiques was the improvement in the quality of traded commodities. The troublesome idea was that the relative price of manufactures might have been increasing due to more rapid improvements in their quality compared to primary commodities. For instance, the price of automobiles might be increasing because the newly produced automobiles perform much better than the older ones. The same kind of improvement in performance does not exist for, say, bananas. However, the studies such as Grilli and Yang (1988), Sarkar (1986b) and Spraos (1980) showed that the extent to which the quality improvements are responsible for the increase in prices of manufactured goods is minuscule. Moreover, Razzaque *et al.* (2007a: 19) argued that “there is no measurement of differential qualitative change in the two types of products”. One way to avoid this problem is again to use the ‘country terms of trade’ instead of ‘commodity terms of trade’. Since the product mix of the export bundle is composed of a mixture of both primary and manufactured commodities for both developing and

developed countries, the differential improvements in quality for different categories is unlikely to systematically favor one country group against the other. The other concerns raised by the critiques will be explored in the rest of the literature survey.

The strongest evidence in favor of a declining trend in relative price of primary commodities is provided by Grilli and Yang (1988) and the debate changed its character after this publication. Therefore, we will first consider the empirical works that were conducted before the study of Grilli and Yang, and then turn to those that followed after their seminal study.

### **3.2.2 Empirical Studies Before Grilli-Yang (1988)**

Since the launch of the Prebisch-Singer hypothesis in 1950 until mid-1980s, very few empirical studies were undertaken to test whether there was a declining trend in the terms of trade for either primary products or developing countries. Most of the discussion was centered on theoretical debates of why and how terms of trade would change. Diakosavvas and Scandizzo (1991) provide a list of these studies, including Kaldor (1963), Myrdal (1956, 1957a, 1957b), Lewis (1955), Nurkse (1959, 1967), Meier (1968), and Viner (1953).<sup>12</sup> Apart from these theoretical analyses, two empirical studies tested the trends in ‘country terms of trade’: First, Kindleberger (1955) did not find any decisive evidence for the deterioration in the terms of trade of primary commodities, but he found some evidence of a declining trend in the terms of trade of developing countries vis-à-vis the industrialized countries. In particular, he showed that the NBTT of Western Europe improved by 50 percent vis-à-vis the less-developed areas outside of Europe (1955: 290). Secondly, Wilson *et al.* (1969) found that between 1954-57 and 1962-65 least developed

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<sup>12</sup> For a complete list, see Diakosavvas and Scandizzo (1991: 238-9).

countries' NBTT declined from 98.3 to 90.7. Since the base year of the study was 1950-53, this means that LDC's NBTT declined 10 percent within 15 years, from 1950 to 1965 approximately.

Although these studies were quite striking in terms of the magnitude of deterioration in the terms of trade between countries and more relevant in terms of determining how the gains from trade were distributed, the debate shifted its ground back to the terms of trade measured between commodities with the publication of Spraos' comprehensive paper (1980), which re-evaluated the evidence from Prebisch (1950). Spraos found that Prebisch's series exaggerated the rate of deterioration in terms of trade for primary commodities, which Spraos estimated to be lower for the period up to 1950s. However, Spraos detected that the declining trend became very weak, or "open to doubt" if the dataset were extended to 1970. This finding implied that the time span chosen for the study was a major determinant of whether or not one would observe a declining trend in terms of trade.

Sapsford (1985) tested for structural breaks in the dataset used by Spraos (1980) and came to the conclusion that Spraos' results suffered from not taking into account the significant break in 1950. Sapsford's estimation included intercept and slope dummies for the period after 1950, i.e. the post-war period, and his Chow test significantly favored the specification including the dummy variables. Since the intercept dummy was positive and the slope dummy was negative, both being significant for OLS estimations, Sapsford interpreted this result as a once-for-all upward shift in the terms of trade in 1950 with a continuing declining trend in the post-war period.

Sarkar (1986b) and Thirlwall and Bergevin (1985), as mentioned in Razzaque *et al.* (2007a), also tested the structural breaks in terms-of-trade deterioration to see if changing the time span would invalidate the declining trend in relative prices of primary commodities. Sarkar (1986b) estimated the exponential trend equation for the two periods of 1876-1929 and 1876-1938 in order to see if the great depression was responsible for the negative trend in Singer's original estimation for the period 1876-1938. Sarkar's results indicated that the declining trend in both series was significant and that the inclusion of 1930s data had made the existing deterioration in the terms of trade even worse. Thirlwall and Bergevin (1985) conducted the same exercise for the two sub-periods 1954-72 and 1973-82 and found that the rate of decline in the terms of trade became more severe for the second period, increasing from 1.2 percent to 2.5 percent per annum. These estimates are much higher than those of Sarkar, who found the overall decline to be 0.89 percent per annum.

### **3.2.3 Empirical Debate subsequent to Grilli-Yang (1988)**

Grilli and Yang (1988) constructed the longest (1900-86) and the most consistent dataset for the relative price of non-fuel primary commodities that had so far been compiled. Razzaque *et al.* (2007a) argue that the construction of this dataset was their most important contribution to the literature. Based on the new dataset, Grilli and Yang found a statistically significant decline of 0.6 percent per annum in the terms of trade of primary commodities against manufactures.

A renewed interest in the empirical tests of trend equations began as several other studies followed the example of Grilli-Yang, using their consistent and longer time-series dataset and analyzing it with the new techniques in time-series econometrics such as unit

root tests and cointegration analysis. Cuddington and Urzua (1989) became the first study to challenge the findings of Grilli-Yang on the grounds that their trend equation estimation was invalid due to the non-stationarity of the estimated series. They argued that the traditional log-linear trend equation is valid if and only if the test for unit root of the series is rejected, i.e. the data generating process is a trend-stationary (TS) one. When this fails to hold, as Cuddington and Urzua (1989) found to be the case for the aggregate primary commodity relative price index of Grilli-Yang, the non-stationary series needs to be transformed into a stationary one by using a difference-stationary (DS) model. The estimation of a DS model by Cuddington and Urzua resulted in a trend rate that was not statistically different from zero. In addition, they found that 39 percent of the average shocks to the NBTT is permanent while the remaining 61 percent is cyclical and disappears in three years (1989: 441).

In a subsequent study, Cuddington (1992) did unit-root tests for the individual commodity price indices of Grilli-Yang and additional data for oil and coal. He rejected the unit root for 13 out of 26 commodities. Among those commodities which can be modeled as TS processes, he found that only 5 of them exhibited a significant negative trend. Similar to Cuddington (1992), Newbold and Vougas (1996) used several unit-root and structural break tests in order to determine whether the aggregate index for relative primary commodity prices is a TS or DS process. Although these tests gave ambiguous results, the authors chose the DS process and came to the conclusion that the PS hypothesis is “non-proven” (1966: 660).

Of course, the results of these empirical studies did not go without any responses from the previous authors who had argued in support of a decline in the growth rate of

terms of trade. Singer, Sapsford, and Sarkar (1992) argued that the procedure of unit-root testing by Cuddington and Urzua was not appropriate because of their inclusion of many insignificant lagged periods of the dependent variable. Singer *et al.* (1992) showed that when these unnecessary variables were excluded, the null hypothesis of a unit root would be rejected, in which case a TS process would be preferred instead of a DS one. This would allow for an estimation of a declining trend, which had been rejected by Cuddington and Urzua (1989). Moreover, Singer *et al.* (1992) questioned the plausibility of the 50.3 percent decline in relative price index during 1920-21 as indicated in the dataset used by Cuddington and Urzua. Schlote (1938) estimated this particular fall as 13.5 percent only. Replacing Schlote's estimate for this time interval and re-estimating the time-trend, Singer *et al.* (1992) found a secular downward trend in commodity terms of trade over 1900-83.

Cuddington's (1992) results in favor of rejecting declining trends in relative prices of most of individual primary commodities were also challenged by successive studies. Changing the unit root testing procedure from the one in Perron (1989) to Zivott and Andrew (1992), Leon and Soto (1997) found that 20 out of 24 commodities followed a TS process and 17 out of these 20 commodities exhibited statistically significant declining terms of trade. Zivott and Andrew's procedure has the advantage of testing for structural breaks endogenously whereas the exogenous structural change test in Perron depends on visual inspection of the data, which might lead to a specification error in the model due to subjectivity involved in selecting the time break. Leon and Soto (1997) suspect that this was the problem with exogenous unit root testing applied by Cuddington. However, a shortcoming of Zivott and Andrew procedure is that it can only

test for one endogenous structural break. Lumsdaine and Papell (1997) developed a testing procedure that made it possible to test for two endogenous breaks. Using this newer technique, Kellard and Wohar (2002) found that 15 out of 24 individual commodity price indices had a TS process and 12 out of these 15 commodities exhibited a declining trend over time. Thus, the incorporation of two endogenous breaks into the unit-root testing procedure makes it more likely to fail to reject the null hypothesis of a unit root.

The findings of Cuddington and Urzua (1989) regarding the permanent and cyclical components of the time-series were also challenged by the studies of Ardeni and Wright (1992) and Reinhart and Wickham (1994). Implementing Harvey's (1989) methodology to decompose the series into permanent and cyclical components, these studies found that most of the deterioration in relative commodity prices was permanent. In particular, Ardeni and Wright (1992) reported that the decline was 0.6 percent per annum.

The development of cointegration technique in time-series econometrics (see for example, Engle and Granger, 1987, Harris, 1995) provided a new methodology to consider trend-stationarity versus difference-stationarity. Powell (1991) and Bleaney and Greenway (1993) made explicit use of this new methodology, but they reached strikingly different conclusions, partly due to differences in interpretation of the results obtained. Considering the index for primary commodity prices together with the index for unit values of manufactures, Powell tested whether there is a long-run relationship between these two non-stationary variables. He argued that the declining terms-of-trade hypothesis would be rejected if the cointegrating parameter was one. Having controlled



for three outliers in the series, 1921, 1938, and 1975, Johnson's test results made it clear that the cointegrating parameter was not statistically different from one. From this result, Powell came to the conclusion that the commodity terms of trade are stationary although the series had three sharp breaks. As Razzaque *et al.* (2007a) suggests, the results could very well be interpreted as "a stepwise version of the PS hypothesis with permanent drops in those three years". In addition, Powell had made no attempt to test for whether the cointegrating parameter was changing between the outliers, in which case the declining terms of trade might not have been rejected (2007a: 25-6). Moreover, as Sarkar (1994) pointed out (i) Powell's indirect testing procedure contains various steps and each step involves tests that have low power; (ii) although Dickey-Fuller test rejected the null hypothesis that the cointegrating parameter was one, Powell used the Augmented Dickey-Fuller test—which failed to reject that it was one -- and it is not clear why the augmented test result is preferred, (iii) cointegration analysis may not be justified when there are structural breaks in the series (1994: 1613).

On the other hand, the cointegration analysis applied by Bleaney and Greenway (1993) follows an error-correction model and incorporates both trend and difference stationary models. This allows Bleaney and Greenway to avoid the pitfalls in unit-root testing by obtaining a more general specification of the trend equation. Using an updated Grilli-Yang index, the long-term growth rate is estimated to be -0.7 percent per annum over the period 1925-91. Moreover, Bleaney and Greenway also find a 'once-for-all' drop in commodity terms-of-trade after 1980.

Razzaque *et al.* (2007b) specify their trend equation following the methodology suggested by Bleaney and Greenway (1993) in order to avoid testing of the variables for

unit roots a priori. This makes the testing procedure much simpler and avoids the type one error of failing to reject the null hypothesis of unit root when it is not true. This is because the unit root tests have low power against the stationary alternative and hence there is a tendency to over-accept the null when it is not true. Using updated Grilli-Yang indices and UNCTAD database, Razzaque *et al.* (2007b) found a negative and statistically significant trend for 8 out of 13 commodities and for all broad commodity groups. The trend rates vary between -0.79 and -1.43 percent per annum for the period 1900-2001. If the period of estimation is restricted to 1960-2002, the trend rate declines are much higher, varying between -0.9 to -3.50 percent per annum. The aggregate relative price index has been estimated to fall at an annual rate of -1.82 percent for this more recent period.

Another study employing Grilli-Yang index for estimating the trend rates in relative commodity prices is Herrera (1996). The novelty of this study was to implement new parameter stability tests (those of Chu and White, 1992) and unit root tests which incorporate trend variables and also allow for an endogenous structural break. The break point is estimated to be 1972. Prior to the 1973 oil crisis, the study estimated the fall in non-fuel primary commodity prices as 0.7 percent per annum, which is pretty close to Grilli-Yang's original estimate. Yet, the period after the oil shock brought a much larger decline: 3.7 percent per annum from 1973 to 1992. This break-point was not previously noticed in the literature. Among the reasons for the 1973-break point, Herrera lists "the productivity slowdown in industrialized countries, the supply response of non-fuel primary commodity exporting countries, and other events following the formation of OPEC and the 1973 oil price shock" (1996: 44). In addition, the results of sequential

testing procedures suggest a level change in 1945 and a slope shift in 1983. Herrera argues that these two dates—the end of World War II and the LDC debt crisis—had a definitive effect on developing countries and their terms of trade.

### **3.2.4 Manufacture-Manufacture Terms of Trade**

The controversy concerning the declining trends in commodity terms of trade evolved around testing the terms of primary commodities vis-à-vis manufactures. The empirical evidence of a declining trend in primary-manufacture terms of trade implied that the developing countries had to industrialize and start exporting manufactured goods if they wished to avoid deterioration in their terms of trade. However, an influential study by Sarkar and Singer (1991) showed that, even though manufactured goods began to dominate the commodity composition of exports of developing countries, the terms of trade of manufactured exports of developing countries vis-à-vis those of developed countries have declined about 1 percent per annum since 1965. Industrialization of the ‘periphery’ and diversification of its exports did not necessarily create the means to break away from unequal exchange relations with industrial countries. Yet, in the absence of such diversification, it became clear that the situation would get much worse for the developing countries.

While the income terms of trade was estimated to have a significant improvement, the differences in labor productivities in manufacturing sectors of the two regions of periphery and center led Sarkar and Singer to conclude that the double factorial terms of

trade of the periphery deteriorated even more than the net barter terms of trade.<sup>13</sup> Another conclusion of the study is derived from the comparisons of terms-of-trade trends for individual countries (vis-à-vis the rest of the world). Among Latin American countries, seven out of ten had negative trends; in contrast, among Asian countries, two out of ten were negative. The authors argued that this contrast contributes to the differences in balance of payments and debt experiences of the two regions (1991: 338). Yet another finding of the study is that no country had a significant improvement in its manufacture-manufacture terms of trade vis-à-vis the United States, the ‘center of the center’, in contrast to some cases of improvement vis-à-vis the rest of the world.

A number of criticisms were directed to the study of Sarkar and Singer (1991): (i) Bleaney and Athukorala argued that the endpoint of the study corresponded to the debt crisis and real devaluation of the currencies of the developing countries. (ii) Athukorala pointed out the limitations of using unit value indices of manufactures to calculate manufacture-manufacture terms of trade. (iii) The majority of industrialized countries’ manufactured exports are part of intra-regional trade while only 25 percent of developing countries’ manufactured exports are part of intra-regional trade, which Athukorala suspects might lead to a bias. (iv) The inclusion of nonferrous metal products in the category of manufactures might be partly responsible for the declining manufacture-manufacture terms of trade of the periphery vis-à-vis the center. (v) Aggregation bias might also be responsible for the negative trend. (vi) The use of labor productivity in the manufacturing sector as a proxy for labor productivity in the export-oriented manufacturing sector may not be appropriate (Athukorala, 1993 and Bleaney, 1993).

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<sup>13</sup> This is because the average labor productivity of the periphery’s manufacturing sector declined much more steeply relative to that of the centre’s manufacturing sector (Sarkar and Singer 1991: 335)

In response to these criticisms, Sarkar and Singer (1993) defended their methodology and the result of declining manufacture-manufacture terms of trade with the following corresponding arguments: (i) Using a dummy variable for the period after 1982, i.e. the start of the debt crisis, Sarkar and Singer tested if the trend decline rates for the two periods, 1970-82 and 1970-89, differed. Their results indicate that the average rates of decline are the same: 1 percent per annum. Thus, changing the endpoint did not change the central result. (ii) As admitted by Athukorala, Sarkar and Singer argue that this point does not create a systematic bias in any particular direction. (iii) Although Athukorala mentions that this fact would create a bias in favor of Sarkar and Singer's result, Sarkar and Singer argue the opposite. Due to the technology gap and demonstration effects, the monopoly power of the industrialized countries' exports increase over time. Since the denominator of the terms of trade is likely to underestimate the upward movements of unit values of manufactured exports from industrialized countries to the developing countries, there would be a bias against the result of declining terms of trade. (iv) Regressing the trend rate of terms of trade against the share of nonferrous metals in total manufactured exports shows that cross-country variations in the latter do not explain the former. (v) Sarkar and Singer question why the disaggregated results would be more appropriate and argue that the aggregation bias (if any) might go in either direction. Lücke (1993) does a country-level analysis of the same trends and comes to the same conclusion as the one Sarkar and Singer had derived from their aggregate analysis. (vi) Sarkar and Singer argue that using labor productivity in the manufacturing sector as a proxy for labor productivity in export-oriented manufacturing does not create a problem as long as the "differences in the rate of growth of the labor productivity in the

total manufacturing sectors of the developing countries and industrialized countries also indicate the actual difference between the rates of growth of labor productivity in the export-oriented manufacturing sectors of the two regions” (1993: 1619).

### **3.3 Data Sample and Classification**

This section examines the direction of movement in the terms of trade of the global South vis-à-vis the global North from 1960 to 2006 by employing an autoregressive model to estimate the long-run trend and test its significance. The global North and South refer to the developed and developing economies, respectively. The analysis is based on nine terms-of-trade indices, each corresponding to a separate category of developing countries, which are classified by the UNCTAD Handbook of Statistics according to their major export commodities and their geographic locations (see Figure 3.1).

First, the major oil-exporting countries are separated from the developing countries as a whole because their terms of trade depend completely on the changes in oil prices. Second, the rest of the developing countries—i.e., non-oil-exporting countries—are further divided into two categories: the major exporters of manufactures and remaining countries. Third, the remaining developing countries—i.e., non-oil- and non-major-manufacture-exporting countries—are grouped according to their geographic location: America, Africa, West Asia and Other Asia. Fourth, there are two additional categories of countries in the UNCTAD classification under the name of “memo items”: the least developed countries (LDCs) and the highly indebted countries (HICs). A schema of this classification is presented in Figure 3.1.

The time period 1960-2006 was chosen solely on account of data availability for the country classification above.<sup>14</sup> Moreover, each terms-of-trade index is a net-barter terms-of-trade index, calculated as the ratio of the unit value of exports to the unit value of imports. While the data for unit value of exports are reported on an f.o.b. basis, those for imports are reported on a c.i.f. basis (UNCTAD *Handbook of Statistics* 2008).

Figure 3.2 overlays the aggregate terms of trade index for developing countries as a whole onto the terms of trade indices of oil-exporters and non-oil exporters. The spikes in the aggregate index reflect the increases in the relative price of oil during the oil shocks of 1973 and 1978. Both oil shocks can be clearly seen from the upward movements in the series. Moreover, the following downward adjustment corresponds to the debt crisis after 1982 and the currency devaluations for the majority of indebted developing countries. Once the oil-exporters are excluded from the sample of developing countries, a marked long-term downturn is noticeable in Figure 3.2.

Figure 3.3 shows that the terms of trade of the major exporters of manufactures were significantly higher prior to the 1980s than that of remaining non-oil exporters. However, the index of the former group starts to decline more steeply than that of the latter and converges with it over time. This evidence reinforces the empirical findings of Sarkar and Singer (1991) that the commodity terms of trade of *manufactures* exported by developing countries relative to those exported by developed countries displayed a downward trend.

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<sup>14</sup> Note that this time period is valid for three terms-of-trade indices of developing countries: developing countries as a whole, the major exporters of oil, and major exporters of manufactures. For the rest of the indices (with the exception of HICs), the time period covers from 1960 to 2003. For the category of highly indebted countries (HICs), the time range is from 1978 to 2003.

The visual inspection of the terms-of-trade series for various groups of countries from Figure 3.4 also suggests a prolonged declining trend over the period 1960-2003.

### 3.4 Empirical Analysis of the Trends in North-South Terms of Trade: 1960-2006

In order to determine whether the terms of trade follows a negative trend over the long run, the methodology developed by Bleaney and Greenway (1993) and Razzaque, Osafa-Kwaako and Grynberg (2007b) is implemented.<sup>15</sup> Suppose that the behavior of net-barter terms of trade (NBTT) can be represented by an autoregressive model<sup>16</sup> that includes a time trend:

$$\ln NBTT_t = a + bt + c \ln NBTT_{t-1} + u_t, \quad (3.1)$$

where  $t$  is time and  $u$  is a white-noise disturbance term. By subtracting  $\ln NBTT_{t-1}$  from each side, Equation (3.1) becomes:

$$\Delta \ln NBTT_t = a + bt + \psi \ln NBTT_{t-1} + u_t, \quad (3.2)$$

where  $\psi = c - 1$ . Equation (3.2) turns into an ideal error-correction model if  $\psi$  is negative, statistically significant and greater than -1, (i.e.,  $-1 < \psi < 0$ ; Razzaque *et al*, 2007b: 37). If this is the case, the change in  $\ln NBTT_t$  is negatively related to its current level, which will pull back the short-run deviations to the steady state long-run trend path. In contrast, if  $\psi = 0$ ,  $\ln NBTT_t$  would be a random walk with an increasing variance over time. The estimation results of Eq. (3.2) can be interpreted in the following fashion: If  $b \neq 0$  and  $\psi < 0$ ,  $\ln NBTT_t$  has a non-zero deterministic trend, i.e., it has a long-run tendency to

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<sup>15</sup> The reason for choosing this methodology is to avoid the loss of power from unit root tests, and to be able to determine the long-run trend of the series for cases where the null hypothesis of a unit root is rejected.

<sup>16</sup> The trend equation is an extension of the linear trend equation, e.g.,  $\ln Y_t = a + bT + ut$ , whereby the growth rate for the dependent variable  $Y$  per time period  $T$  is given by the coefficient  $b$ .



revert to a non-zero trend following any short-term disturbances. If  $b \neq 0$  and  $\psi = 0$ ,  $\ln NBTT_t$  is a random walk with drift. In this case, a negative (positive) value estimated for  $b$  implies that it is more probable that  $\ln NBTT_t$  will be smaller (greater) in the future compared to its current value. The combinations of the following conditions therefore provide empirical support for the declining trend hypothesis: (i)  $b < 0$  and  $\psi = 0$ ; (ii)  $b < 0$  and  $\psi < 0$ . An augmented version of Eq. (3.2) will be used for the estimation:

$$\Delta \ln NBTT_t = a + bt + \psi \ln NBTT_{t-1} + d \Delta \ln NBTT_{t-1} + v_t. \quad (3.3)$$

This version follows the usual practice with Dickey-Fuller regressions by including the first-order lagged dependent variable (i.e.,  $\Delta \ln NBTT_{t-1}$ ) in Eq. (3.3) irrespective of its statistical significance. In addition, dummy variables are used to control for the sudden jumps in commodity prices. Most terms-of-trade indices have a clear peak around the mid-1970s. In order to control for these sharp terms-of-trade movements, the trend equations to be estimated have to include point dummy variables. The inclusion of these point dummy variables lets us pull the atypical data points towards the expected result for a normal year, defined by the trend equation.

Results reported in Table 3.1 show that the estimated coefficients of the trend variable are negative and statistically significant at the 5 percent level for all categories of developing countries, i.e.,  $b < 0$ . The lagged level dependent variable ( $\ln NBTT_{t-1}$ ) is negative and less than zero for all the regressions. For all groups of countries except the LDCs and the remaining West Asian countries,<sup>17</sup> the t-ratio on  $\ln NBTT_{t-1}$  is higher than the Dickey-Fuller critical value. Thus, we reject the null hypothesis of a unit root at least at the 10 percent level, which means that  $\psi$  is significantly different from zero. The

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<sup>17</sup> For these groups' terms of trade, we fail to reject the null hypothesis of unit root, i.e.,  $\psi = 0$ . However, as we noted before, the case where  $b < 0$  and  $\psi = 0$  also provides empirical evidence for the deterioration in net barter terms-of-trade.

combination of a negative trend coefficient with a negative lagged dependent variable, with both being significant, leads us to the case where  $b < 0$  and  $\psi < 0$ . This implies that the terms of trade series has a long-run tendency to revert to a negative trend following any short-term disturbances. In order to determine the degree of the decline in terms of trade, it is necessary to calculate the long-term growth rate.

The last column of Table 3.1 displays the long-term growth rate in NBTT in percent per annum for each group of countries.<sup>18</sup> The rate is negative for all groups, ranging between -0.65 (for the remaining countries) and -2.19 (for the highly indebted countries, HICs). For all non-oil-exporting developing countries, the terms of trade has fallen at an annual rate of almost 1.5 percent from 1960 to 2003, which cumulatively amounts to 47 percent from 1960 to 2006. The sharpest declines in NBTT are observed for the least developed countries (LDCs) and the highly indebted countries, declining respectively at the rates of -1.78 and -2.19 percent annually. The least deterioration is observed for the remaining countries as a whole: -0.65 percent. There is a notable contrast between the trend rates of major exporters of manufactures' NBTT and the remaining countries' NBTT. While the former index declined at the rate of 1.42, the latter declined much less, 0.65 percent per annum. This evidence matches with our visual

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<sup>18</sup> In Equation (2),  $\Delta \ln \text{NBTT}_t = a + bt + \psi \ln \text{NBTT}_{t-1} + ut$ ,  $b$  is the time trend. However, the trend affects prior values of NBTT, which because of the lagged term affect subsequent values of NBTT. Thus, the trend has two effects: a direct effect on NBTT (coefficient  $b$ ) and an indirect effect through the lagged values of NBTT. To calculate the long-term trend, we assume that Equation (2) is equilibrium in the long-run, meaning that  $\ln \text{NBTT}_t = \ln \text{NBTT}_{t-1}$ . Then, the change in  $\ln \text{NBTT}_t$  would be zero:  $0 = a + bt + \psi \ln \text{NBTT}_{t-1} + ut$ . Replacing  $\ln \text{NBTT}_{t-1}$  by  $\ln \text{NBTT}_t$ , we obtain  $0 = a + bt + \psi \ln \text{NBTT}_t + ut$ , which can be rearranged as  $-\psi \ln \text{NBTT}_t = a + bt + ut$ , or  $\ln \text{NBTT}_t = (a / -\psi) + (b / -\psi) t + ut$ . The coefficient on the trend variable is the long-run trend rate:  $(b / -\psi)$ .

inspection of Figure 3.3, in which we noted the steeper decline of the NBTT of major exporters of manufactures.

The regression residuals are tested for serial correlation and normality. First, the Breusch-Godfrey serial correlation LM test results are reported under the column “serial corr.” in Table 3.1. Residuals were found to be serially correlated for first regressions for West Asian and Other Asian countries’ NBTT. This can be seen from the p-values below five percent, which implies rejection of the null hypothesis of no serial correlation. In the case of the West Asian NBTT, adding four additional lagged regressors, i.e.,  $\ln NBTT_{t-m}$ , eliminated the problem of serial correlation, while in the case of Other Asian NBTT, leaving out the insignificant point dummy variable made the series serially uncorrelated. These second regressions are preferred specifications for making inferences. Second, the tests of normality are conducted using White’s Q-statistic. Since these statistics are greater than 5 percent for all preferred specifications, i.e., the second regressions when there is a second one, we fail to reject the null hypothesis that the residuals from each regression are normally distributed. This also implies that the inferences drawn from these model specifications are valid.

### **3.5 Analysis of the Structural Breaks**

Trend equations with intercept and slope dummies are estimated in order to see if there were any significant changes in the annual percentage change in the trend rates.<sup>19</sup> The results are reported in Table 3.2. For most of the categories, we found evidence for a slightly increasing terms-of-trade prior to 1975 or 1980, followed by a much greater

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<sup>19</sup> The methodology used here is similar to Perron’s structural break tests. Innovational outlier with changing trend model is estimated for different categories and different structural break points. The structural break points are exogenously determined.

decline after 1975 or 1980. For the broadest category of non-oil exporting countries, for example, the terms of trade increased by 0.77 percent per annum prior to 1975 and declined by 1.42 percent per annum after 1975. If we take the year 1980 as the structural break point, the value of the estimates decline to 0.49 and 1.295 respectively. Since the dummies for 1975 are more significant, it might be better to take 1975 as the break point. For the major exporters of manufacturers, the year 1976 represents the most significant point of structural break. The terms of trade of this group of developing countries increased 1.01 percent per annum prior to 1976 and started to decline after that year by 1.12 percent per year. For the remaining category of non-oil- and non-major manufacture exporting countries, the break in the year 1980 is more significant than the one in 1975. Before 1980, the terms of trade for the remaining countries increased at 0.53 percent per year and began to decline after 1980s at 0.86 percent per year. Among the groups of remaining countries, the ones that experienced the sharpest decline in their terms of trade are again the less-developed countries (LDCs) and the highly-indebted countries (HICs). These are also the ones that experienced the sharpest structural breaks in their terms-of-trade movements.

Complementary to the results in Table 3.2, we have undertaken tests for unknown break dates using JMulti software. The break date estimated for each country classification is presented in Table 3.3. The results are very close to each other for most of the cases. For the non-oil exporting developing countries' terms of trade, 1974 is estimated to be the break date from the unknown break test. Compared to the break date from the exogenous tests, this is one year earlier than 1975. The same is also true for the remaining countries. However, the break dates are the same for NBTT of major exporters

of manufactures, being 1976 from both test results. The break date for LDCs is also estimated to be the same in both test results: 1977. The test results differ for the terms-of-trade series of remaining countries in Africa, West Asia, Other Asia, and HICs by an amount of 3-6 years. In short, we can conclude that both tests confirm the existence of a structural break between 1974 and 1977 for the majority of terms-of-trade series for different classifications of developing countries, excluding the major oil exporters. Prior to the break, the terms-of-trade series exhibited a slight rise, which turned into a steep decline after the break date.

### **3.6 Factors Responsible for the Structural Break in the Terms of Trade**

In the mid-to-late 1970s, the terms of trade for non-oil exporting developing countries has experienced a sharp structural break, that is, a reversal from a slightly increasing upward trend to a largely decreasing downward trend. This evidence applies for all the disaggregated groups except the Highly Indebted Countries (HICs) whose break date is 1986. Three major and largely unexpected developments in the world-economy explain this generalized downturn in the terms of trade in mid-to-late 1970s.

The first was the end of golden age of growth in the developed economies after the oil shocks of 1970s, having an adverse effect on the demand for commodities exported by developing countries (Ocampo and Parra 2003, Maizels 1992). Since most of the exported commodities from the developing countries were used as inputs of production in industrial products, the demand for these commodities declined as a result of the reduced output growth in industrial production of the developed countries. As income growth in the North slows down, the demand for imports from the South has a

tendency to fall—depressing the relative price of Southern exports to the North, i.e. terms-of-trade deterioration for the South.

The second major development was the eruption of the debt crisis in 1980s as a result of the interest rate shock of 1979. As the real interest rates in the United States had increased from -1.8 % in 1979 to 3.6 % in 1981, the cost of borrowing for developing countries increased tremendously due to the rise in average risk premiums from 2.5 to 22.0 percentage points (Ocampo 2008: 13). The resulting debt crisis created an excessive debt burden for the developing countries. In order to service their debts, they were under constant pressure to generate trade surpluses. Sharp reductions in their real exchange rates allowed many of these indebted developing countries to increase their volume of exports, but it came with the side-effect of reducing the relative prices of their exports. Therefore, the process of “export desperation”, as Sarkar (1991) named it, explains a major part of the deteriorations in terms of trade for developing countries occurring in this time period.

The third major factor was the increasing implementation of outward-looking strategies in developing countries. The neoliberal reforms were put into practice, partly as a result of the pressure from international organizations, and partly due to the perception that the outward-oriented economies had achieved higher rates of growth. Nominal devaluations were one of the major policy items among the neoliberal conditionality packages, which in general contributed to the deteriorating trend in developing countries’ terms of trade. However, more importantly, it is possible to identify two main effects resulting from increased openness on the terms of trade. The first one is the failure of the small country assumption to hold. The small country assumption maintains that each

trading country is small enough not to have any effect on the world prices of its exports and imports. Lutz and Singer (1994) show that this assumption might fail to hold if the trade liberalization is aimed at raising the size of the tradable sector (in either absolute or relative terms). In this case, changes in the tradable sector size might lead to a deterioration in terms of trade under certain conditions.<sup>20</sup> The second effect is known as the fallacy of composition, which underlines that even where the small country condition is valid for separate individual countries, it may not apply to several countries when they simultaneously liberalize their trade or become more outward-oriented. If many countries follow the same trade diversification strategy at the same time, the resulting oversupply of products in the global market may lead to declining prices and deteriorating terms of trade. Therefore, the collective efforts of several developing countries all at once to engage in trade diversification in similar product markets might indeed lead to lower prices for their exports and lower their terms of trade.

To summarize, the structural breaks in the trend of terms of trade in the mid-to-late 1970s reflect the simultaneous impacts of the changes in the world-economy: (i) the slowdown of the Northern growth rate after the oil shocks; (ii) the decreased trade deficits of the Southern economies as a share of their national income, i.e. increased 'export desperation' after the debt crisis; (iii) the increased openness of the Southern

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<sup>20</sup> The idea is that the increasing size of the tradable sector, thus the size of exports and imports and their shares in global markets all else constant, might change the relative prices of exports and imports. If the relative prices of exports declines in this process, this implies a deterioration of terms of trade. Since the trade liberalization of a given country then results in a change in terms of trade, this violates the small-country assumption.

economies due to neoliberal reforms. In order to show their differential effects over time, we will use an augmented structural equation with dummies in the following form:<sup>21</sup>

$$\ln NBTT_t = \beta_1 \ln YN_t + \beta_2 D \ln YN_t + \beta_3 OP_t + \beta_4 DOP_t + \beta_5 TBR_t + \beta_6 DTBR_t + u_t$$

(3.4)

where  $\ln NBTT_t$ : the logarithm of net barter terms of trade for non-oil exporting developing countries,

$\ln YN_t$ : the logarithm of real GDP in developed countries (or the North),

$D \ln YN_t$ : an interaction dummy, e.g. 0 if  $t < 1980$ , and  $\ln YN_t$  if  $t \geq 1980$ .

$OP_t$ : an index of openness which is calculated based on Rao (1999).<sup>22</sup>

$DOP_t$ : an interaction dummy, e.g. 0 if  $t < 1980$ , and  $OP_t$  if  $t \geq 1980$ ,

$TBR_t$ : the ratio of trade balance to GDP in non-oil exporting countries,

$DTBR_t$ : an interaction dummy, e.g. 0 if  $t < 1980$ , and  $TBR_t$  if  $t \geq 1980$ .

For  $t < 1980$ , the interaction dummy variables become zero, and the structural equation reduces to:

$$\ln NBTT_t = \beta_1 \ln YN_t + \beta_3 OP_t + \beta_5 TBR_t + v_t \quad (3.5)$$

For  $t \geq 1980$ , the coefficients of the interaction dummy variables must be added to the coefficients of the original variables, which yields:

$$\ln NBTT_t = (\beta_1 + \beta_2) \ln YN_t + (\beta_3 + \beta_4) OP_t + (\beta_5 + \beta_6) TBR_t + w_t \quad (3.6)$$

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<sup>21</sup> Log-log form lets us interpret the coefficients in such a way that a one percentage change in any independent variable leads to its coefficient times percentage change in the dependent variable. Therefore, variables are in levels instead of growth rates. The coefficient is omitted since it was insignificant. The TBR variable is not in logarithm form because it is already measured in percentages.

<sup>22</sup> Openness index is calculated by the error terms from the regression of Trade/GDP to structural determinants of population size and per capita GDP. "Given the premise that population and income are 'structural' determinants of a country's capacity to trade, we have statistically isolated their effects on observed trading shares and constructed an openness index from the latter after purging them of the structural effects" (Rao 1999: 302).



The estimation of the augmented structural model gave us the following results:

$$\begin{aligned} \ln NBTT_t = & .29 \ln YN_t + (-.03) D \ln YN_t + (.01) OP_t + (-.02) DOP_t + (-.03) TBR_t \\ & (84.91) \quad (-7.88) \quad (3.66) \quad (-3.86) \quad (-1.18) \\ + & (-.03) DTBR_t \\ & (-1.07)^{23} \end{aligned}$$

The results of the estimation can be rearranged in the form of Equations (3.5) and (3.6) to reflect the differences between the two periods:

$$\text{Pre- 1980: } \ln NBTT_t = (.29) \ln YN_t + (.01) OP_t + (-.03) TBR_t$$

$$\text{Post-1980: } \ln NBTT_t = (.26) \ln YN_t + (-.01) OP_t + (-.06) TBR_t$$

The following points are worth stressing:

- (i) A one percent increase in total Northern income leads to 0.29 percent increase in Southern terms of trade in the period prior to 1980.
- (ii) This positive response of the term of trade decreases to 0.26 percent in the post break period of post-1980. The reduction in the coefficient implies that the slowdown in Northern income growth had a depressing effect on Southern terms of trade.
- (iii) A one percentage point increase in the openness index of the South leads to a 0.01 percent improvement in the terms of trade of the South before 1980s.
- (iv) The coefficient of the openness index turns negative in the post-break period, indicating the crowding-out effects associated with the fallacy of composition effect. After 1980s, one percentage point increase in openness leads to a 0.01 percent decrease in Southern terms of trade.
- (v) Due to the excessive burden of the debt payments and increasing necessity to export more, regardless of how low the relative price ratios might be, the trade balance to

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<sup>23</sup> N=47, Adjusted R<sup>2</sup>= 0.99, AIC: -105.13, and the figures under coefficients are t-ratios.

GDP ratio, or *TBR*, posed an accentuated negative impact on the terms of trade after 1980. Note, however, that there could be simultaneity/joint determination here.

(vi) While a one percentage point increase in the *TBR* resulted in a 0.03 percent decrease in the terms of trade before 1980, the effect became much stronger after 1980: a 0.06 percent reduction per percentage point increase in *TBR*.

### **3.7 Conclusion**

The controversy over the international terms of trade has predominantly focused on the commodity terms of trade— between primary commodities versus manufactures, or manufactures versus manufactures with different countries of origin. However, neither of these measures accommodates the changes in the commodity composition of developing country exports. While the first measure—the primary/manufactures terms of trade—is hardly relevant when the export bundle of developing countries is increasingly dominated by manufactured goods, the intra-manufacturing terms of trade completely ignores the primary commodities exported by the developing countries. These drawbacks arising from using different versions of commodity terms of trade can be avoided if the country terms of trade—that is, the terms of developing countries’ trade vis-à-vis developed countries—are taken as the unit for measurement. This is especially the case if the aim is to adequately measure the extent to which gains from trade are unevenly distributed between the global North and South.

Our review of the literature also shows that empirical inferences concerning the trend in the terms of trade have been strongly shaped by the particular time-series techniques used. In order to avoid pitfalls in unit-root testing, this paper employs a more general specification of the trend equation, which allows us to proceed without *a priori*

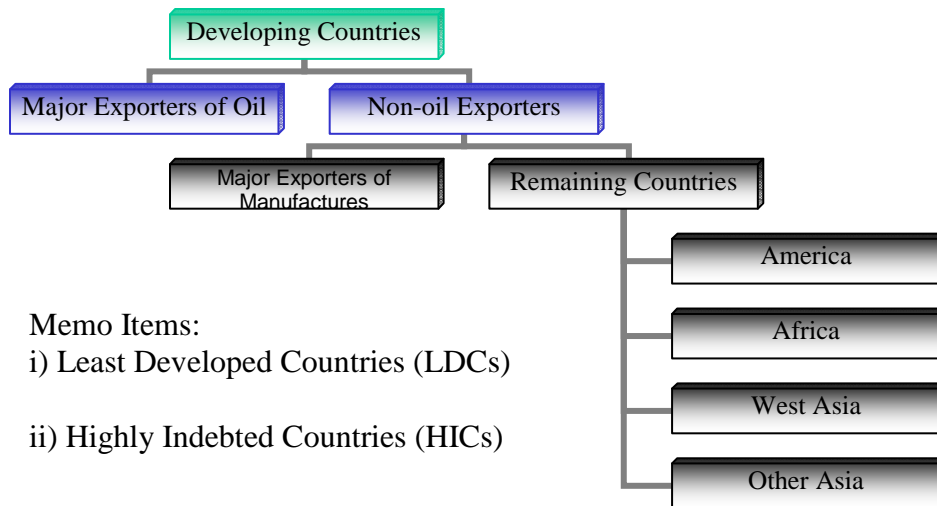
testing of the variables for unit roots. The results of the econometric analysis concerning nine North-South terms of trade indices reveals that the terms of trade have turned against the South since the 1960s. However, the terms-of-trade deterioration is neither continuous nor evenly distributed over different country groupings. Further analysis of the data provides evidence of structural break around the mid-to-late 1970s in the South-North terms of trade, which deteriorated at a rate of almost 1.5 % per year during the post-break period. Cumulatively, this amounts to a decline of 47 % from 1960 to 2006—the most striking finding to date in support of the dynamic unequal exchange thesis.

The terms-of-trade deterioration was not evenly distributed across countries. First, the highest rates of decline in terms of trade are observed for the least developed and highly indebted countries: -1.78 % and -2.19 % per annum, respectively.<sup>24</sup> Moreover, the terms of trade for major exporters of manufactures deteriorated much more severely than for the rest of the non-oil exporting developing countries. This supports the view that manufactured exports are not immune to falling relative prices (Singer and Sarkar 1991, Kaplinsky 2006). Within the country group of non-major exporters of oil and manufactures (or the remaining countries), the terms of trade for developing countries in America exhibits greater deterioration compared to terms of trade for the developing countries in Other Asia. In all, then, these findings point to a highly differentiated and uneven process of development that is partly structured by international trade relations.

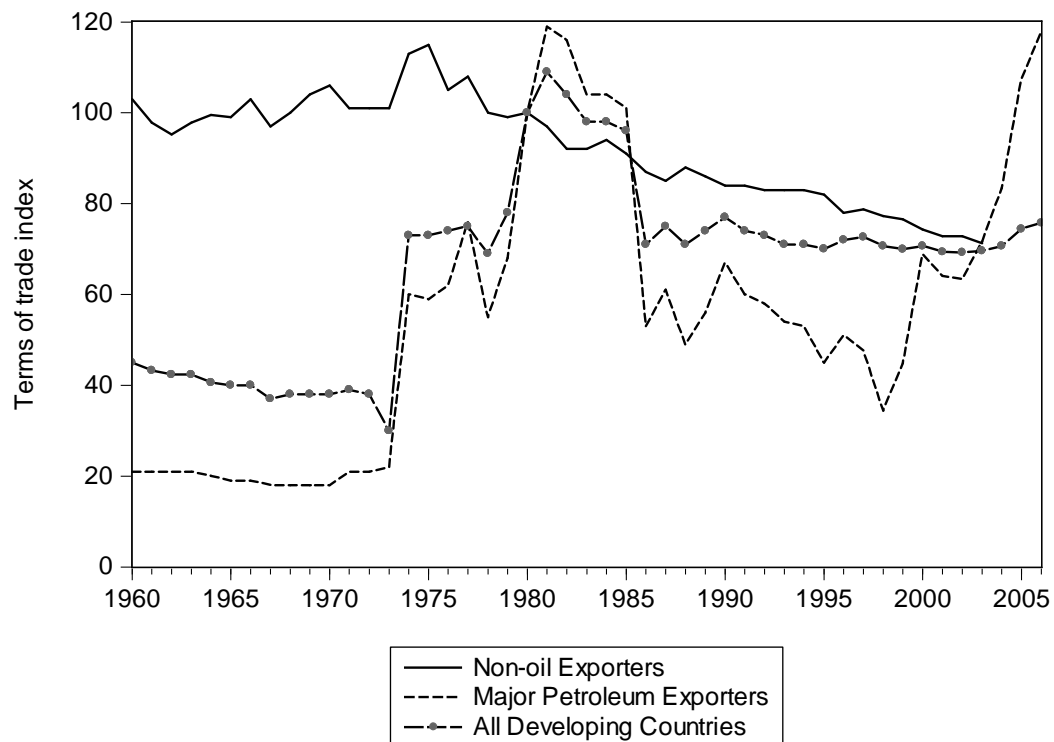
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<sup>24</sup> Note here that the criteria for inclusion in the memo item groupings exert a downward bias in the terms-of-trade movement since a decline in terms-of-trade is one contributor to being a poor or highly-indebted country.

**Figure 3.1** Classification of Country Groupings

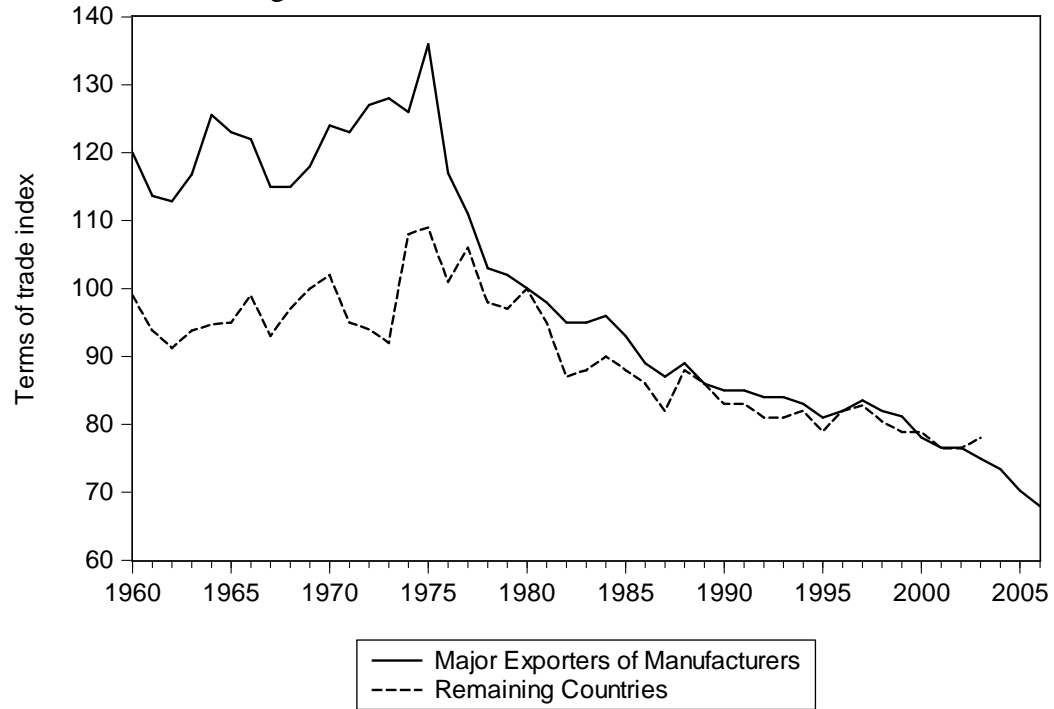


**Figure 3.2** Terms of Trade Indices for All Developing Countries, Oil Exporters, and Non-oil Exporters, 1960-2003/6.



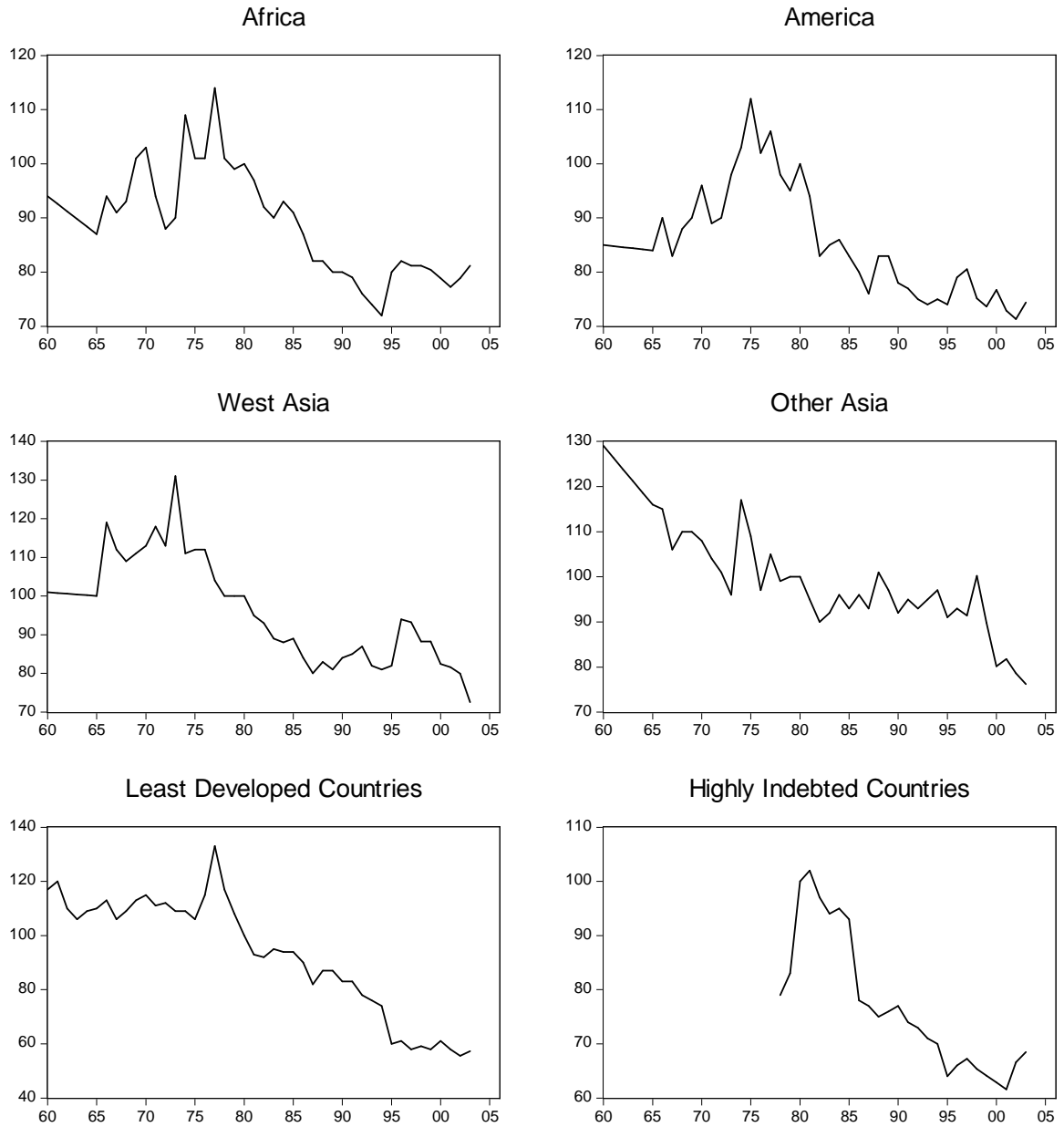
Source: UNCTAD Handbook of Statistics

**Figure 3.3** Terms of Trade Indices for Major Exporters of Manufactures and Remaining Countries from 1960-2003.



Source: UNCTAD Handbook of Statistics

**Figure 3.4** Terms of Trade Indices for the Remaining Countries Disaggregated by Region and Economic Groupings, 1960-2003.



Source: UNCTAD Handbook of Statistics

**Table 3.1** Estimation Results for Different Categories of Developing Countries

$\Delta \ln NBTT_t$	Constant	$T$	$\ln NBTT_{t-1}$	$\Delta \ln NBTT_{t-m}$	$\Delta \ln NBTT_{t-1}$	Dummies	Adj. R <sup>2</sup>	AIC	Serial Corr.	White's Q-stat.	Trend (%)
Non-oil-exporting countries	6.160 (2.94)	-0.0026 (-2.94)	-0.2271 (-2.50)	—	-0.2106 (-1.25)	$D751$ -.08 (-1.95)	0.15	-161.08	1.722 (0.1894)	34.733 (0.015)	-1.15
	23.428 (4.93)	-0.0099 (-4.86)	-0.66866 (-4.50)	$\Delta \ln NBTT_{t-12}$ -.065(0.37)	-0.1648 (-2.13)	$D751$ -.07 (-2.01)	0.46	-135.79	1.171 (0.2792)	16.265 (0.298)	-1.48
Major exporters of manufactures	10.67 (4.33)	-0.0046 (-4.27)	-0.3238 (-4.22)	—	.1594 (1.24)	$D751$ -.13 (-3.99)	0.36	-168.89	3.471 (0.0625)	20.042 (0.392)	-1.42
Remaining Countries	5.349 (2.76)	-0.002 (-2.51)	-0.2916 (-2.87)	—	-.01205 (-0.09)	$D741$ -.16 (-4.43)	0.41	-157.79	8.283 (0.004)	29.78 (0.055)	-0.69
	6.285 (3.41)	-0.0023 (-3.11)	-0.3553 (-3.65)	—	-.2376 (-1.81)	$D74751$ -.13 (-4.98)	0.46	-161.49	0.462 (0.497)	26.47 (0.118)	-0.65
Remaining America	7.215 (2.60)	-0.0029 (-2.40)	-0.31778 (-2.82)	—	-.1179 (-0.76)	$D751$ -.13 (-2.49)	0.21	-112.60	0.017 (0.897)	24.347 (0.082)	-0.91
	8.297 (3.05)	-0.0032 (-2.78)	-0.3981 (-3.45)	—	.0185 (0.12)	$D75771$ -.12 (-3.03)	0.27	-115.39	0.268 (0.605)	15.93 (0.46)	-0.80
Remaining Africa	8.199 (2.81)	-0.0031 (-2.53)	-0.4047 (-3.32)	—	.0556 (0.38)	$D771$ -.16 (-3.08)	0.28	-112.85	1.769 (0.184)	18.19 (0.31)	-0.77

Note: Table continues in the next page.

**Table 3.1 (continued)**

$\Delta \ln NBTT_t$	Constant	$T$	$\ln NBTT_{t-1}$	$\Delta \ln NBTT_{t-m}$	$\Delta \ln NBTT_{t-1}$	Dummies	Adj. R <sup>2</sup>	AIC	Serial Corr.	White's Q-stat.	Trend (%)
Remaining West Asia	7.711 (2.37)	-0.0031 (-2.20)	-0.3054 (-2.71)	—	-0.097 (-0.74)	$D731$ -.18 (-3.77)	0.36	-120.22	4.383 (0.036)	10.27 (0.85)	-1.02
	9.636 (2.04)	-0.0039 (-1.88)	-0.3892 (-2.53)	$\Delta \ln NBTT_{t-2}$ <small><math>t-3, t-4, t-5</math></small>	-0.0233 (-0.13)	$D731$ -.18 (-3.40)	0.31	-98.86	1.334 (0.2481)	5.29 (0.98)	-0.99
Remaining Other Asia	14.17 (3.30)	-0.0055 (-3.20)	-0.7425 (-3.35)	—	.0503 (0.28)	$D731$ .08 (1.38)	0.27	-106.64	11.22 (0.001)	11.20 (0.79)	-0.74
	13.108 (3.06)	-0.0049 (-2.94)	-0.70314 (-3.16)	—	.04134 (0.22)	—	0.25	-106.49	1.473 (0.225)	10.276 (0.852)	-0.71
LDCs	7.94 (2.50)	-0.0035 (-2.42)	-0.197 (-2.46)	—	-0.096 (-0.65)	$D771$ -.18 (-3.53)	0.24	-130.65	1.685 (0.19)	13.12 (0.83)	-1.78
HICs	33.91 (4.34)	-0.0155 (-4.30)	-0.70664 (-4.44)	—	.34322 (2.15)	—	0.45	-77.80	0.75 (0.39)	9.3219 (0.502)	-2.19
<p><i>Notes:</i> Figures within the parentheses under coefficients are <math>t</math>-ratios. Those under the test statistics of serial correlation and White's Q-statistic are p-values. The Dickey-Fuller critical values for the coefficient of <math>\ln NBTT_{t-1}</math> at the 10, 5 and 1 percent levels are, respectively, -3.18, -3.50 and -4.15 for all series except <i>HIC</i>, which has 24 observations, and therefore the corresponding critical values for its <math>\ln NBTT_{t-1}</math> are -3.24, -3.95 and -4.38. Variables with the letter 'D' indicate a point dummy variable. For example, <math>D751</math> indicates a dummy variable with 0 for 1973 and 1 for all other years, and <math>D7577</math> indicates a dummy variable with 0 for 1975 and 1977, and 1 for all other years. The estimates of trends do not significantly change when the dummies are excluded from the estimation. The only changes that occur affect the stationarity of the series, i.e. some estimates might point to a non-stationarity in the time-series.</p>											



**Table 3.2** Estimation Results with Intercept and Slope Dummy Variables for Different Categories of Developing Countries

$\Delta \ln NBTT_t$	Const.	$T$	$\ln NBTT_{t-1}$	$\Delta \ln NBTT_{t-1}$	Intercept Dummy	Slope Dummy	Adj. R <sup>2</sup>	AIC	Serial Corr.	White's Q-stat.	Trend rate (%)
Non-oil exporting countries	-9.935 (-2.40)	.00727 (3.24)	-.946 (-4.60)	.22432 (1.52)	$D75$ 40.83(4.7)	$D75t$ -.021(-4.7)	0.42	-175.9	0.10 (0.75)	19.824 (0.405)	Pre 75: 0.77 Post 75: -1.42
	-4.877 (-1.51)	.00478 (2.42)	-.98219 (-4.39)	.35657 (2.05)	$D80$ 34.49(3.8)	$D80t$ -.018(-3.8)	0.32	-169.5	2.73 (0.10)	14.959 (0.725)	Pre 80: 0.49 Post 80: -1.29
	5.054 (2.32)	-.002 (-2.14)	-.2280 (-1.96)	-.0325 (-0.20)	$D90$ 3.28(0.60)	$D90t$ -0.002(-0.6)	0.05	-155.6	4.07 (0.04)	30.150 (0.049)	x
Major exporters of manufactures	-1.677 (-0.33)	.0016 (0.61)	-.3138 (-2.77)	.0314 (0.20)	$D75$ 11.02(1.5)	$D75t$ -.006(-1.5)	0.19	-158.5	20.25 (0.00)	16.198 (0.644)	Pre 75: 0.51 Post 75: -1.27
	-7.314 (-2.23)	.0049 (2.85)	-.4837 (-5.66)	.0168 (0.15)	$D76$ 20.25(4.0)	$D76t$ -.010(-4.1)	0.59	-186.8	0.06 (0.81)	15.33 (0.70)	Pre 76: 1.01 Post 76: -1.12
	7.907 (2.35)	-.0033 (-1.87)	-.3105 (-1.91)	.1527 (0.79)	$D80$ .013(0.00)	$D80t$ -.00003(0.01)	0.10	-153.8	3.54 (0.06)	17.76 (0.539)	x
Remaining Countries	-6.535 (-1.16)	.0051 (1.77)	-.7659 (-3.81)	.1523 (0.97)	$D75$ 25.87(3.3)	$D75t$ -.013(-3.3)	0.29	-148.8	0.23 (0.63)	19.29 (0.44)	Pre 75: 0.67 Post 75: -1.05
	-5.805 (-1.60)	.0053 (2.52)	-.9943 (-4.85)	.2807 (1.75)	$D80$ 27.2(3.67)	$D80t$ -.014(-3.7)	0.36	-153.2	5.08 (0.02)	21.698 (0.299)	Pre 80: 0.53 Post 80: -0.86
Remaining America	-30.69 (-1.95)	.01668 (2.07)	-.47975 (-2.61)	.0033 (0.02)	$D75$ 44.56(2.5)	$D75t$ -.023(-2.5)	0.19	-110.7	0.001 (0.98)	7.9630 (0.95)	Pre 75: 3.48 Post 75: -1.23
	-14.7 (-1.43)	.0089 (1.60)	-.6228 (-2.97)	.0924 (0.49)	$D80$ 28.38(1.9)	$D80t$ -.014(-1.9)	0.18	-110.1	2.27 (0.13)	9.44 (0.89)	Pre 80: 1.43 Post 80: -0.88
Remaining Africa	-7.42 (-0.60)	.0048 (0.76)	-.4632 (-2.60)	.10413 (0.57)	$D77$ 19.06(1.3)	$D77t$ -.01(-1.3)	0.09	-103.2	0.30 (0.58)	12.3 (0.72)	Pre 77: 1.04 Post 77: -1.06
	-6.84 (-0.78)	.0047 (1.02)	-.5365 (-2.90)	.1208 (0.66)	$D80$ 17.52(1.5)	$D80t$ -.009(-1.5)	0.14	-105.3	0.06 (0.80)	14.28 (0.58)	Pre 80: 0.88 Post 80: -0.78

Note: Table continues in the next page.

**Table 3.2 (continued)**

$\Delta \ln NBTT_t$	Const.	$T$	$\ln NBTT_{t-1}$	$\Delta \ln NBTT_{t-1}$	Intercept Dummy	Slope Dummy	Adj. R <sup>2</sup>	AIC	Serial Corr.	White's Q-stat.	Trend rate (%)
Remaining West Asia	-11.86 (-0.46)	.0066 (0.51)	-.2564 (-1.88)	-.1775 (-1.09)	$D73$ 18.6(0.71)	$D73t$ -.01(-0.7)	0.07	-105.5	1.30 (0.25)	7.264 (0.968)	x
	-6.135 (-0.38)	.0039 (0.48)	-.3289 (-2.31)	-.2409 (-1.52)	$D75$ 12.8(0.75)	$D75t$ -.007(-0.8)	0.13	-108.0	0.28 (0.59)	5.669 (0.99)	x
	12.56 (1.51)	-.0055 (-1.32)	-.3699 (-2.12)	-.1576 (-0.94)	$D80$ -6.9(-0.8)	$D80t$ .0035(0.78)	0.11	-107.0	0.07 (0.79)	4.701 (0.99)	x
	15.45 (2.78)	-.0068 (-2.74)	-.4311 (-2.90)	-.2298 (- 1.71)	$D96$ 42.36(2.9)	$D96t$ -.021(-2.9)	0.35	-118.6	0.57 (0.45)	9.874 (0.87)	Pre 96: -1.58 Post 96: -6.50
Remaining Other Asia	-5.13 (-0.26)	.0041 (0.43)	-.632 (-2.65)	.0185 (0.10)	$D75$ 16.76(0.9)	$D75t$ -.009(-0.9)	0.23	-103.6	0.14 (0.71)	10.27 (0.85)	x
	11.09 (1.16)	-.004 (-0.87)	-.6969 (-2.93)	.0367 (0.19)	$D80$ 2.104(0.2)	$D80t$ -.001(-0.2)	0.20	-102.6	1.24 (0.27)	10.85 (0.82)	x
	16.10 (2.53)	-.0061 (-2.23)	-.8732 (-3.54)	.1181 (0.60)	$D90$ 14.86(1.9)	$D90t$ -.007(-1.9)	0.3	-107.2	0.18 (0.67)	15.32 (0.50)	Pre 90: -0.70 Post90: -1.55
LDCs	2.937 (0.39)	-.0002 (-0.05)	-.5476 (-4.00)	.1592 (1.07)	$D75$ 27.88(3.1)	$D75t$ -.014(-3.1)	0.24	-129.5	0.58 (0.45)	17.83 (0.53)	Pre75: -0.04 Post75: -2.61
	2.88 (0.46)	.00011 (0.04)	-.6658 (-4.11)	.2037 (1.37)	$D77$ 35.9(3.97)	$D77t$ -.018(-3.9)	0.28	-131.8	2.23 (0.14)	22.54 (0.26)	Pre77: 0.02 Post77: -2.70
	.3997 (0.09)	.0012 (0.55)	-.6038 (-3.90)	.2073 (1.30)	$D80$ 33.9(3.49)	$D80t$ -.017(-3.5)	0.23	-129.2	0.36 (0.55)	20.14 (0.39)	Pre80: 0.20 Post80: -2.62
	8.297 (2.14)	-.0032 (-1.89)	-.4279 (-2.79)	.1465 (0.86)	$D90$ 15.35(1.4)	$D90t$ -.008(-1.4)	0.12	-123.7	0.21 (0.65)	16.43 (0.63)	Pre90: -0.75 Post90: -2.57
HICs	64.84 (5.84)	-.031 (-5.69)	-.781 (-5.98)	.1154 (0.78)	$D90$ -38.1(-3.7)	$D90t$ .01917(3.7)		-87.4	0.004 (0.95)	8.12 (0.62)	Pre90: -3.97 Post90: -1.52

*Note:* Figures within the parentheses are  $t$ -ratios. The Dickey-Fuller critical values for the coefficient of  $\ln NBTT_{t-1}$  at the 10, 5 and 1 percent significance levels are, respectively, -3.18, -3.50 and -4.15 for all series except  $HIC_t$ , whose number of observations are 24 and therefore the corresponding critical values for  $\ln NBTT_{t-1}$  are -3.24, -3.95 and -4.38. x means that the trend coefficient is not significant and therefore the trend growth rate is not estimated and can be considered to be zero.

**Table 3.3** Timing of Structural Breaks

	Estimated break date with a shift dummy <sup>25</sup>
Non-oil exporting countries	1974
Major exporters of manufactures	1976
Remaining Countries	1974
America	1975
Africa	1974
West Asia	1974
Other Asia	1974
LDCs	1977
HICs	1986

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<sup>25</sup> Break dates are endogenously estimated by using the JMulti software, downloadable from [www.jmulti.de](http://www.jmulti.de). This program provides unit root tests proposed by Saikkonen and Lütkepohl (2002) and also implements tests for unknown break dates.

## CHAPTER 4

### **GROWTH DIVERGENCE AND THE EVOLUTION OF TERMS OF TRADE: THE EMERGENCE OF IMMISERIZING GROWTH DURING NEOLIBERAL GLOBALIZATION**

#### **4.1 Introduction**

In open economies, one of the major constraints on economic growth is the availability of foreign exchange. This is especially the case for developing countries that have balance of payments difficulties arising from their inadequate international competitiveness. If a country runs a current account deficit, or a foreign exchange shortage, that is not automatically eliminated through a change in the relative prices of tradable goods, it becomes a constraint on demand given that the deficit cannot be indefinitely financed at a constant rate of interest, and will therefore affect the growth process. Thus, the balance of payments is a binding constraint on economic growth in the presence of foreign exchange shortages that need to be managed by attracting short-term capital flows that are highly volatile and demand high rates of interest.

By limiting the potential for achieving high growth rates in developing countries, the balance of payments constraint becomes an important mechanism to generate growth divergence between developed and developing economies. It is much easier for developed countries to raise foreign exchange since it is their own currency that functions as a global unit of exchange in world capital markets. Therefore, balance of payments constraint favors developed countries and disfavors developing ones, enhancing the patterns of growth divergence across countries.

The studies focusing on balance of payments constrained growth (Thirlwall and McCombie 2004, Blecker 2004, Perraton 2004) take into account neither the changes in

terms of trade nor changes in trade balance.<sup>26</sup> Dutt (2002) emphasizes that both of these neglected aspects should be incorporated into the analysis in order to obtain a more complete theory of uneven development:

...[Thirlwall's Law] is derived on the basis of a number of stringent assumptions, of which two are: that the terms of trade is constant, and that trade is balanced. Both these assumptions are troubling in the present context. Regarding the first, variations in the terms of trade between rich and poor countries have played an important role in the examination of economic relations between the North and the South...Regarding the second, international capital flows have also been a major relation in the analysis of the relation between rich and poor countries. It has often been argued that foreign direct investment by transnational corporations creates development problems for the South and exacerbates North-South uneven development, and 'surplus transfers' from the South to the North resulting from payments of interest on Southern debt have also had analogous effects. Others have argued that international capital flows provide an important means by which the South can grow more rapidly than is possible from domestic saving and thereby catch up with the North. .... What is needed to overcome this problem is a model that simultaneously determines the growth rate of the North and the South and the evolution of the North-South terms of trade, rather than one that arbitrarily takes the terms of trade as exogenously given. Such a general equilibrium model of North-South trade also offers the possibility of explicitly taking into account North-South flows of capital.... (Dutt 2002: 376).

Such a model that simultaneously determines the growth rate of the North and the South, and the evolution of North-South terms of trade can be formulated based on the Prebisch-Singer Thesis (PST) that *endogenizes* the relative growth rates and the North-South terms of trade. Moreover, PST offers the possibility of explicitly taking into account North-South flows of capital by its modification to imbalanced trade. The purpose of this chapter is to introduce a formal PST model that relates growth divergence in the world economy to the evolution of terms of trade endogenously under a North-South balance of payments constraint. The extension of PST allows us to take into account the cases where trade is not balanced, and therefore, capital flows play an important role in balancing payments. The income elasticity differentials are also

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<sup>26</sup> See Razmi (2009) for an exposition of these BOP-constrained models and their exclusion of the non-tradable sector.

endogenized as a function of structural change and technological upgrading based on a structuralist North-South model (Botta 2009). The chapter combines this theoretical framework with empirical evidence on the patterns of growth divergence, the evolution of terms of trade, the trends in trade balance, and the income-elasticity differentials; it also tests the joint predictions of PST. The evidence suggests the emergence of *immiserizing growth* for the whole set of developing countries in the 1980s as the simultaneous entry of many developing countries into simple manufacturing production for servicing their debt payments led to a sharp decline in terms of trade and growth collapses across the whole set of developing countries. The primary gain from increased exports and initial growth was largely offset by the secondary loss in income due to deteriorating terms of trade. It is in this sense that the South experienced immiserizing growth under the neoliberal phase of globalization.

#### **4.2 A Reformulation of the Prebisch-Singer Thesis**

A few years after the pioneering work of Prebisch (1950) and Singer (1950) on the terms of trade trends, Johnson (1953) developed a simple model on the effects of economic growth on terms of trade. This model derives the conditions for the trade balance equilibrium to hold within an expanding world economy. Johnson's model can be reinterpreted assuming that there are two regions in the world: the North and the South, which are also identified as the advanced countries and the developing countries. The North exports high-technology manufactured goods, the South raw materials or low-technology manufactures. The demand for high-technology manufactures, that is, the South's import volume ( $M$ ), thus depends on the national income of the South ( $Y_S$ ) and

the price of high-technology manufactures relative to raw materials (or low-technology manufactures) ( $p$ ):

$$M = M(Y_S, p) \quad (4.1)$$

The demand for raw materials, or the South's export volume ( $X$ ), depends on the national income of the North ( $Y_N$ ) and the relative price of raw materials ( $1/p$ ):

$$X = X(Y_N, 1/p) \quad (4.2)$$

What would be the effect of economic expansion on trade balances if the demand for high-technology manufactures is more income-elastic relative to the demand for raw materials (or low-tech manufactures)? If we assume that both regions grow at the same pace, the demand for high-technology manufactures in the South grows faster than the North's demand for raw materials (or low-tech manufactures). As a result, there will be a relative abundance of these less sophisticated commodities produced by the South, which will push the Southern terms of trade down. The deterioration in Southern terms of trade can only be prevented if the South grows less rapidly than the North.

This situation can also be seen from the conditions for equilibrium under balanced trade ( $TB=0$ ):

$$TB = X(Y_N, 1/p) - pM(Y_S, p) \quad (4.3)$$

Taking time derivatives and setting  $dTB/dt = 0$ , Eq. (4.3) yields

$$dTB/dt = X[e_S g_N + \eta_S \hat{p}] - pM[e_N g_S + (1 - \eta_N) \hat{p}] \quad (4.4)$$

where  $e_S$  = income elasticity of demand for Southern exports

$e_N$  = income elasticity of demand for Northern exports

$\eta_S$  = price elasticity of demand for Southern exports

$\eta_N$  = price elasticity of demand for Northern exports

$g_S$  = rate of growth for Southern national output, i.e.  $(dY_S/dt)/Y_S$

$g_N$  = rate of growth for Northern national output, i.e.  $(dY_N/dt)/Y_N$

$\hat{p}$  = rate of growth of Northern terms of trade.

If we initially assume that  $TB=0$ , then we have  $X=pM$ . To ensure a zero trade balance over time, we need to have

$$e_S g_N - e_N g_S + (\eta_S + \eta_N - 1)\hat{p} = 0 \quad (4.5)$$

This results in a trend of the Northern terms-of-trade depending on (4.6):

$$\hat{p} = \frac{e_N g_S - e_S g_N}{\eta_S + \eta_N - 1} \quad (4.6)$$

Eq. (4.6) implies that the lower income elasticity of demand for raw materials relative to high-tech manufactures would be reflected in a deterioration of South's terms of trade (conversely an improvement in the North's terms of trade) or alternatively as a slower rate of economic growth for developing countries. In other words, the *elasticity differential* ( $e_N > e_S$ ) generates two predictions: (i) If the regions grow at the same rate in the steady-state, the South's terms-of-trade is bound to deteriorate; (ii) If the terms-of-trade remains constant over time, the South will grow at a slower rate than the North. The Prebisch-Singer Thesis (PST) is a *joint* hypothesis composed of these two predictions.

Notice that the derivation of PST is based only on the *income* elasticity differential. However, the magnitude of the change in terms of trade required to reestablish trade balance also depends on the *price* elasticities. The lower these elasticities are, the larger the deterioration of the terms of trade of Southern exports will be. We assume that the sum of these price elasticities of demand for exports of both



regions is greater than one (a positive denominator in Eq. 4.6), which is required by the Marshall-Lerner dynamic stability condition.<sup>27</sup>

#### **4.2.1 Incomplete Specialization, Technological Change, and Factor Accumulation**

In the case of incomplete specialization, that is when countries produce import-competing and exported goods, the effect of economic growth on terms-of-trade may be ambiguous. If the growth is biased towards exports, the excess supply of exports leads to a deterioration in the growing country's terms of trade. By contrast, growth that is biased towards imports may improve its terms-of-trade. Thus, the effect of growth on import demand determines the direction of change in terms-of-trade. An import-biased growth that significantly lowers the demand for imports would improve the growing country's terms-of-trade. Indeed, this was precisely the basic reasoning behind the strategy of import-substituting industrialization supported by Prebisch. If the developing countries increased their domestic supply of manufactured goods, the growth of their manufactured imports could be less than that of national income, despite their high income elasticity of demand for these goods.

Even though the PST depends primarily on demand side factors, considerations from the supply side can be introduced into the basic framework. Consider, in particular, the effect of a neutral technological change, such that relative factor use at constant factor prices is not affected by the technological change. If the rate of technological change varies across sectors, the terms of trade of countries that specialize in sectors with faster productivity increases will have a tendency to decline. This was the reason behind the

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<sup>27</sup> Note that Eqs. (4.1) and (4.2) and hence (4.5) and (4.6) assume infinite elasticities of supply of Home and Foreign exports.

Ricardian expectation that the terms-of-trade of countries specialized in producing manufactures would tend to deteriorate due to rapid technological developments in manufacturing (especially relative to primary sector). If we assume that the technological change is not similar in the same sectors of different countries, the effect of productivity increases on the terms of trade becomes uncertain. Nevertheless, we can still derive a more general implication. A region's terms-of-trade tends to improve (deteriorate) if the rate of technological change in its import-substituting (export) sectors increases more rapidly than the rest of the world. This is also the view emphasized by Prebisch and Singer: the productivity increases taking place in export industries are "exported" to the rest of the world via a declining terms-of-trade, whereas those in import-substituting sectors tend to benefit technologically developing countries more than proportionately.

Another supply-side factor that affects the terms-of-trade is the relative supply of productive factors. If the countries are specialized in the production of goods that intensively use their relatively more abundant factors, an increase in the supply of these abundant factors would have a negative impact on their terms-of-trade. On the other hand, an increase in the supply of scarce factors would improve the region's terms of trade. If developed countries increase their relative endowment of capital as they grow, this will depress their terms of trade over time as they specialize in capital-intensive goods. By contrast, economic growth renders land and other natural resources relatively scarce, which leads to increasing relative-prices of land- or natural resource-intensive products. Note that this was also a Ricardian prediction that warned about rising terms of trade of countries specialized in primary products.

Although the net effect from these demand-side and supply-side factors on terms of trade for developing countries is ambiguous, it can be seen that the demand elements generally reduce the terms of trade of primary commodity producing regions, while the supply factors tend to have a counteracting effect. Moreover, our consideration of these supply factors indicates that the developing countries as a whole benefit much more from technological improvements in import-substitution activities compared to export activities, plus their accumulation of scarce factors such as capital (including human capital) would tend to improve their terms of trade.

The condition of trade balance equilibrium is, to a great extent, a reasonable external constraint to the growth of developing countries as many of them find themselves running into balance of payment problems whenever they try to expand at a faster rate. Some economists argued that free capital movements have not necessarily relaxed this external constraint because of their adverse effect in destabilizing the developing economies by creating currency crises (Taylor 1998). Thus, it seems appropriate to take the trade balance to be a binding constraint for the South, especially over the long run.

### **4.3 The Generalized PST**

In some cases, trade deficits/surpluses might be sustained over time. To examine these cases, we will relax the assumption of balanced trade and derive the conditions for terms of trade deterioration and growth divergence under unbalanced trade. Using the expression for trade balance in the South (Eq. 4.3), we can consider situations where the trade balance is not zero due to international movements of capital:

$$TB = X(Y_N, 1/p) - pM(Y_S, p) \quad (4.3)$$

As demonstrated in Appendix A, the following dynamic restriction expresses the modified Prebisch-Singer Thesis when neither the level, nor the change in the trade balance (TB), is preset to be zero:

$$\frac{\hat{TB}}{\frac{pM}{TB}(\eta_S + \eta_N - 1) + \eta_S} + \frac{e_N g_S \frac{pM}{TB} - e_S g_N \frac{E}{TB}}{\frac{pM}{TB}(\eta_S + \eta_N - 1) + \eta_S} = \hat{p} \quad (4.7)$$

where, as before,  $e$  is the income elasticity,  $\eta$  is the price elasticity of demand for exports, and  $\eta_S + \eta_N > 1$  is the Marshall-Lerner stability condition. Eq. (4.7) is thus the generalized form of Eq. (4.6), or the generalized PST, without restrictions placed on the trade balance.

Eq. (4.7) may be interpreted, to begin with, for the case where there is no initial trade balance.

(i) If  $\hat{TB} = 0$ , that is, when the trade balance is constant but not necessarily zero, and  $\hat{p} = 0$ , then if the South starts with a trade surplus,  $g_S$  could equal  $g_N$  even if  $e_S < e_N$ .

In other words, an initial Southern trade surplus makes uneven growth less likely. In contrast, an initial trade deficit or balance for the South implies that the South will grow slower than the North, with the deficit reinforcing uneven development.

(ii) If  $\hat{TB} = 0$  in the steady-state such that  $g_S = g_N$ , then if the South starts with an initial trade surplus,  $\hat{p}$  might decline (or the Southern terms of trade might improve) even if  $e_S < e_N$ . Thus, an initial Southern trade surplus makes terms-of-trade deterioration for the South less likely. On the other hand, an initial Southern trade deficit or balance leads to a deterioration in the South's terms of trade.

In summary, given a constant trade balance over time, the original predictions of Prebisch-Singer hypothesis apply as long as the South begins with an initial trade deficit or balance. In the case of an initial trade surplus, the predictions depend on whether the opposing effect of this trade surplus exceeds the effect of elasticity differentials or not.

Let us consider the case where the trade balance varies over time.

(i) If the trend change in trade balance is positive, that is  $\hat{TB} > 0$ , and  $\hat{p} = 0$ , then there will be growth divergence as long as the South starts with a trade balance or deficit. Again, an initial Southern trade surplus would make the result ambiguous. In the contrary case of a negative trend in trade balance and  $\hat{p} = 0$ , we obtain  $\frac{e_N}{e_S} \frac{pM}{E} > \frac{g_N}{g_S}$ , which means that growth rates do not necessarily diverge.

(ii) If  $\hat{TB} > 0$  in the steady-state such that  $g_S = g_N$ , then the Southern terms of trade will deteriorate as long as the initial trade balance is negative or zero. However, in the case of a substantial initial trade surplus, there appears the possibility that the terms of trade might improve. On the other hand, if  $\hat{TB} < 0$  in the steady-state, the resulting effect on  $\hat{p}$  depends on whether the negative effect of  $\hat{TB}$  outweighs the positive effect of income-elasticity difference and the initial trade deficit/balance. An initial trade surplus would weaken the positive impact from income-elasticities and would therefore make the decline in  $\hat{p}$  (or the improvement in Southern terms of trade) more likely.

In short, a positive trend in trade balance reinforces the original PST predictions. As long as the initial trade balance is zero or negative, a positive trend in Southern trade balance results in either growth divergence between the North and the South and/or a terms-of-trade deterioration for the South. Moreover, a negative trend in Southern trade

balance, together with an initial trade surplus, might yield ambiguous results but does not exclude the original PST predictions.

#### **4.3.1 A Structuralist Extension of the PST: A Three-Region North-South Model**

As the literature review in Chapter 2 has demonstrated, there has been a vast body of literature on economic modeling of the North-South interactions. The new theories of international trade have greatly formalized and illustrated a range of implicit ideas contained within the propositions of structuralist school of thought, such as the presence of technological gaps and the existence of ‘external economies.’ However, a drawback of this new generation of models has been the neglect of some of the crucial insights of the structuralist theories, such as asymmetries in productive structures, external balance constraints, and asymmetric trade patterns.

In order to bring these mechanisms of uneven development back into the technology-gap models, and therefore form a more complete formulation of the North-South interactions, Botta (2009) has incorporated crucial aspects of structuralist formulations into a model where differences in the levels of technology, as well as industrial policies and institutional changes, play a crucial role in giving rise to uneven development. This section will provide an overview of the model, illustrating its relevance for the North-South patterns of growth divergence, terms-of-trade movements, and possibilities of ‘catching-up’ with the developed North. The model is fully-compatible with the PST and can be thought of as a *closure* of PST. It is a two-region North-South model, but it can also be used to demonstrate the emergence of a third semi-industrialized region under the provision of protectionist measures that are temporary and conditional to the achievement of performance criteria. Kaldorian “cumulative causation”

mechanisms play an important role in eliminating both demand-side and supply-side bottlenecks during this process.

This section will also consider the impact of the third region on the persistence of a North-South divide. While Botta assumes the emergence of one of the three conditions, (divergence, convergence, or initial convergence with long-run divergence), one can use the model to describe the emergence of partial convergence of the South (due to differentiation within the South) accompanied by and partly leading to the sustained persistence of growth divergence between the North and the rest of the South. The driving force in the model is the increasing importance and share of manufacturing activities within the total GDP—which acts as an indicator of structural change. However, Botta implicitly assumes that the manufacturing experience of one part of the developing world is independent from those in other parts. This leaves out the possibility of exports from faster growing developing country that “crowd out” their competitors from the global markets, i.e. it assumes the absence of the fallacy of composition effects.<sup>28</sup> Yet, it is possible to consider these effects in order to see their impact on the long-run growth dynamics of other countries whose structural transformation takes place at a slower pace.

Let us first begin by assuming two regions, a developing South and a developed North. Suppose that the productive regimes of these regions take the following form:

$$q_{nt} = r + \alpha_n h_{nt-1} \tag{4.8}$$

$$q_{st} = r + \alpha_s h_{st-1} \tag{4.9}$$

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<sup>28</sup> For empirical evidence on these effects, see Blecker and Razmi (2008).

In Equations (4.8) and (4.9),  $q_{st}(q_{nt})$  and  $h_{st}(h_{nt})$  are the rates of growth for labor productivity and for the share of manufacturing in GDP of the South (North).

Industrialization produces positive effects on labor productivity as a result of the increasing returns in manufacturing and technological spillovers from the manufacturing sector to the rest of the economy. This formulation is widely-known as the Kaldor-Verdoon law, reflecting the original perspective of Kaldor on the positive relationship between the growth rate of labor productivity and the “excess of the rate of growth of manufacturing production over the rate of growth of the economy as a whole” (Kaldor, 1967:8, quoted from Botta 2009: 63). This productivity-enhancing property of manufacturing can also be traced back to Adam Smith and other classical political economists, and it is strongly supported by empirical evidence (UNCTAD 2003a, Greenwald and Stiglitz 2006).

Following the structuralist tradition, the mark-up rate is assumed to be constant, which allows the price-setting to be represented in the following terms:

$$\begin{aligned} p_{nt} &= w_{nt} - q_{nt} \\ w_{nt} &= r + \rho_n \alpha_n h_{nt-1} \end{aligned} \tag{4.10}$$

$$\begin{aligned} p_{st} &= w_{st} - q_{st} \\ w_{st} &= r + \rho_s \alpha_s h_{st-1} \end{aligned} \tag{4.11}$$

According to (4.10) and (4.11), the price inflation  $p_{st}(p_{nt})$  is defined as the difference between the monetary wage inflation  $w_{st}(w_{nt})$  and the labor productivity growth rate in the South (North). The monetary wage deflation is determined by the sum of the exogenous component of the growth in labor productivity ( $r$ ) and a portion of the endogenous component, where, the parameters  $\rho_s$  and  $\rho_n$  are institutional factors that



influence the degree of productivity growth that is transferred to the nominal wage inflation.

A binding external constraint to growth is imposed based on the existence of trade balance in the long-run. In dynamic terms, this yields:

$$p_{st} + x_{st} = p_{nt} + m_{st} \quad (4.12)$$

$$x_{st} = \eta_s (p_{nt} - p_{st}) + e_s g_{nt} \quad (4.13)$$

$$m_{st} = \eta_n (p_{st} - p_{nt}) + e_n g_{st} \quad (4.14)$$

Equations (4.13) and (4.14) express trade equations: The growth rate of exports (imports) in the South  $x_{st}$  ( $m_{st}$ ) is a function of the growth rate of relative price differences and of income in the North (South)  $g_{nt}$  ( $g_{st}$ ). Price and income elasticities are represented by the  $\eta$ 's and  $e$ 's.

Income growth in the South under the trade balance constraint can be derived by substituting Eqs. (4.8)– (4.11), (4.13) and (4.14) in (4.12):

$$g_{st} = \frac{(\eta_s + \eta_n - 1)}{e_n} [(w_{nt} - w_{st}) + \alpha_s h_{st-1} - \alpha_n h_{nt-1}] + \frac{e_s}{e_n} g_{nt} \quad (4.15)$$

This expression can be simplified through a few additional assumptions:

(i) If the developed countries are the engines of growth in the world economy (Taylor 1983, Findlay 1981), the Northern income growth and productive structure can be

assumed to be exogenous and constant over time, that is  $g_{nt} = g_n$  and  $h_{nt} = 0$ .

(ii) The rate of growth of the manufacturing GDP share in the South is positively related to the economic growth,  $g_{st}$ .

$$h_{st} = \sigma^t g_{st}, \text{ and } 0 \leq \sigma < 1 \quad (4.16)$$

Income growth in the South tends to shift consumers' preferences towards industrial goods, and thus stimulates the growth of manufacturing share. On the supply side, income growth generates a larger and fast-growing domestic market that sustains manufacturing industries with economies of scale. Parameter  $\sigma$  is a policy variable that captures the feedback from domestic institutions to industrialization in the South. While high-values of  $\sigma$  represent protectionist policies and favor expanding the manufacturing growth rate as a share of GDP, low values of  $\sigma$  stand for a 'market-friendly' institutional environment that impedes infant-industry protection. Needless to say, the development strategies represented by  $\sigma$  exert a great impact on the emergence of the different North-South growth paths.

(iii) Incorporating insights from the technology-gap literature (Verspagen 1993, and others), the pattern of exports are assumed to change through technological factors such as learning-by-doing, innovation, and technological spillovers from developed countries. Thus, the income elasticity of exports (imports)  $e_{st}$  ( $e_{nt}$ ) is positively (negatively) related to the domestic share of manufacturing in GDP and negatively (positively) related to "technological content":

$$e_{nt} = \frac{2e^*}{1 + e^{[\ln(H_{st}/H_n)]/\phi}} \quad \text{with} \quad \frac{\partial e_{nt}}{\partial (H_{st}/H_n)} < 0 \quad \text{and} \quad \frac{\partial e_{nt}}{\partial \phi} < 0 \quad (4.17a)$$

$$e_{st} = \frac{2e^*}{1 + e^{-[\ln(H_{st}/H_n)]/\phi}} \quad \text{with} \quad \frac{\partial e_{st}}{\partial (H_{st}/H_n)} > 0 \quad \text{and} \quad \frac{\partial e_{st}}{\partial \phi} > 0 \quad (4.17b)$$

where  $H_{st}$  ( $H_{nt}$ ) is the level of the share of manufacturing in the South's (North's) GDP;

$e^*$  is a uniform level of income elasticity if the regions had identical productive

structures; and  $\phi$  is a technological parameter that captures the “technological content” of industrialization in the South.

One of the central properties of the model is that the process of industrialization leads to diversification of the productive pattern and thereby changes the composition of export and import flows. Equation (4.17a) shows that development of the manufacturing sector within the South lowers the income elasticity of imports as the South becomes capable of producing substitutes for imported goods. At the same time, Southern industrialization diversifies the set of domestic exportable goods, and thereby increases the income elasticity of exports (Leon-Ledesma 2002, Botta 2009).

Higher values of the technological parameter  $\phi$  indicate a rise in the non-price competitiveness of the Southern goods. This results in an increase of Southern exports and a decline of Southern imports. With the growth of Northern income, this means the South has a higher income elasticity of exports and a lower one for imports. The evolution of income elasticities is illustrated in Figure 4.1.

Equation (4.15) can be rewritten based on the assumptions (i)–(iii):

$$g_{st} = (1 - \rho_s) \frac{\alpha_s (\beta_s + \beta_n - 1)}{e_{st}} \sigma^{(t-1)} g_{st-1} + \frac{e_{nt}}{e_{st}} g_n \quad (4.18)$$

where  $0 < \alpha_s (\beta_s + \beta_n - 1) < 1$  and  $e_{st} \geq 1$ .

In Equation (4.18), industrialization generates economic growth through Eqs. (4.9), (4.17a) and (4.17b). First, the lagged rise in the share of manufacturing in GDP increases labor productivity, and therefore the price competitiveness of Southern goods, as shown by the Kaldor-Verdoon law in Eq. (4.9). Note that the terms of trade of the South would deteriorate during this process, as the rising productivity leads to lower

relative prices of Southern tradable goods. Second, the increasing level of Southern industrialization modifies the North-South trade pattern and reduces the gap in income elasticities. Both of these effects tend to relax the external balance constraint and stimulate the Southern growth to gain a faster pace.

The long-run dynamics of the model are obtained through a Kaldorian cumulative causation process between industrialization and growth. Equation (4.19), whose derivation is provided in Botta (2009: 67-8), represents these dynamics as follows:

$$g_{st} = [\alpha_s(1 - \rho_s)(\eta_s + \eta_n - 1)]^t \prod_{i=1}^t \frac{\sigma^{(i-1)}}{e_{ni}} g_{so} + \left[ \alpha_s(1 - \rho_s) \frac{(\eta_s + \eta_n - 1)}{e_{nt}} \sigma^{(t-1)} \right] \{B\} g_n + \frac{e_{st}}{e_{nt}} g_n \rightarrow g_s^*$$

With:  $g_s^* = \frac{e_s^*(H_s^*)}{e_n^*(H_s^*)} g_n$ . (4.19)

In the long-run, the growth of income in the South depends on the growth rate of the Northern income and the long-run income elasticity differential. This is exactly the same condition obtained from the Prebisch-Singer hypothesis under the conditions that the terms of trade remain constant over time and the balance of trade holds. Interestingly though, this extended dynamic model allows us to conceive the income elasticity differential as a function of the relative share of manufacturing sectors in the South vis-à-vis the North. Note also that the long-run equilibrium is “path-dependent” and “endogenous” to the process of industrialization, i.e. different initial conditions or temporary shocks generate permanent impacts on industrial development.

Two distinct outcomes emerge from Eq. (4.19) in the long-run. First, if the South accomplishes structural transformation so that its share of manufacturing GDP converges to that of the North ( $H_s^* = H_n$ ), the South will grow at the same pace as the North in the

long-run ( $g_s^* = g_n$ ). Second, the failure of the South to transform itself sustains the differential in relative manufacturing ratios as a share of GDP ( $H_s^* < H_n$ ), resulting in North-South divergence in the long-run ( $g_s^* < g_n$ ). To be precise, the author also considers a third dynamic outcome, which is composed of a temporary convergence that is replaced by a long-run divergence due to the failure to upgrade technologically.

Instead of considering these outcomes one at a time as multiple paths of North-South growth, one might think of them as simultaneous paths corresponding to different types of Southern countries, based on their pace of structural change and previous manufacturing experiences. The case of a “high-quality” industrialization process for one country in the South, say for the major exporters of manufactured goods, can take place simultaneously with the case of a “failed industrialization attempt” for the rest of Southern countries that rely mostly on primary production. The model, therefore, not only accommodates the presence of “differentiation within the South,” but explains the emergence of a third region that successfully transforms itself during the Kaldorian traverse. This third region develops its manufacturing sector vigorously with its selective industrial policies (high values of  $\sigma$ ), rising productive efficiency (high values of  $\alpha_s$ ) and upgrading its domestic industries technologically (high values of  $\phi$ ). Figure 4.2a provides a depiction of this growth-enhancing manufacturing process.

The development of the third-region might indeed make it more difficult for the rest of the developing countries to industrialize. This ‘fallacy of composition’ effect operates through both the demand-side and supply-side factors. As to the demand-side factors, economic growth in the developed countries may increase the market share of the manufactured goods produced by fast-developing countries by shifting consumers’

preferences towards the superior-quality and cheaper industrial goods produced by leading exporters of manufactures. As to the supply-side factors, the excess supply of labor in the faster-growing region gets more quickly depleted, and the pressure to introduce technological innovations increases. In the lagging regions, on the other hand, the large reserve of surplus labor creates a greater incentive to rely on cheaper labor inputs and reduces the rate of technological upgrading. Although price competitiveness might trigger initial convergence, it fades out without rising levels of productive efficiency and attaining higher levels of technological content. The failed industrialization attempts might also be due to the “trade-off between too-high and generalized protectionist measures and poor incentives to pursue efficiency and innovation” (Botta 2009: 69). Thus, a high level of  $\sigma$ , together with low values for  $\alpha_s$  and  $\phi$ , might produce sustained uneven development for the majority of the South vis-à-vis the North. These dynamics are shown in Figure 4.2b.

Sustained uneven development can also occur when the industrial policy variable  $\sigma$  is set to zero under an extreme “market-friendly” setting. The neoliberal paradigm that predicates privatization, liberalization, trade openness and abandonment of discretionary industrial policies can be depicted in Figure 4.2, where Eq. (4.18) does not move at all since domestic industrialization does not take place ( $\sigma = 0$ ). The original North-South asymmetries in productive and technological structures remain intact, and the income-elasticity differential reproduces the original North-South growth divergence. In fact, several developing countries experienced *deindustrialization* after following the neoliberal recipes dictated by international lending institutions. In this model, this would correspond to a declining manufacturing GDP share that would lower the export-import

elasticity ratio even further and widen the divergence between these developing countries and the North.

#### **4.4 An Empirical Analysis of the PST**

##### **4.4.1 Data Sample and Classification**

This section examines the evolution of the income elasticity of demand for imports ( $e_n$ ) and exports ( $e_s$ ) using an unbalanced panel data set composed of 51 developing countries over 1960-2006: 11 major exporters of manufactured goods, 4 major exporters of petroleum and 36 primary commodity exporters, out of which 15 are highly indebted poor countries (HIPCs). The sample is fairly comprehensive and aimed to be representative of certain types of international specialization among developing countries. It includes the leading exporters of manufactures (China, Hong Kong, India, Indonesia, Korea, Malaysia, Brazil, Mexico, Thailand, Turkey, and the Philippines) and a few petroleum exporting developing countries (Congo Republic, Iran, Nigeria, and Syria). While manufactured exports play a central role in the pattern of specialization of the first group, the exports of the second group are dominated by petroleum and other petroleum-based products. The group of primary exporters can be separated into two sub-groups: first 15 countries that have accumulated a large share of debt to GDP (Benin, Bolivia, Cameroon, Central African Republic, Chad, Cote d'Ivoire, Ethiopia, Honduras, Madagascar, Malawi, Mali, Nicaragua, Rwanda, Senegal, and Togo), then 21 countries with lower ratios of debt to GDP (Bangladesh, Barbados, Chile, Colombia, Costa Rica, Ecuador, Egypt, El Salvador, Guatemala, Jamaica, Jordan, Kenya, Mauritius, Morocco, Pakistan, Panama, Paraguay, Peru, South Africa, Tunisia, and Uruguay). Note that the

former group tends to have a less diversified export structure with greater dependence on primary commodities than the latter group in general. In total, the sample considers a sufficiently heterogeneous group of countries whose patterns of specialization represent the major patterns that can be found in developing economies.

#### 4.4.2 Income Elasticity Differentials

First, different panel data techniques are used to estimate the income elasticity of demand for imports based on the following equations:

$$m_{it} = a_i + e_n y_{it} + \eta_n pm_{it} + u_{it} \quad (4.20)$$

where  $m$  is the log of imports in real terms,  $a_i$  is the country-specific effect (using panel data),  $y$  is the log of real domestic income,  $pm$  is the log of import prices relative to domestic substitutes, and  $u$  is a white noise error term.

Assuming that the adjustment of import demand to changes in prices and income is not instantaneous, we present a dynamic specification for estimation:

$$m_{it} = \alpha_i + e_n y_{it} + \eta_n pm_{it} + \delta_n m_{it-1} + \mu_{it} \quad (4.21)$$

where  $m_{it-1}$  is the log of lagged real imports and  $\mu$  is a white noise error term. This specification allows us to distinguish short and long run elasticities. The short run price and income elasticities are  $\eta_n$  and  $e_n$  respectively; whereas the long run elasticities are  $\eta_n / (1 - \delta_n)$  and  $e_n / (1 - \delta_n)$ . The estimates for these coefficients are presented in Table 4.1 and Figure 4.3.

Similarly, we can estimate the income elasticity of demand for exports using the following equations:

$$x_{it} = b_i + e_s z_{it} + \eta_s px_{it} + \omega_{it} \quad (4.22)$$



where  $x$  is the log of exports in real terms,  $b_i$  is the country-specific effect,  $z$  is the log of real foreign income,  $px$  is the log of relative export prices, and  $\omega$  is a white noise error term. Including a lagged dependent variable ( $x_{it-1}$ ), the dynamic specification would be of the form:

$$x_{it} = b_i + e_s z_{it} + \eta_s px_{it} + \delta_s x_{it-1} + \gamma_{it} \quad (4.23)$$

Rolling regressions<sup>29</sup> are used to estimate the income elasticity of demand for exports and imports of the total sample of developing countries from 1960-2006. The results are presented in Figure 4.3.

It can be seen from Figure 4.3 that the elasticity of demand for exports was significantly lower than import elasticity for the whole set of developing countries. Three points are worth emphasizing in this regard:

- (i) The evolution of income elasticity for imports exhibits two peaks in the 1970s and 1990s and a sharp trough in the 1980s.<sup>30</sup> Export elasticity follows a similar trend, but with a considerable time lag of one or two decades.
- (ii) Income-elasticity differential persists over time. It shows a decline in the late 1970s and early 1980s with the implementation of trade liberalization and the initial tendency for the export demand to respond faster to currency devaluations. However, this initial positive effect is reversed with subsequent currency overvaluation and insufficient levels of technological upgrading.
- (iii) There has been an upturn in income elasticities in the recent period, 1996-2005, corresponding to an upturn in terms of trade for several primary commodity producers

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<sup>29</sup> Rolling regressions for demonstrating the evolutions of elasticities have been used by other studies including Cimoli *et al.* (2010) and Pacheco-Lopez and Thirlwall (2006).

<sup>30</sup> This is similar to the findings for Latin American countries (Cimoli *et al.* 2010: 393-4).

due to rising demand for raw materials and industrial inputs from China and India. This has increased their purchasing power of exports, and thus might have been reflected in the upward trends for income elasticities of imports and exports.

Table 4.1 presents the results obtained by estimating  $e_n$  (the coefficient of variable  $y$ ) for the whole sample using three different estimation techniques. The first is the fixed effects estimator which includes dummy variables to account for individual country-specific effects. The second is the dynamic panel data model based on generalized methods of moments (GMM) that controls for the endogeneity of other explanatory variables. The third is a cointegration technique based on dynamic OLS estimation performed with one lead and one lagged differenced dependent variable, hence the term DOLS (-1, 1).

It can be seen from Table 4.1 that the estimated income elasticities are consistent across different estimation techniques. The long-run income elasticity for imports is found 1.15 and 1.29 by using the dynamic fixed effects estimator and the GMM model respectively. The results from the static fixed effects model and the DOLS model are similar as well, with 1.11 and 1.12 respectively. Moreover, the estimates for price elasticities are very low, which resembles to the findings of other research papers (Santos-Paulino and Thirlwall 2004, Perraton 2004) and contradicts the small country assumption of traditional trade theory.

Table 4.2 shows the estimation results from fitting Eqs. (4.22) and (4.23) to the data for the whole data set. It is seen that the estimates for income-elasticity of exports are inelastic, ranging from 0.76 to 0.92 depending on the estimation method. Price elasticities of exports are still low, but slightly higher than the import price elasticities.

In summary, Figure 4.3, as well as Tables 4.1 and 4.2, show that income elasticity for exports tended to be less than that for imports for the developing countries in our sample as a whole,<sup>31</sup> and this was, in large part, due to the increases in the elasticity differential in the 1970s and 1990s. However, in order to see the differences among developing countries according to their patterns of specialization it is necessary to consider each specialization group separately and compare the evolution of their elasticity differentials over time.

Figure 4.4 presents the evolution of income elasticities for developing countries whose exports are predominantly composed of manufactured goods, with varying degrees of technological-intensity. The dotted line displays the rising trend in the income elasticity of demand for exports, while the straight line represents the more stagnant trend in import income-elasticity. Two trends stand out in the evolution of income elasticities for major exporters of manufactured goods:

- (i) Income-elasticity of exports exceeded that of imports for sustained periods of time by eliminating the initial difference in the 1960s and then rising steeply again after the decline in the 1980s. This played a large role in relaxing the external constraint on the growth paths of the countries specialized in exporting manufactured goods.
- (ii) Income elasticity of imports for manufacture exporters follows a steady trend through the 1960s and 1970s, declines during the 1980s, then rises again in the 1990s (Figure 4.4). However, since it never reaches very high levels as a share of export elasticity, it never poses a serious constraint on balance of payments and growth.

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<sup>31</sup> The preliminary estimation results from aggregated data shows similar results (see Appendix C). For the majority of developing countries that are non-major exporters of manufactures and oil, the export to import elasticity ratio is less than 1. The elasticity differential is greater than 1 for major exporters of manufactures and oil.

The evolution of income elasticities for the developing countries specializing in primary commodity production can be seen from Figure 4.5. Except for a short period of time between the late 1970s and early 1980s, the export income-elasticity lies below the income elasticity for imports. It is also observed that during the period following trade liberalization, both elasticities significantly rose; however, the impact on import elasticity is much more profound keeping the gap wide open in the 1990s. There are some signs of convergence in the more recent period due to the recent increase in commodity prices. Note that the latest available date is 2006, therefore, the collapse of primary commodity prices in 2008-9 is not reflected within this data set.

In comparison to the broad group of primary exporters, highly indebted poor countries (HIPCs) have a larger discrepancy between income-elasticity of imports and that of exports, again with peaks in the 1970s and 1990s. The greater instability of elasticity differentials is another indicator of a low degree of diversification in the HIPCs compared to the primary commodity exporting developing countries. This makes it more difficult for them to adjust to changes in the international economy and tends to create major disruptions in their pattern of specialization.

#### **4.4.3 Elasticity Differentials, Terms of Trade, and Relative Growth Rates**

The next objective is to evaluate these elasticity differential trends in view of changes in the terms of trade and relative growth rates. The evolution of terms of trade in our sample is presented in Figure 4.7. It is fairly analogous to the terms-of-trade trends for non-oil developing countries that we analyzed in the previous chapter.

The median, as well as the mean, of net barter terms of trade indices across developing countries in our sample exhibit a slightly rising trend until the mid- to late-

1970s, followed by a steep decline after the late 1970s. This pattern confirms our previous findings from aggregated terms of trade indices for non-oil exporting developing countries.

Table 4.3 presents the income elasticity ratios, growth rates of income, trends in terms of trade, and trade balance growth rates for the different groups of developing countries from 1960 to 2006. For all 51 developing countries in our sample, the ratio of export to import elasticity is estimated to be 0.66, which is less than 1 as we expected. Only for the major exporters of manufactured goods (11 out of 51) is the elasticity ratio greater than 1. The ratio is 0.55 for exporters of primary commodities, 0.36 for the highly indebted poor countries, and 0.92 for petroleum exporters. This finding suggests that countries specialized in primary commodities—whether agricultural products or petroleum—experience a tendency for their export demand to grow at lower rates compared to those specialized in manufactured exports. Following the literature on growth and structural change, the income elasticity ratio is a function of the pattern of specialization and thus a country’s “supply characteristics” (McCombie 1997: 346). In the North-South model developed by Botta (2009), we have shown that the income-elasticity of exports (imports) responds positively (negatively) to higher shares of manufacturing in GDP, thus lowering the export-import elasticity ratio.

A periodical comparison across groups of developing countries from Table 4.3 allows us to trace different phases of economic growth across these developing countries. These phases, in turn, are related to shifts in economic policy. First, during the 1960s developing economies grew at relatively high rates around 5 percent per annum.<sup>32</sup> This was, however, not sufficient to prevent growth divergence from the rest of the world

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<sup>32</sup> Note that this is total GDP growth and not GDP per capita.

which was growing at an annual rate of 5.39 percent. Terms of trade for the entire set of developing countries improved until the first oil shock of 1973. The rise in their relative prices of exports before the oil shock resulted in higher export earnings since the majority of the goods exported from developing countries were income-inelastic during this period. The higher rate of growth of exports ensured a positive trend in trade balance, which reinforces the PST's joint predictions on growth divergence and/or terms of trade deterioration given the unfavorable elasticity-ratio as we have shown in the previous sections. Essentially due to the strong import demand from developed countries, the terms of trade did not deteriorate, but improved instead. The growth divergence, however, was not avoided due to the BOP-constrained growth dynamics and the positive trend in trade balance.

Second, these growth dynamics of the 1960s were not universal. Despite unfavorable elasticity-ratios and trade balance trends, major exporters of manufactures were able to increase their relative growth rates vis-à-vis the rest of the world, while the primary commodity exporters, HICs, and petroleum-exporters were confined to divergent growth. However, all groupings experienced slightly rising terms of trade throughout the 1960s. The positive trend was very low in the case of petroleum exporters, while it was 0.54 percent per annum for primary commodity exporters and 0.35 percent per annum for major exporters of manufactures.

Third, the growth and terms of trade dynamics were reversed during the 1970s. While developing countries continued to grow at a rather fast annual rate of 5.46 percent, the rest of the world grew at much slower rates around 3.26 per cent—allowing an opportunity for developing countries to partially catch-up. However, a comparison of

GDP per capita growth rates shows an absence of catching up due to much higher rates of population growth within the developing world. Indeed, the 1970s represent the end of the golden age of prosperity of the previous period through two major external shocks. The first one comprised of the oil crises of 1973 and 1979, which not only adversely affected the terms of trade (of both the North and the non-oil exporting South), but also caused price hikes and persistent inflation worldwide. The price stabilization attempts in the North took the form of monetarism. Rising interest rates at the end of 1970s—as a result of actions taken by the US treasury to tighten the money supply and to control for inflation—was the second shock with rather harsh consequences for developing countries. Many of them experienced severe debt problems due to the skyrocketing cost of borrowing. Moreover, the non-oil commodity prices collapsed during the 1980s, which made the debt crisis far worse for most of the developing countries. In all, the two oil price shocks, the abrupt rise in world interest rates at the end of 1970s, and the adverse trend in non-oil exporters' terms of trade initiated the debt crisis of the 1980s, which prepared the conditions for the IMF and World Bank interventions.

Fourth, during the 1980s there was a sharp decline in the growth rates of developing countries, in both absolute and relative terms. The domestic growth rate fell from 5.46 percent to 3.04 percent annually, and the relative growth ratio declined by almost half, from 1.67 to 0.88. Developing countries were paying the debt accumulated during the 1970s by means of a sharp contraction in growth, particularly in the investment rate. The deterioration of the terms of trade for all the developing countries in our sample worsened from -0.03 to -1.60 percent per annum. Even the exporters of petroleum suffered from a downturn in their terms of trade trend from an 8.89 percent

increase during 1971-80 to a 7.81 per cent decline during 1981-90. The trend in trade balance of the entire sample changed from a negative trend of 0.07 percent to a positive trend of 1.76 percent. The change in sign of the trade balance growth rate was due to the widespread “export desperation” (Sarkar 1994) among developing countries that were trying to earn the necessary foreign exchange to service their debt. The trade surpluses that ran during this period corresponded to a simultaneous massive capital outflow, which tended to restrain the rate at which developing countries grew relative to the rest of the world.

Fifth, major exporters of manufactured goods obtained elasticity ratios that were continuously higher than 1 in after the 1970s and recorded relative growth rates that were larger than 1 all through the four decades: 1970s, 1980s, 1990s, and 2000s. The upward adjustments in elasticity ratios reflect changes in their pattern of production towards manufactured goods with expanding international markets. This played an important role in relaxing the balance of payments constraint on the effective growth rates of countries specializing in manufactured exports. However, note that part of the adjustment to rapidly growing net exports (reflected by the positive trend in trade balance) is accomplished through a deterioration in the terms of trade, which lends support once again to the idea that manufactured goods are not immune to falling prices in international trade.

Sixth, during the 1990s the elasticity ratio for all developing countries increased to 0.92, but it remained still below 1. The GDP grew faster than during the previous period, in both absolute and relative terms. However, it is seen that the gap in GDP per capita remained wide open. The terms of trade deteriorated at an annual rate of 0.42 per cent, while the trade balance grew slightly. The growth in the overall trade balance



reflected mainly the better export performance of leading manufacture exporters, whose export growth far exceeded import growth. The primary commodity exporters, on the other hand, exhibited a negative trend in their balance of trade. This provided an opportunity to catch up as long as capital inflows were sustained. However, for several developing countries, the dependency on capital inflows and their high rates of fluctuation resulted in financial crises.

The relative growth patterns of developing countries can be illustrated in Figure 4.8 for the entire sample. This figure plots the convergence rate (the rate of growth of developing countries with respect to the rate of growth for the rest of the world, i.e. domestic/foreign growth rates) against the ratio between the income elasticity of exports and that of imports (export/import elasticity). This allows for the reproduction of the first section of Table 4.3 to discuss the movements in convergence/divergence rates and the BOP-constraint imposed by the elasticity ratio. Four patterns emerging from Figure 4.8 are worth emphasizing:

- (i) In the 1960s, the developing countries were in quadrant C, which represents sustainable divergence; yet the degree of the divergence (measured by the distance with respect to the horizontal line) was not large during this period.
- (ii) In the 1970s, the developing countries moved to quadrant A of sustainable convergence by attaining an elasticity-ratio and a relative growth ratio that is greater than 1. However, the seemingly sustainable growth path proved unstable once the external shocks of interest-rate hike and severe terms of trade deterioration hit the developing countries, pushing them into a balance of payments crisis that then turned into a debt crisis.

(iii) In the 1980s, there was sustainable divergence once again (quadrant C), with the developing countries growing at relatively much lower rates constrained under the unfavorable elasticity ratios. Payments for the debt accumulated during the 1970s contributed to the sharp contraction in growth rates as the developing countries sought ways to simultaneously increase their exports for earning sufficient foreign exchange. As the relative prices of their exports continued to collapse during this period, the fallacy of composition effect reinforced losses from international trade. In all, the unfavorable external shocks of the 1970s were indeed responsible for the “lost decade” of divergence during the 1980s. The uncoordinated policy responses from the IMF and the World Bank only made the situation worse.

(iv) In the 1990s, the developing countries moved to the situation of unsustainable convergence (quadrant B). However, the convergence rate was rather low in this case compared to that of the 1970s, and the elasticity-ratio was less than unitary. Even though the elasticity-ratio might seem quite close to 1, leading one to expect a rather small adverse impact on balance of payments and growth, it is seen from Table 4.3 that the ratio is much lower for the majority of primary commodity exporters (0.77) and higher for the manufacture-exporters (1.21), relative to the overall ratio of 0.92. The rise in the income elasticity ratios between these two groups of developing countries underlines the degree of divergence *within* the South that has been growing since the last few decades.

#### **4.5 Emergence of Immiserizing Growth**

The growth of a country that is experiencing technological progress and/or factor accumulation might increase the supply of its exports and its demand for imports simultaneously. These market forces would generate a deterioration in its terms of trade if

the growing country possesses monopolistic or monopsonistic power in the world markets and the rest of the world grows at a slower pace. If the deterioration in the terms of trade produces a loss of real income greater than the increase in real income due to growth itself, the country will actually be made worse off—immiserized—by growth, a phenomenon referred to as “immiserizing growth”.

#### **4.5.1 Optimal Trade Policy**

The sub-optimal welfare condition of immiserizing growth can be offset by the imposition of an optimal tariff structure. The theory of the optimum tariff follows that “if a country possesses monopolistic or monopsonistic power in world markets, world market prices for its exports and imports will not correspond to the marginal national revenue from exports and marginal national costs of its imports, and asserts that by appropriately chosen export and import duties—taxes on trade—the country can equate the relative prices of goods to domestic producers and consumers with their relative opportunity costs in international trade” (Johnson 1969: 143). In other words, Pareto optimality requires the imposition of taxes on trade that are intended to equate the domestic price ratios facing producers and consumers with the marginal rates of transformation between commodities in international trade if foreign demand or supply is imperfectly elastic.

When several developing countries simultaneously attempt to diversify their exports into commodity markets that face low income-elasticity of demand, their collective actions exert monopoly power on the relative prices of internationally traded goods. They may experience immiserizing growth if the secondary loss from deteriorating terms of trade outweighs the primary gain from the initial growth process.

Since the terms of trade deterioration is essentially as result of possessing monopoly power in world markets and the imperfectly-elastic foreign demand, the restoration of previous welfare levels require the pursuit of an optimal trade policy.

In other words, given that the global South acts in a unified way to pursue an *optimal trade policy* (imposing an export tax and/or import tariff), it can protect itself against immiserizing growth due to terms of trade losses. It is possible to make a case that the South as a whole effectively acted in this way during the post-war era from roughly 1950-1973.<sup>33</sup> Optimal trade policies allowed developing countries as a whole to correct for the tendency of their terms of trade to deteriorate and to achieve higher rates of income per capita compared to the past. Indeed, the terms of trade for non-oil exporters improved during the 1960s and the South was granted enough policy space to pursue industrial policies aimed at import substitution. Although Southern per capita income growth was particularly high during this period, it was not enough to catch-up with the developed economies.

As we have discussed in the previous section, the period of high growth and optimal trade policies came to an end with adverse external shocks in the 1970s. The oil price shocks, the abrupt rise in world interest rates at the end of 1970s, and the adverse trend in terms of trade for non-oil exporters initiated the debt crisis of the 1980s, which prepared the conditions for the intervention of the IMF and the World Bank. With the

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<sup>33</sup> It is true that the optimal trade policies, such as import tariffs, were not a coordinated action of an established institution of developing countries in the way that OPEC functioned. However, given the concerted efforts for industrialization during the 1960s and 1970s and the recognition that import tariffs can be an effective tool for infant industry protection, there was a *unified* action of developing countries towards this direction, i.e. implementing optimal trade policies. Thus, it was not a coordinated effort, but the result of an uncoordinated yet collective action in more or less the same direction.

programs of structural adjustment and stabilization imposed on the indebted developing countries, there was a complete change in the imposition of industrial and trade policies, and the outcome of “immiserizing growth” became the new reality facing the developing world after the 1980s.

#### **4.5.2 Abandonment of Optimal Trade Policy**

First, the “policy space” granted to the developing countries to pursue their own policies of industrialization was put under deliberate constraints. Conventional economic wisdom held that an integrated world economy would close the income gap between the rich and the poor nations. The standard advice to the developing countries was therefore liberalization of trade flows and financial transactions. Being caught up in the midst of debt crisis, the conditionalities of the IMF loans induced the majority of the developing countries to open up their trade and financial systems to the global market. Despite the increased openness across the South during the 1980s, income convergence was far from being realized. The growth rates of per capita income of developing countries decreased substantially during the post-1980 period (much more than the decline of the developed countries’ income growth rates), which resulted in greater income divergence between the developed and developing economies.

Second, trade liberalization meant that the global South could not implement optimal trade policies since every country was considered a single unit with no monopoly power in international trade and therefore faced elastic foreign demand. Arguments for free market policies were backed by the new political economy argument concerning directly-unproductive profit-seeking (DUP) and rent-seeking activities (Bhagwati 1982b, Krueger 1974). The neoliberal ideology served to tie the hands of the state and curtail its

developmental agenda. In the absence of the optimal trade policies, the terms-of-trade moved against the South (excluding the oil exporters) throughout the neoliberal era. The devaluations across the South due to the debt crisis worsened the rate of deterioration.

Third, the North began to retaliate in the 1980s in order to protect its home markets from global competition. The retaliation of the North, through powerful protectionist measures, further immiserized the South since its capacity to respond to the Northern retaliation was significantly undermined. Bhagwati acknowledges this possibility even though he tries to refute every possible argument in support of an import-substituting strategy:

If Brazil successfully exports footwear, for example, and the importing countries invoke market-disruption-related QRs, or frivolous countervailing duty (CVD) retaliation, then Brazil faces a less than perfectly elastic market for footwear, and an optimal tariff (that is, a shift to import-substituting (IS) strategy) *in this sector* is called for. This should justify only selective protection, carefully devised and administered, not a general IS strategy. If, however, this response is feared no matter what is exported, that is, the fear of protectionism is nearly universal in scope, a generalized shift to IS strategy unfortunately would be appropriate (Bhagwati 1988: 41).

The case of universal protection in the developed world certainly justifies a protective response in the form of an optimal tariff at the very least. This policy response, however, was practically prevented from taking place through universal reductions in tariff levels across the South. Moreover, the pursuit of industrial development in the South, with the exception of the East Asian countries, was also severely constrained. Therefore, despite the widespread protectionism in the North, particularly in the export markets of the South such as agricultural commodities and low-skilled manufactures like textiles, the appropriate “generalized shift to IS strategy” has failed to take place.

### **4.5.3 Shifts in Demand and in Production of Partner Country/Region**

Fourth, even if the South were implementing optimal policies before and after growth, it might not have avoided immiseration if the foreign offer curve shifted (due to shifts in demand or in production abroad) sufficiently enough to outweigh the gains from growth. This was the case developed by Melvin (1969). Bhagwati (1969) argued that in this case, the reduction in gains from trade resulting from shifts in the foreign offer curve is the primary cause of immiseration. Therefore, even though optimal policies were followed before and after growth, he argued it would not be possible to escape this kind of immiseration. Interestingly enough, a similar case was emphasized recently by Samuelson (2004), where social welfare of the home country decreases as a result of biased economic growth in the partner country. If an import substitution strategy is followed by the growing partner country, it will produce more of the importable good and therefore import less of it. The reduced demand for the importables will lower its relative price (vis-à-vis exportables). Since the partner country's importables are the home country's exportables, this will amount to a deterioration in the home country's terms of trade. This adverse price shift might cause immiseration in the home country if the losses from reduction in the gains from trade outweigh the primary gain from economic growth.

Samuelson argued that an industrialized country such as the United States could experience such a case of immiserizing growth if its less developed trade partner (e.g. China or India) is rapidly growing by producing the products that it had previously been importing. Therefore, the developing country growth leads to immiserizing growth for the industrialized country. A New York Times article summarized Samuelson's central point saying: "... a low-wage nation that is rapidly improving its technology, like India or

China, has the potential to change the terms of trade with America in fields like call-center services or computer programming in ways that reduce per-capita income in the United States” (Lohr 2004). In general, the possibility of immiserizing growth arises depending on “the types of changes in the production frontier in both countries (import or export biased), demand conditions in both countries, trade policies pursued in both countries, and the relative rates of economic growth in both countries” (Pryor 2007: 212).

Samuelson’s recent discussion of immiserizing growth provoked a response from Bhagwati, Panagariya and Srinivasan (2004), arguing that such immiseration worries in the case of an innovative society such as the United States were unwarranted. First, they try to demonstrate that the job loss from outsourcing is not so great as to cause general unemployment and that new jobs are created also through outsourcing itself. Second, while acknowledging the possibility of immiserizing growth, they “discount and dismiss the possibility of significant terms of trade changes” that might yield immiserizing growth because of their firm belief that the US is capable of generating more high-value jobs and that its foreign competitors will not be able to close the innovation gap with the US. In an interview, Bhagwati argued that the US could change the terms of trade in its favor by moving up the technology ladder, and that he was, therefore, optimistic.<sup>34</sup> Increased investments in science, research, and education would be the policy prescriptions to prevent the type of immiseration suggested by Samuelson. Furthermore, wage insurance programs could be introduced for workers who lose in global competition.

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<sup>34</sup> See Lohr (2004).



#### **4.5.4 Reproduction of the Technology Gap under WTO Rules**

This indeed brings us to our fifth point about the rules of the game in the post-1980 period. The innovation gap between the North and the South is being reproduced under the main WTO agreements from the Uruguay Round (1986-1994). While the agreement on Trade-related Aspects of International Property Rights (TRIPS) directly provides support for intellectual property rights of Western corporations, the agreement on Trade-related Investment Measures (TRIMS) and the General Agreement on Trade in Services (GATS) indirectly serve to keep the innovation gap open, in favor of the already industrialized nations.<sup>35</sup> Under TRIPS, each member state is required to enforce intellectual property rules to protect copyrights, trademarks, industrial designs, data secrets, and patents (on drugs, electronic and mechanical devices, etc.). Although the agreement might seem innocent in treating each member equally, the end result is the creation of rents flowing from the South to the North. In the market for knowledge, the North is a net producer of patentable knowledge, while the South is a net consumer. By increasing the price of patentable knowledge to consumers, TRIPS ensures that the North receives increasing flows of rent from the South (Wade 2003: 624).

Moreover, TRIPS prevents the spread of technological knowledge from the centers of innovation to the periphery of replication. Given that the latter has limited funds and foreign exchange in general, the firms operating in the periphery either use much older technology (which lowers their competitiveness further) or try to reverse-engineer some of the patented products. Reverse-engineering, however, has become much more difficult as the scope of TRIPS covers not only the final product, but every single intermediate products and each stage of production as well. Thus, an argument in

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<sup>35</sup> For a detailed examination of these agreements, see Wade (2003).

support of TRIPS that says “the higher the returns to knowledge generation, the more the North will innovate, and the more the knowledge dissemination to the South will be” does not hold. Even if the North innovates more to receive higher returns of its patents, the dissemination from there to the South is far from being automatic.

In addition to TRIPS, the policy space of developing countries is further constrained by TRIMS, which regulates investment measures. Its central emphasis is “to avoid trade and investment distortions”. Since most of the ‘performance requirements’ on foreign firms, such as local content and export requirements, are interpreted as ‘distortions’, TRIMS prohibits the use them. When a developing country tries to impose such performance requirements, what typically happens is that a complainant from the US or the EU is taken it to the Dispute Settlement Mechanism (DSM), where the developing country certainly loses the case. During the Doha Round in 2001, the US and EU demanded an expansion of the current TRIMS agreement to cover all performance requirements, including technology transfer, joint venturing, etc. However, India and Brazil prevented the approval of these demands (Wade 2003: 627-8).

Complementing TRIMS and TRIPS in tilting the playground against developing countries is the agreement on trade in services, namely GATS. Similar to TRIMS, GATS aims to eliminate any trade and investment distortions, but as it relates to the service trade, which includes banking, education, and tourism. Therefore, GATS prohibits any kind of government interference into service markets, such as regulating multinational companies operating in their service sectors. As a result, it becomes almost impossible for developing countries to protect their own service industries from competition by foreign firms while delivering the necessary public services demanded by the public

(health services, water, sanitation, etc.). GATS secures the interests of foreign firms by deregulating service sectors, even though it might clash with the interests of the general public. Moreover, the promises of increased flows of foreign direct investment (FDI) did not come true as the UNCTAD and World Bank reports confirm (Wade 2003: 629).

To summarize, the post-1980 period brought several changes that enhanced the economic and political power of the North in the world-economy at the expense of immiseration in the South: the narrowing ‘policy space’ prevented the South from pursuing optimal trade policies that could have counteracted the deterioration in its terms of trade; the neoliberal actors in policy-making, both domestic and international, eliminated the effectiveness of the state as a developmental force in pursuing industrial development; the Northern retaliation in the form of increased protection of its own markets against Southern exports turned the terms of trade further against the South and increased its immiseration; and international agreements changed the rules of the game that sustained immiserizing growth in the South by keeping its innovation gap with the North wide open.

#### **4.6 Technological Asymmetries and Elasticity Differentials**

In the extension of PST to a three-region model, we have shown that the elasticity differential is a function of structural change (share of manufacturing in GDP) and technological upgrading. As the productive and technological structure of the economy becomes diversified towards manufactured goods with higher technological content, the income elasticity for imports tends to fall and that for exports tends to increase, closing the gap in elasticity ratios. This convergence scenario, however, is becoming increasingly

difficult under the current WTO agreements due to the difficulties associated with technological upgrading as discussed in the previous section.

This section will examine the evolution of technological asymmetries between the developed and developing countries, as well as its impact on elasticity differentials and growth divergence. Figure 4.9 shows the relative values of exports for developing countries vis-à-vis developed ones in different categories of goods, classified according to their technological intensity. Although all non-oil global markets are still dominated by developed country producers, developing countries have expanded their participation rapidly, especially since the mid-1980s. This was accompanied by a significant shift in the structure of exports by developing countries away from primary commodities towards manufactured goods. The share of developing countries in markets of low-tech, medium-tech, and high-tech manufacture markets have increased, while those of primary commodities and natural-resource based manufactures declined over the period 1962-2003 (Figure 4.9).

This remarkable increase in participation of manufactured exports with higher technological content has been largely due to the efforts of China, plus first-tier and second-tier NICs. The declining share of developing countries in primary commodity markets was due to the rising market penetration of developed countries within these commodity markets by means of relatively high protectionism and subsidization. Since the shares are calculated based on values instead of volume of exports, the divergences in price trends between commodity exports by developed and developing countries could have also played a role in this outcome. Although the general trend for developing countries has been greater diversification of their production structure and increased

participation in global markets, the Asian countries (the NICs, China, and India) have diversified much faster than other regions. The slowest diversification away from primary commodities has taken place in Sub-Saharan Africa.

In order to assess the impact of diversification of productive structure on the evolution of the elasticity differential of developing countries, we will use two indicators of diversification. The first one is the share of developing countries in primary commodity exports, which acts as an indicator of structural change in developing countries with respect to developed ones. Lower shares of primary exports indicate rising shares of manufactured exports, and thus an increasing share of manufacturing in the total output of developing countries relative to developed ones. The second indicator is the share of developing countries in high-tech manufactured exports, which measures the technological intensity of manufactured exports of developing countries relative to developed ones. We expect that higher shares of developing countries in high-tech exports would reduce the income elasticity differential (i.e. increase the export-import elasticity ratio).

Table 4.4 presents the correlation coefficients between the export-import income elasticity ratio (ER), the share of developing countries in high-tech manufactured exports (H) and the share of developing countries in primary commodity exports (P). There is a positive correlation (0.61) between the export-import elasticity ratio and the participation of developing countries in high-tech export markets, which confirms our expectation: higher shares of technological content in manufactures tends to raise export elasticity and lower import elasticity, thus reducing the elasticity differential (i.e. the effect of  $\phi$  on elasticities).

The correlation coefficient between ER and P is negative (-0.32), indicating that the structural change of developing countries away from primary commodity exports tended to increase income-elasticity for exports more than that for imports, which reduces the income elasticity differential between developing and developed countries.

Figure 4.10 displays multiple items. Evolution of the export-import elasticity ratio is shown in a bar chart and uses the left-handed scale, while the percentage share of developing countries in high-tech manufactures and primary exports uses the right-handed scale. The elasticities are estimated using the dynamic fixed effects estimator in rolling regressions with a 10 year window. The shares of high-tech and primary exports correspond to the middle point of these 10 year windows. For example, for the 1960-1969 elasticity ratio, the share of high-tech and primary exports in year 1965 is used.

The positive association between the rising share of developing countries in high-tech exports (therefore falling shares of primary exports) and the rising shares of export-import elasticity ratios are also observed from Figure 4.10.

#### **4.7 Conclusion**

Previous tests of PST have largely ignored the joint predictions arising from the impact of income elasticity differentials on North-South growth divergence and terms of trade movements. They have primarily focused on testing the tendency for relative prices of primary commodities to deteriorate over time—which may or may not be observed depending on a host of factors, including the evolution of elasticity differentials, the changes in relative growth rates of the regions, and the growth rate of the trade surplus/deficit. In other words, the deterioration of terms of trade is *conditional* upon the trends of these interrelated factors.

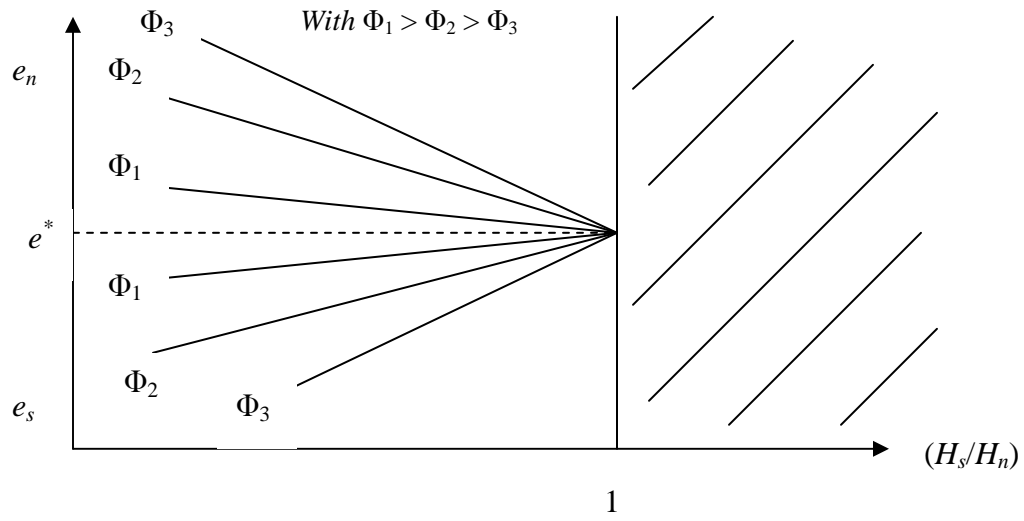
This chapter derived a generalized PST model where both the North-South terms of trade trends and patterns of growth divergence are endogenized within a balance of payments constrained framework. The specialization patterns determine long run outcomes. If the South produces relatively income-inelastic goods, it must face in the long run either slower growth or a deterioration of the terms of trade. If part of the South begins to specialize in relatively more income-elastic goods, by means of industrial policies designed for structural transformation and technological upgrading, there is a possibility of catching-up with the North in terms of achieving high rates of growth. Thus, industrial policy plays a crucial role in the process of successful industrialization, and its absence or mismanagement produces persistent uneven North-South development.

Empirical findings confirm the joint predictions of the generalized PST model. First, income elasticity differential is present for the entire sample of developing countries, as well as subsets of these developing countries, except for the set of major exporters of manufactured goods. The elasticity differential is highest for highly indebted poor countries and also rather high for primary commodity exporters. Second, the simultaneous entry of new producers from the developing world into markets that faced low income elasticities during the mid-to-late 1970s produced a sharp deterioration in the terms of trade for all non-oil exporters, which had negative consequences for their growth performance and overall welfare level. This is the phenomenon of *immiserizing growth*. Third, protectionism of the Northern markets and the resulting retaliation efforts, combined with the imposition of neoliberal policies designed to dismantle the developmental state in the South, were additional factors responsible for the adverse terms of trade movements, along with the divergence of growth paths during neoliberal

globalization. Forth, the comparative evidence shows that countries specialized in exporting manufactures succeeded to eliminate their elasticity-differentials and relax the external constraint on their growth dynamics; whereas the opposite has been the case for those specialized in less income-elastic exports. Fifth, capital flows have not necessarily relaxed the trade balance constraint. Periods of loose monetary policy and significant capital inflows generally followed periods of tight monetary policy and capital flights. These fluctuations in international liquidity and financial transactions often resulted in financial crises taking a large toll on the growth performance of developing countries. Finally, empirical evidence suggests that elasticity differentials of developing countries tend to decline as developing countries increase their share of high-technology manufactured exports and lower their share of primary exports relative to the developed country exports. Despite significant export diversification over the last decades, the share of developing countries in high-technology manufactured exports relative to developed countries is still very low, about 13 percent (see Figure 4.10). Thus, the disparity in technological capabilities between developed and developing countries remains significantly high. Under the current WTO regulations with their novel difficulties for technology transfer, there does not seem to be much scope for eliminating these technological asymmetries and thus for creating a more egalitarian world economy.

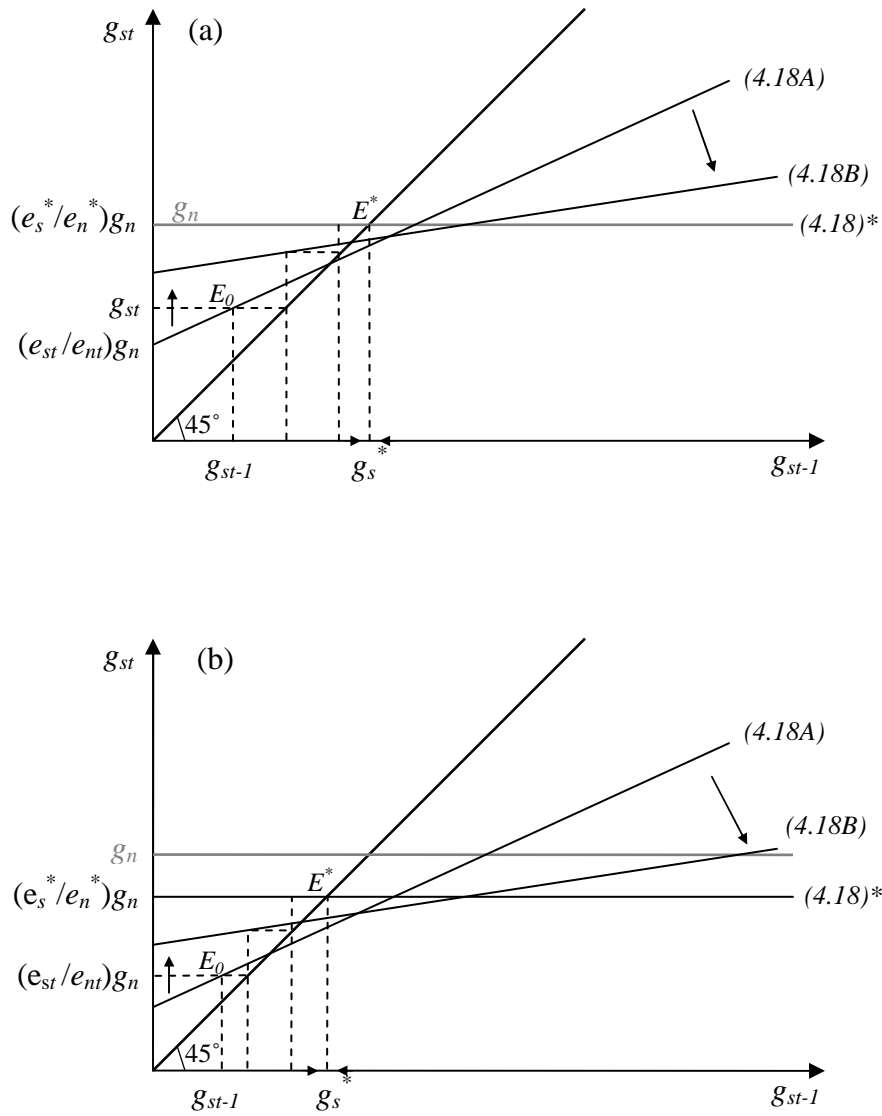


**Figure 4.1** The North-South Import-Export Income Elasticity Pattern



Source: Botta (2009).

**Figure 4.2** Convergence and Divergence Dynamics



(a) Convergence of the third-region to the North: “high quality” industrialization in the South. (b) Divergence between the North and the rest of the South: high price elasticities, but poor technological content of industrialization in the South.

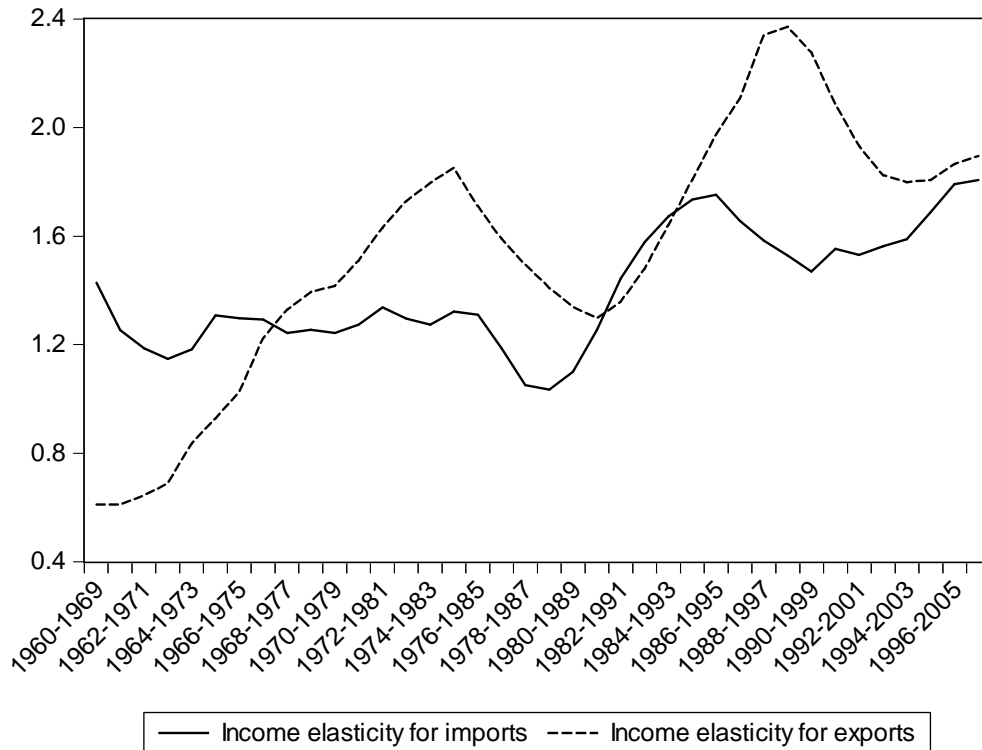
Source: Botta (2009).

**Figure 4.3** The Evolution of the Income Elasticities of Demand for Imports vs. Exports, All Developing Countries, 1960-2006.



Source: Author's estimations. Data sources are presented in Appendix B.

**Figure 4.4** The Evolution of the Income Elasticities of Demand for Imports vs. Exports, Major Exporters of Manufactures, 1960-2006.



Source: Author's estimations. Data sources are presented in Appendix B.

**Figure 4.5** The Evolution of the Income Elasticities of Demand for Imports vs. Exports, Primary Commodity Exporters, 1960-2006.



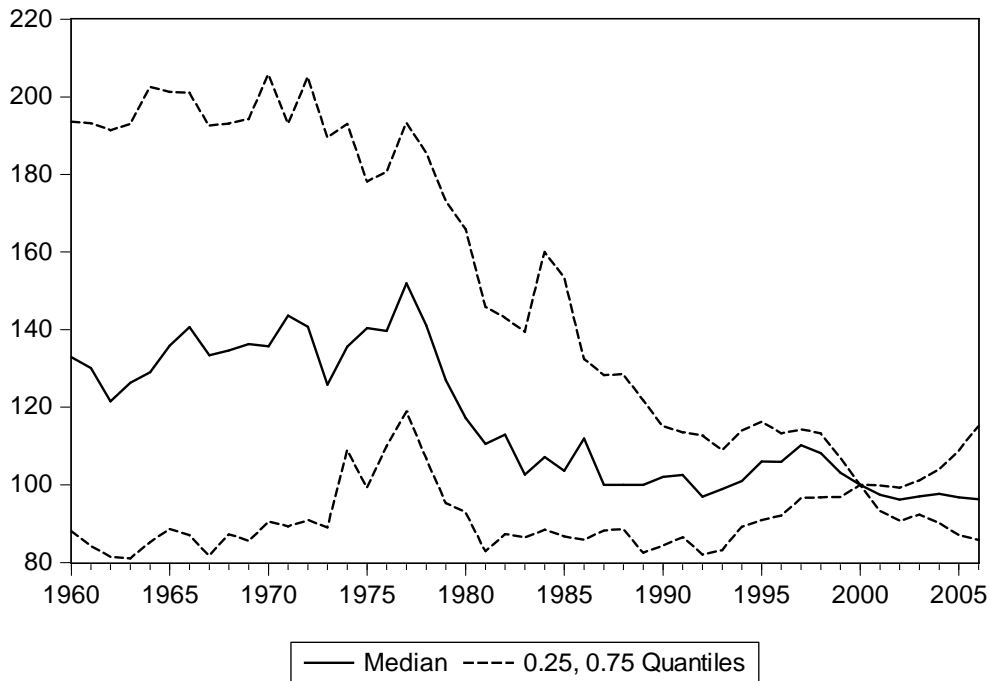
Source: Author's estimations. Data sources are presented in Appendix B.

**Figure 4.6** The Evolution of the Income Elasticities of Demand for Imports vs. Exports, Highly Indebted Poor Countries, 1960-2006.

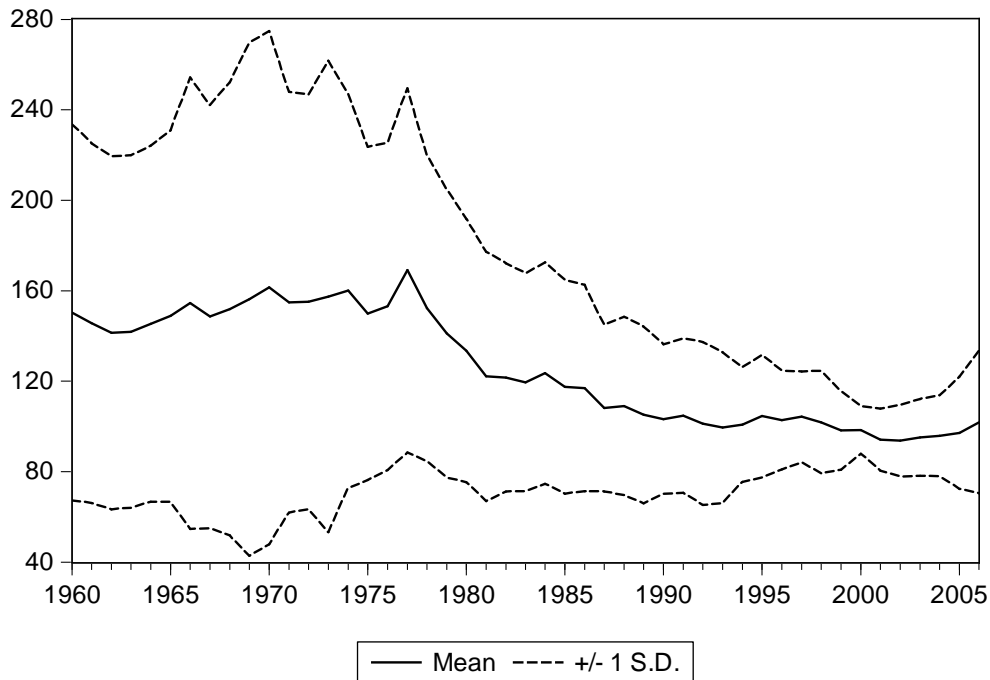


Source: Author's estimations. Data sources are presented in Appendix B.

**Figure 4.7** Evolution of Net Barter Terms of Trade (NBTT) for 51 Developing Countries  
 4.7a. Median and 0.25, 0.75 Quantiles of NBTT (2000=100, Whole Sample)

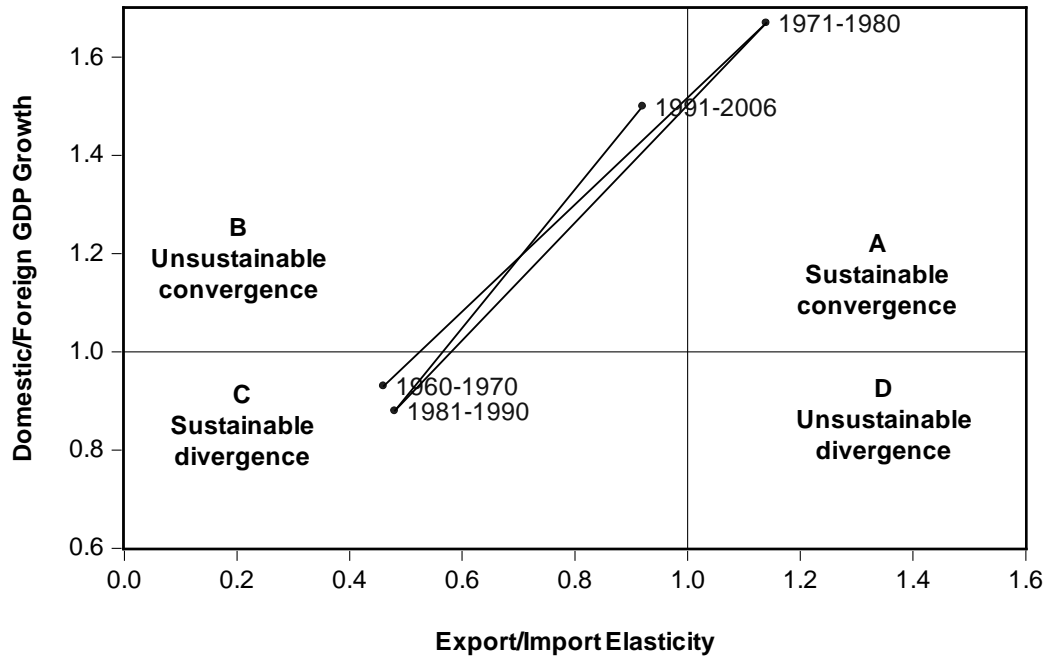


4.7b. Mean and +/- 1 Standard Deviation of NBTT (2000=100, Whole Sample)



Source: Author's calculations.

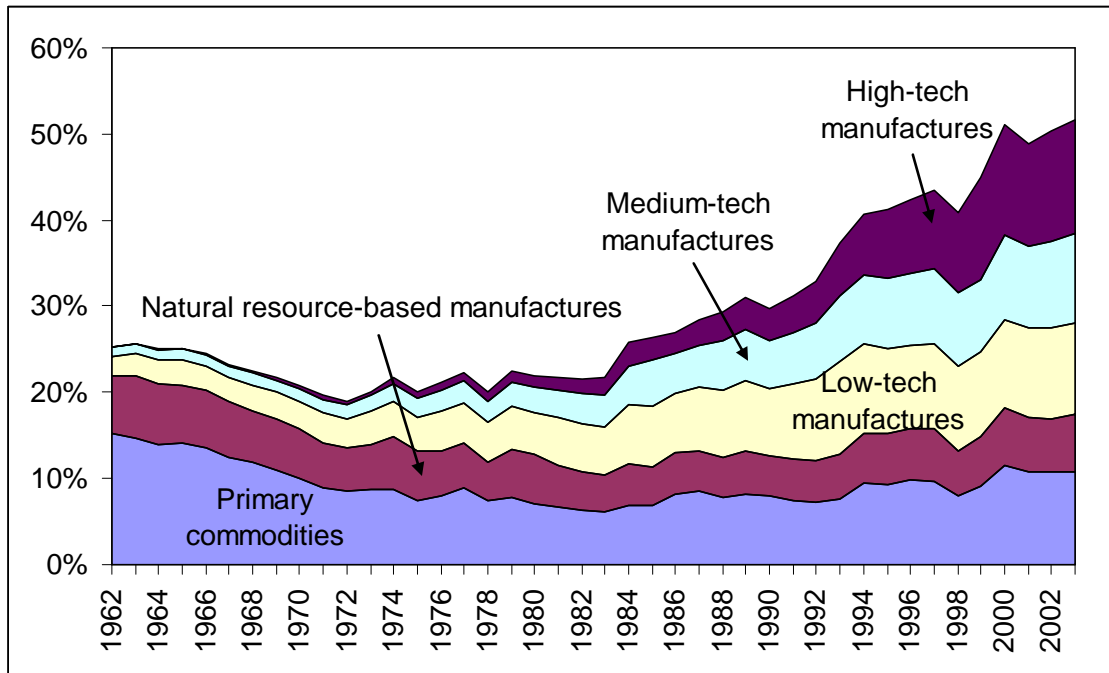
**Figure 4.8** Developing Countries: Sustainable and Unsustainable Convergence



Source: Author's calculations.

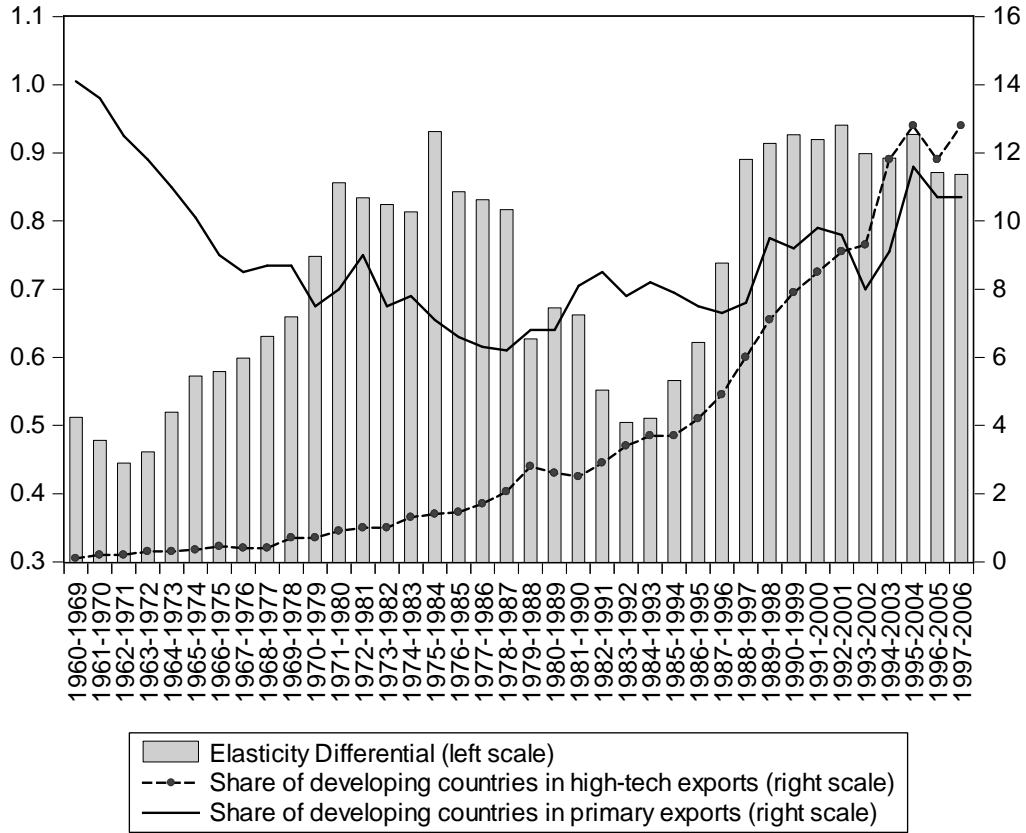


**Figure 4.9** Value of Exports of Developing Countries as a Percentage of the Value of Exports of Developed Countries, by Category of Goods, 1962-2003.



Source: Ocampo and Vos (2008).

**Figure 4.10** Technological Diversification and Elasticity Differential for Developing Countries



Source: Figure 4.9 and Author's calculations.

**Table 4.1** Import Elasticities in Developing Economies (Entire Sample): 1960-2006

	Fixed Effects		GMM	DOLS
	Equation (4.20)	Equation (4.21)	Equation (4.20)	(-1, 1)
Explanatory Variables				
Log of relative prices ( $pm$ )	-0.31*	-0.06*	-0.08 **	-0.33*
Log of domestic income ( $y$ )	1.11**	0.15**	0.27**	1.12**
Lagged log of real imports ( $m_{t-1}$ )		0.87**	0.79**	
Long run income elasticity ( $y_{LR}$ )		1.15	1.29	
Long run price elasticity ( $pm_{LR}$ )		-0.46	-0.38	
Diagnostic Statistics				
R <sup>2</sup>	0.96	0.99		0.96
Hausman test	0.63	18.13**		
Wald test			[0.00]	
Sargan test			[0.00]	
1st -order serial correlation			[0.65]	[0.00]
2nd -order serial correlation			[0.00]	[0.00]
Residual Unit Root Tests				
Im, Pesaran and Shin W-stat				[0.061]
ADF - Fisher chi-square				[0.001]
PP - Fisher chi-square				[0.015]
Number of observations	1843	1821	1770	1735
<p><i>Notes:</i>  ** indicates that a coefficient is significant at the 1% level; * significant at the 5% level, and <sup>§</sup> significant at the 10% level.  Figures in brackets are p-values.  Hausman's chi-square statistic favors the fixed effects estimator over the random effects model. This indicates that there is within group variation in all variables for at least some groups. The Wald test is for the joint significance of the explanatory variables. The Sargan test is for over-identifying restrictions.  All estimations are performed using EViews 7.  Panel data unit root tests and cointegration tests are reported in Appendix B Tables B1 and B2.</p>				

**Table 4.2** Export Elasticities in Developing Economies (Entire Sample): 1960-2006

	Fixed Effects		GMM	DOLS
	Equation (4.22)	Equation (4.23)	Equation (4.22)	(-1, 1)
Explanatory Variables				
Log of relative prices ( $px$ )	-0.42**	-0.11**	-0.17**	-0.43**
Log of domestic income ( $z$ )	0.76**	0.06**	0.11**	0.79**
Lagged log of real imports ( $x_{t-1}$ )		0.92**	0.88**	
Long run income elasticity ( $z_{LR}$ )		0.75	0.92	
Long run price elasticity ( $px_{LR}$ )		-1.38	-1.42	
Diagnostic Statistics				
R <sup>2</sup>	0.94	0.99		0.95
Hausman test	11.62**	177.16**		
Wald test			[0.00]	[0.00]
Sargan test			[0.00]	
1st -order serial correlation		[0.00]	[0.00]	
2nd -order serial correlation				
Residual Unit Root Tests				
Im, Pesaran and Shin W-stat				[0.000]
ADF - Fisher chi-square				[0.000]
PP - Fisher chi-square				[0.000]
Number of observations	2310	2258	2207	2209
<p><i>Notes:</i>  ** indicates that a coefficient is significant at the 1% level; * significant at the 5% level, and § significant at the 10% level.  Figures in brackets are p-values.  Hausman's chi-square statistic favors the fixed effects estimator over the random effects model. This indicates that there is within group variation in all variables for at least some groups. The Wald test is for the joint significance of the explanatory variables. The Sargan test is for over-identifying restrictions.  All estimations are performed using EViews 7.  Panel data unit root tests and cointegration tests are reported in Appendix B, Tables B3 and B4.</p>				

**Table 4.3** Income Elasticity Ratios, Growth Rates of Income and Trade Balance and Trends in Terms of Trade

<b>All Developing Countries</b>	<b>(1960-1970)</b>	<b>(1971-1980)</b>	<b>(1981-1990)</b>	<b>(1991-2006)</b>	<b>(1960-2006)</b>
Import elasticity ( $\varepsilon_s$ )	1.10	1.05	1.24	1.65	1.15
Export elasticity ( $\varepsilon_n$ )	0.50	1.19	0.59	1.52	0.76
$\varepsilon_n/\varepsilon_s$	0.46	1.14	0.48	0.92	0.66
Domestic growth rate <sup>a</sup> (% p.a.)	5.02	5.46	3.04	3.72	4.07
Foreign growth rate (% p.a.)	5.39	3.26	3.47	2.48	3.19
Relative growth ratio (domestic/foreign)	0.93	1.67	0.88	1.50	1.28
Domestic GDP per capita growth rate (% p.a.)	2.28	2.22	0.61	1.79	1.50
Foreign GDP per capita growth rate (% p.a.)	3.31	1.76	1.77	1.57	1.69
Relative GDP per capita growth ratio (domestic/foreign)	0.69	1.26	0.34	1.14	0.89
Terms of trade trend (% p.a.)	0.47	-0.03	-1.60	-0.42	-0.85
Trade balance growth rate in real terms (% p.a.)	0.62	-0.06	3.94	0.32	0.81
Trade balance growth rate in nominal terms (% p.a.)	1.06	-0.07	1.76	0.33	0.03
Initial trade balance (millions US\$)	-68	-110	-1184	-682	-68
<b>Major Exporters of Manufactures</b>					
	<b>(1960-1970)</b>	<b>(1971-1980)</b>	<b>(1981-1990)</b>	<b>(1991-2006)</b>	<b>(1960-2006)</b>
Import elasticity ( $\varepsilon_s$ )	1.34	1.27	1.25	1.64	1.41
Export elasticity ( $\varepsilon_n$ )	0.64	1.51	1.30	1.99	1.44
$\varepsilon_n/\varepsilon_s$	0.48	1.19	1.04	1.21	1.02
Domestic growth rate <sup>a</sup> (% p.a.)	6.04	6.56	5.45	4.44	5.69
Foreign growth rate (% p.a.)	5.39	3.26	3.47	2.48	3.19
Relative growth ratio (domestic/foreign)	1.12	2.01	1.57	1.79	1.78
Domestic GDP per capita growth rate (% p.a.)	3.40	4.24	3.58	3.03	3.69
Foreign GDP per	3.31	1.76	1.77	1.57	1.69

capita growth rate (% p.a.)					
Relative GDP per capita growth ratio (domestic/foreign)	1.03	2.41	2.02	1.93	2.18
Terms of trade trend (% p.a.)	0.35	-1.82	-0.87	-0.77	-1.15
Trade balance growth rate in real terms (% p.a.)	0.82	2.75	2.69	2.20	1.98
Trade balance growth rate in nominal terms (% p.a.)	1.18	0.46	1.05	1.15	0.77
Initial trade balance (millions US\$)	-187	-375	-1706	-2414	-187
<b>Primary</b>					
<b>Commodity</b>	<b>(1960-1970)</b>	<b>(1971-1980)</b>	<b>(1981-1990)</b>	<b>(1991-2006)</b>	<b>(1960-2006)</b>
<b>Exporters</b>					
Import elasticity ( $\varepsilon_s$ )	1.12	0.86	0.77	1.63	0.95
Export elasticity ( $\varepsilon_n$ )	0.35	0.44	0.42	1.26	0.52
$\varepsilon_n/\varepsilon_s$	0.31	0.51	0.55	0.77	0.55
Domestic growth rate <sup>a</sup> (% p.a.)	4.74	5.16	2.46	3.54	3.58
Foreign growth rate (% p.a.)	5.39	3.26	3.47	2.48	3.19
Relative growth ratio (domestic/foreign)	0.88	1.58	0.71	1.43	1.12
Domestic GDP per capita growth rate (% p.a.)	0.98	1.49	0.10	1.33	0.79
Foreign GDP per capita growth rate (% p.a.)	3.31	1.76	1.77	1.57	1.69
Relative GDP per capita growth ratio (domestic/foreign)	0.30	0.85	0.06	0.85	0.47
Terms of trade trend (% p.a.)	0.54	-0.52	-1.17	-0.92	-1.10
Trade balance growth rate in real terms (% p.a.)	0.21	-0.62	3.15	-0.06	0.65
Trade balance growth rate in nominal terms (% p.a.)	0.81	-1.17	1.58	-0.18	-0.39
Initial trade balance (millions US\$)	-31	-97	-875	-169	-31
<b>HICs</b>					
	<b>(1960-1970)</b>	<b>(1971-1980)</b>	<b>(1981-1990)</b>	<b>(1991-2006)</b>	<b>(1960-2006)</b>

Import elasticity ( $\varepsilon_s$ )	0.91	1.26	0.01	1.96	1.31
Export elasticity ( $\varepsilon_n$ )	0.66	0.47	0.44	1.28	0.47
$\varepsilon_n/\varepsilon_s$	0.73	0.37	44.00	0.65	0.36
Domestic growth rate <sup>a</sup> (% p.a.)	4.17	3.90	1.83	3.62	2.80
Foreign growth rate (% p.a.)	5.39	3.26	3.47	2.48	3.19
Relative growth ratio (domestic/foreign)	0.77	1.20	0.53	1.46	0.88
Domestic GDP per capita growth rate (% p.a.)	1.24	0.74	-1.21	0.97	-0.18
Foreign GDP per capita growth rate (% p.a.)	3.31	1.76	1.77	1.57	1.69
Relative GDP per capita growth ratio (domestic/foreign)	0.37	0.42	-0.68	0.62	-0.11
Terms of trade trend (% p.a.)	0.48	0.80	-1.24	-1.73	-0.86
Trade balance growth rate in real terms (% p.a.)	0.79	-2.15	3.42	-1.40	0.61
Trade balance growth rate in nominal terms (% p.a.)	0.81	-1.79	1.49	-0.54	-0.38
Initial trade balance (millions US\$)	-13	-26	-214	-74	-13
<b>Oil-Exporters</b>					
	<b>(1960-1970)</b>	<b>(1971-1980)</b>	<b>(1981-1990)</b>	<b>(1991-2006)</b>	<b>(1960-2006)</b>
Import elasticity ( $\varepsilon_s$ )	0.80	1.77	0.25	1.16	0.62
Export elasticity ( $\varepsilon_n$ )	0.67	1.46	1.19	0.35	0.57
$\varepsilon_n/\varepsilon_s$	0.84	0.82	4.76	0.30	0.92
Domestic growth rate <sup>a</sup> (% p.a.)	4.79	5.10	1.62	3.47	4.1
Foreign growth rate (% p.a.)	5.39	3.26	3.47	2.48	3.19
Relative growth ratio (domestic/foreign)	0.89	1.56	0.47	1.40	1.29
Domestic GDP per capita growth rate (% p.a.)	0.95	1.95	-1.54	1.22	1.13
Foreign GDP per capita growth rate (% p.a.)	3.31	1.76	1.77	1.57	1.69
Relative GDP per capita growth ratio (domestic/foreign)	0.29	1.11	-0.87	0.78	0.67

Terms of trade trend (% p.a.)	0.04	8.89	-7.81	4.92	2.00
Trade balance growth rate in real terms (% p.a.)	3.71	-8.95	14.14	-2.57	-0.67
Trade balance growth rate in nominal terms (% p.a.)	2.87	0.42	5.36	2.65	1.67
Initial trade balance (millions US\$)	-61	509	-2530	-538	-61
<p><i>Notes:</i>  Elasticities are estimated by dynamic fixed effects estimator. The growth rates of national income and terms of trade are estimated by standard exponential growth functions. Initial trade balance is the mean of the trade balance for the entire sample for the initial year.  <sup>a</sup> Growth rate of GDP percent per annum.</p>					

**Table 4.4** Correlations between Elasticity Differential of Developing Countries (ER), Share of Developing Countries in High-Tech Manufactured Exports (H), and Share of Developing Countries in Primary Exports (P)

	ER	H	P
ER	1.00	0.61	-0.32
H	0.61	1.00	0.10
P	-0.32	0.10	1.00
Source: Figure 4.9 and Author's calculations.			



## CHAPTER 5

### OPTIMUM TARIFFS AND RETALIATION: FROM GLOBAL TO INDIVIDUAL STRATEGIC TRADE POLICY

#### 5.1 Introduction

While many questions in international trade policy have their roots in global North-South interactions, the policy responses are necessarily adopted at the individual country level. In this sense, what constitutes a “global policy response” to mechanisms reproducing uneven development with or without terms of trade deterioration requires taking into account game theoretic, or strategic, actions of individual country players. These strategic actions might be motivated by the “optimum tariff” theorem, which states that a country can improve its welfare as compared with the free trade position by imposing a tariff on imports. If other countries retaliate by imposing tariffs in their turn, two possibilities emerge: either all players are worse off at the end of the tariff war (Sckitovszky 1941-2) or the country that initiates the tariff war can eventually be better off (Johnson 1953-4). While the first possibility emerges as a standard “prisoners’ dilemma” game at the global level, the second one is a different kind of game where one party gains in equilibrium, and it is “often overlooked” in the literature (Johnson 1953-4: 142). In this chapter, I bring into analysis game theoretic nature of the tariff policy problem to discuss: (i) the strategic reasons that lead countries to implement optimum tariffs which might invite retaliation from other countries, and (ii) the possible outcomes emerging from the tariff games.

Consider three separate but interconnected games of tariff policy: (i) the tariff game played between countries in the North, (ii) the tariff game played between countries

in the South and (iii) the global North-South tariff game where groups of developed and developing countries play the game.<sup>36</sup> The first two games in each region are composed of symmetric players, i.e. their payoffs from a particular strategy pair are similar. The third differs from these intra-regional games in that it is played by asymmetric players—North and South—whose payoffs from a particular strategy pair are different. One of the reasons for this difference is that for countries with asymmetric productive structures, the gains from a certain tariff policy strategy combination are unevenly distributed among each other. For instance, the benefits of removing trade barriers in industrial sectors of developing countries might be much larger for already-industrialized countries having a competitive edge. In such inter-regional games with asymmetric players, as we will show, it is more likely that the trade negotiations will conclude with a stalemate, or a non-free trade solution at best.

This chapter is organized as follows. In section 5.2, I discuss the global North-South game in a non-cooperative framework with a focus on the incentives for imposing an optimal tariff on imports. In section 5.3, I consider the same game under a cooperative framework that allows for negotiations between the parties. I also present the Nash cooperative solutions based upon the negotiation sets resulting from the game rules under the standard and the Johnson cases. In section 5.4, I discuss the intra-regional North and South games, and in section 5.5, I discuss the inter-regional North-South game from a historical viewpoint. Finally, I summarize the inferences and implications of this chapter.

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<sup>36</sup> The last one has been well-documented in the Doha Round between the long standing Quad and the more recently formed G20 (Jawara and Kwa 2003). The Quad consists of Canada, the US, the EU, and Japan. The G20 is a group of developing countries including Brazil and India.

## 5.2 Global North-South Game in a Non-Cooperative Framework

In this section, I assume that regions set their tariff policies without the benefit of prior communication with each other. Thus, the central assumption is that they behave non-cooperatively. Consider the game in Table 5.1. This is a non-cooperative game between the global North and South, in which each region has only two alternative strategies: to charge no tariff by choosing Free ( $F$ ) trade, or to charge a tariff that is optimal relative to the other region's tariff by imposing an Optimal ( $O$ ) tariff.<sup>37</sup>

The elements of Table 5.1 indicate the four possible outcomes which correspond to four pairs of strategies. Thus, if North chooses strategy  $O$  and South chooses strategy  $F$ , the outcome is  $(a, d')$ . North receives  $a$  and South receives  $d'$ , where  $a$  and  $d'$  are measured in utility terms. Based on the game-theoretic trade theory, it is possible to establish the relative magnitudes of the elements of Table 5.1.

Optimal tariff theorem states that beginning from free trade, if a group of countries large enough to exert monopoly power in trade change an optimal tariff and no retaliation takes place, the group of countries which impose the optimal tariff is better off and the other group of countries is worse off from the optimal tariff. In terms of the elements of Table 5.1, this means that  $a > b$ ,  $a' > b'$ ,  $b > d$  and  $b' > d'$ . The outcome  $(c, c')$  is the result of a tariff war where retaliation occurs in response to an optimal tariff. Comparing this outcome with the free trade outcome, there are two possible welfare outcomes. The first one is the standard case where both countries in tariff war are worse off than at free trade, and it is a classical prisoner's dilemma game,  $b > c$ ,  $b' > c'$ . The second possibility is that one country benefits from a tariff war while the other one loses,

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<sup>37</sup> A similar game was developed by Riezman (1982) for two countries in a tariff game.

and it differs from the prisoner's dilemma game with conditions specified by Johnson (1953-4). In Table 5.1 this means that  $b > c$  and  $c' > b'$  (or  $c > b$  and  $b' > c'$ ).

In the standard case of prisoner's dilemma, the dominant strategy for each region is to choose strategy  $O$ , since for any strategy choice of the opposing region the playing strategy  $O$  yields a higher payoff. This result can easily be seen from Table 5.1. Suppose the South chooses strategy  $F$ , then the North receives  $b$  for playing  $F$ , and  $a$  for playing  $O$ . Since  $a > b$ ,  $O$  is the best choice for the North when the South chooses  $F$ . Suppose the South chooses  $O$ . The North obtains  $d$  by playing  $F$  and  $c$  by playing  $O$ ; again  $O$  is the best choice for North. Therefore, North will choose  $O$ , and the same reasoning applies to South. In the second case developed by Johnson, the same reasoning can be applied to show that the dominant strategy for each region remains  $O$ . To sum up, when the regions act in a non-cooperative game, each region will select the strategy of imposing the optimal tariff, and the outcome of free trade will not be reached. Note, however, that it is possible that one region benefits from the tariff war, but both cannot at the same time.

### **5.3 Global North-South Game in a Cooperative Framework**

Relaxing the assumption that cooperation is not allowed, we can assume that the groups of countries can communicate and make binding agreements before they choose a tariff strategy. In a cooperative framework, each region approaches the negotiations trying to maximize its own welfare. They are aware of the fact that they can both receive at least  $c$  and  $c'$  respectively, which would be the outcome when they both select strategy  $O$  and refuse to negotiate. Thus, the point  $(c, c')$  would be a logical choice for beginning point of negotiations. During the negotiations, a set of points dominating the point  $0 = (c, c')$  can be identified as the negotiation set. Figure 5.1a displays the standard case where

both regions suffer from a tariff war, and Figure 5.1b displays the Johnson case where one region is better off while the other is worse off from a tariff war.

In Figure 5.1, point B denotes the payoff  $(d, a')$  that corresponds to the strategy choice  $(F, O)$  since it is known that  $d < c$  and  $a' > c'$  from Table 5.1. Similarly, point C indicates the payoff  $(a, d')$  which results from the strategy pair  $(O, F)$ . If free trade is chosen by both regions  $(F, F)$ , the payoff is  $(b, b')$ . In the standard case of prisoner's dilemma,  $b > c$  and  $b' > c'$ , and therefore, the free trade outcome  $(b, b')$  can be denoted by point F in Figure 5.1a, showing the best possible outcome that is attainable. The shaded area  $OEFD$  in Figure 5.1a shows the negotiation set, which is composed of outcomes with positive payoffs for the two regions. If the Pareto optimality assumption is made, then the negotiation set becomes restricted to the line segment  $EFD$ , and the set of solutions lying on this line segment is called the Von Neumann-Morgenstern solution.

To summarize, under the standard prisoner's dilemma game, when the two regions negotiate in a cooperative framework, they will choose a joint tariff policy whose utility level is given by some point on  $EFD$ . Note that the free trade outcome (point F) is only one of the many possibilities which can be chosen in the process of negotiations. However, if they have no way of negotiation in a non-cooperative game, they will end up imposing optimal tariffs on each other, resulting in the worst possible outcome of point O.

The shaded area in Figure 5.1b illustrates the negotiation set for the Johnson case. While the locations of points B, C, and O are the same as the standard case, the location of point F differs since its payoff outcome  $(b, b')$  in Johnson case yields a loss for one player and gain for the other: either  $b > c, c' > b'$  or  $c > b, b' > c'$ . Thus, point F could have been drawn somewhere around point B, instead of point C. Since moving to free trade makes

one region worse off relative to the point where both regions impose the optimal tariff, none of the players choose free trade as a pure strategy in Johnson case. If we assume Pareto optimality, the negotiation set shrinks to the line segment  $ED$ .

Given that we have identified the negotiation sets under the two possible cases, the next step is to examine a cooperative game solution in order to assess the likelihood for free trade strategy to be chosen. Consider the Nash cooperative solution, which is, by definition, the point that maximizes the product of the two region's utilities and exists in the negotiation set. In our game, if  $U_i$  is the utility of region  $i$ , then the Nash solution chooses the point that maximizes  $U = U_S U_N$ . Figure 5.2 shows that the Nash solution could be either free trade (as in Fig. 5.3a) or a point which is not free trade (as in Fig. 5.3b).

Free trade strategy will be chosen if the slope of the world indifference surface  $U_S/U_N$  is greater in absolute terms than the slope of line segment  $BF$  and less than the slope of  $FC$ , which can be written as the following:

$$\frac{a' - b'}{b - d} < \frac{U_S}{U_N} < \frac{b' - d'}{a - b}$$

The North and the South are likely to choose free trade as a joint cooperative strategy the smaller the gain from imposing a tariff ( $a - b$  and  $a' - b'$ ) and the larger the gain to the retaliated region of moving to free trade ( $b - d$  and  $b' - d'$ ). If the regions are symmetric (i.e.  $a = a'$ ,  $b = b'$ , etc.) then free trade will be the joint strategy chosen (as in Fig. 5.3a).

Figure 5.2b shows an equilibrium outcome which is not free trade. The slope of the world indifference surface equals the slope of  $FC$ , i.e.  $U_S/U_N = b' - d'/a - b$ . This

indicates that  $a - b$  is large, or the potential gain of the North from imposing a tariff on Southern imports is rather large. In this case, the North would sacrifice much more than the South by accepting free trade. Since each region is treated equally under the Nash cooperative solution, the final solution will differ from free trade.

It should be here mentioned as a historical reference that almost all of the now-developed countries of the North had used tariff protection and other forms of infant industry promotion when they were in catching-up positions. Only when protection could no longer offer benefits as the now-developed economies became far more competitive than others, they resorted to free trade policies and denied the use of tariff protection as part of the “kicking away the ladder” (Chang 2002). From a historical perspective, therefore, the developing countries sacrifice much more than the developed ones when they accept free trade strategies. In other words, the potential gain of the South from charging a tariff on imports from developed countries is so much larger that the free trade outcome would not be realized in the Nash cooperative equilibrium.

#### **5.4 Intra-Region North and South Games**

Intra-regional games between Northern (or Southern) individual countries can, in principle, be characterized as a prisoner’s dilemma game where one country can benefit from imposing a tariff on other country’s imports, but if the other country retaliates, it might end up being worse off at the end of the tariff war. However, it should be noted that the proposition of optimum tariff theorem is valid only in the case of large countries (or a group of countries acting in a unified fashion) which grants them monopoly power in trade. If the large country assumption is relaxed, the individual countries in the North

or the South can no longer take advantage of imposing optimal tariffs as they fail to influence world market prices. In other words, the optimal tariff argument fails to hold in case of the small country assumption.

Nevertheless, the Northern intra-regional game has often been simplified as either a dual game between the United States and the European Union (Krugman 1987, Bradley 1987), or a trilateral game between Japan, the US, and the EU (Harrison and Rutström 1991). Thus, assuming that each country (or group of countries in case of the EU) has enough market power in international trade flows, the same game theoretic approach presented in previous sections applies. As Krugman summarized, the game is essentially a prisoner's dilemma, "where each country is better off intervening than being the only country not to intervene, but everybody would be better off if nobody intervened" (1987: 142). In Krugman's model, the strategic trade interventions arise from the oligopolistic market structures prevailing in developed country markets.

With the recent rise of large-sized developing countries including Brazil, India, China, and Russia in international trade, Southern intra-regional game can also be thought of as a prisoner's dilemma from a strategic viewpoint. But perhaps more importantly, the fallacy of composition argument (each developing country is better off with a small competitive devaluation and/or entry into low-tech manufactures, but it is worse off if many other developing countries follow the same policies simultaneously) is essentially a standard prisoner's dilemma game. Thus, even when the large country assumption fails to hold for a large number of small developing countries, their best response strategies to cope with the growing competitive pressures in the world market leads them into outcomes where they are worse-off as a whole (and the immiserizing



growth outcome resumes). Moreover, it is much harder for many small countries within the South to reach cooperative outcomes<sup>38</sup> avoiding the Nash non-cooperative solutions as compared with the small number of players in the intra-North game.

### **5.5 Inter-regional North-South Game from a Historical Viewpoint**

From a historical perspective the degrees of protection exercised by individual countries varied with respect to their stages of development and their colonial/semi-colonial status. Most of the now-developed countries implemented very high rates of tariff protection in their earlier stages of development, and forced the less developed countries to practice free trade by means of unequal treaties and colonization (see Table 5.2).<sup>39</sup>

During this period from roughly 19<sup>th</sup> century to the Second World War, the North-South game can be depicted as in Table 5.3. The best response for the North is to impose an optimal tariff on its rival's imports regardless of whether the South practices free trade or plays the optimal tariff. The same is true for the South. In a non-cooperative equilibrium, we would expect both regions to end up in a mutually harmful trade war with the payoff (1, 1). However, the period is characterized by a very uneven world trade regime in which the now-developed countries actively used infant industry protection and prevented less developed countries from imposing tariff barriers through unequal treaties and colonization. Indeed, for several colonies average tariff rates were as low as 5 percent over this period (Amsden 2001: 43-45). The result of this unequal bargaining process

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<sup>38</sup> Commodity agreements for coffee, cocoa, etc. are attempts to reach such cooperative outcomes, but they have been quite limited and ineffective as a solution, especially given the rise of financialization of commodity markets (UNCTAD 2008).

<sup>39</sup> See Chang (2002) and Amsden (2001) for a detailed historical analysis.

would be illustrated by the strategy pair ( $F, O$ )—the South practicing free trade ( $F$ ) and the North imposing optimal tariffs ( $O$ )—which results in the payoff  $(-5, 5)$ , that is, a net loss for the South and a net benefit for the North.

Once the now-developed countries achieved to promote their infant industries through interventionist industrial, trade, and technology policies, they began to reduce their tariffs in a gradual manner. In the meantime, during the post-WWII period the less developed countries gained independence and freedom to pursue ISI-type policies. The new North-South game can be represented by Table 5.4. Thanks to its industrial development, the North receives a higher payoff for practicing free trade when the South adopts a tariff-ridden policy. The non-cooperative outcome of the game is  $(O, F)$ —where the Southern optimal trade policies are tolerated by the North which begins to liberalize its trade barriers. The payoff outcome is  $(5, 2)$ , which is the same total benefit of free trade  $(3,4)$ . But clearly the South benefits more under these renewed rules of the game.

Once the less developed countries begin to attain higher rates of growth and arise as strong competitors with the now-developed countries (Korea, Taiwan, and other Asian countries in fierce competition with the USA and the EU), the rules of the game alter one more time. Table 5.5 shows that the North can no longer afford to tolerate competition from Southern firms at global markets. This is epitomized by very high rates of tariff protection during the Reagan administration in the USA.

In Table 5.5 if the South imposes an optimal tariff, the best response of North is to retaliate. Non-cooperative game solution would be  $(O, O)$  with the payoffs  $(1, 1)$ . However, the developed countries and the lending institutions controlled by them have succeeded to convince (or force depending on the debt situation of the developing

country) them to open up their markets by liberalizing their trade and investment flows. The neoliberal agenda under the Washington consensus can be represented by the strategy pair (*F, O*) in which the South practiced free trade while the North began to pursue protectionism. This was almost as destructive as the colonial game due to ensuing deindustrialization in developing countries. The neo-colonial relations created the “lost decade” for many developing countries.

Even though average tariff rates of developed countries declined substantially after the Reagan-years, “the developed countries’ weighted tariff on imports from developing countries is twice the average rate they impose on imports from other developed countries” (Cordoba and Vanzetti 2005: 3). The reason for this uneven tariff structure is the existence of tariff peaks for important export goods of developing countries such as low-skill manufactures and processed agricultural products. Tariff peaks are defined as tariffs that are three times the national weighted average. Since the WTO negotiations target the reduction of average applied tariff rates, developed countries are not required to lower the very high rates of protection that apply to textiles and agriculture. One of the UNCTAD reports wrote:

...protection in Quad markets is quite clearly concentrated in typical export categories of interest to low- and middle-income developing countries, such as textiles and agriculture. Therefore, developing countries that are mainly specialized in raw materials and primary agricultural products are faced with higher trade barriers when trying to move into the subsequent production stages (low technology sectors such as processed agriculture and textiles, or medium technologies such as automotive) (UNCTAD 2003b: 25).

Difficulties to diversify into products with higher technological content arising from the concentrated Northern protection in strategic export markets of the developing world should be taken into account in trade negotiations. In the present context, taking into account other impediments to development from other WTO agreements on

intellectual property rights and so forth, it is hard to say that the outcome of the global North-South game changed from an unfavorable payoff for South coupled with a favorable payoff for the North in the upper off-diagonal section.

## 5.6 Conclusion

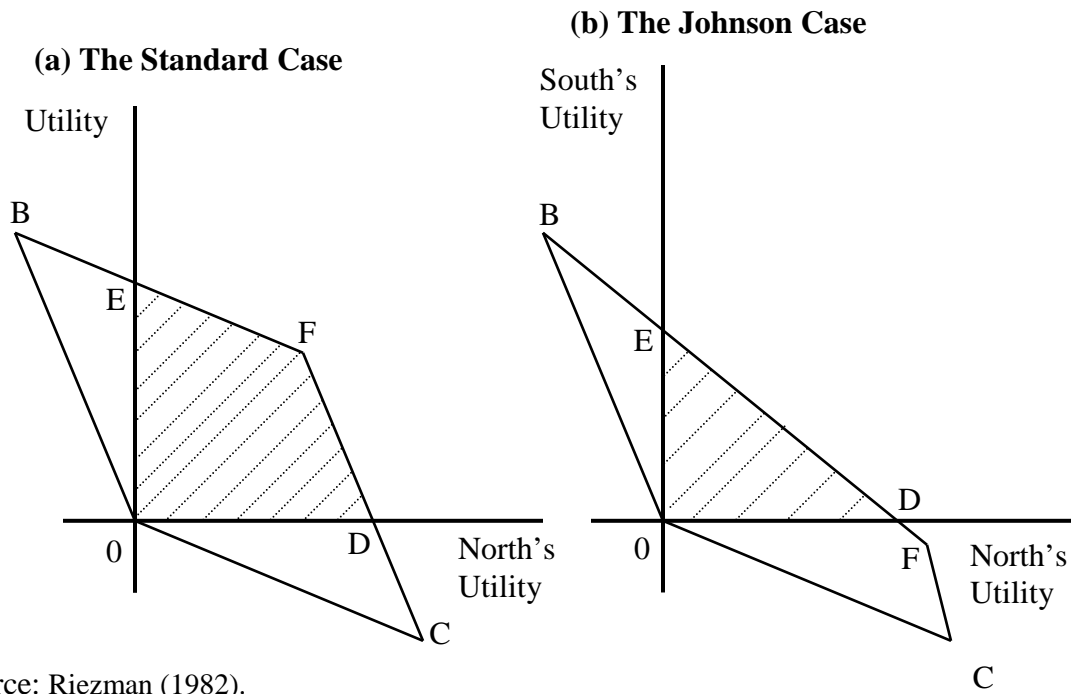
There are many inferences and implications that can be drawn from the game-theoretic approach presented in this section. Three points are worth emphasizing:

- (i) Countries, or a group of countries acting in a concerted manner, can be viewed as players in a tariff game. Each player recognizes the dynamic nature of its tariff decision and takes into account that any change in its tariff rates might evoke a response from its rival. The tariff game might quickly turn into a tariff war if the response from the rival takes the form of increasing tariffs and making both players worse off eventually (the standard prisoner's dilemma solution).
- (ii) An exception to the standard game is the Johnson case where one country ends of benefiting from a tariff war. In either case, the best response for each country (or group of countries) is to choose an optimal tariff strategy if the rival chooses a free trade strategy. The best response remains the optimal tariff strategy even if the rival decides to choose an optimal tariff policy due to the welfare loss from practicing free trade.
- (iii) These results apply to the three games we have discussed: intra-North game, intra-South game, and inter-regional North-South game. The asymmetric nature of the players in the latter makes it less likely for the cooperative Nash outcome to be reached. The evolution of game dynamics depending on the economic development and political influence of players has a lasting effect on the equilibrium outcomes. While the pursuit of free trade in earlier stages of development is much costlier than that in later stages, the

existence of colonial or semi-colonial status (i.e. unequal exchange treaties) brings additional costs to countries under colonial rule. These dynamic and political concerns should be taken into account in multilateral tariff negotiations if a fair and welfare-improving solution is aimed to be reached.

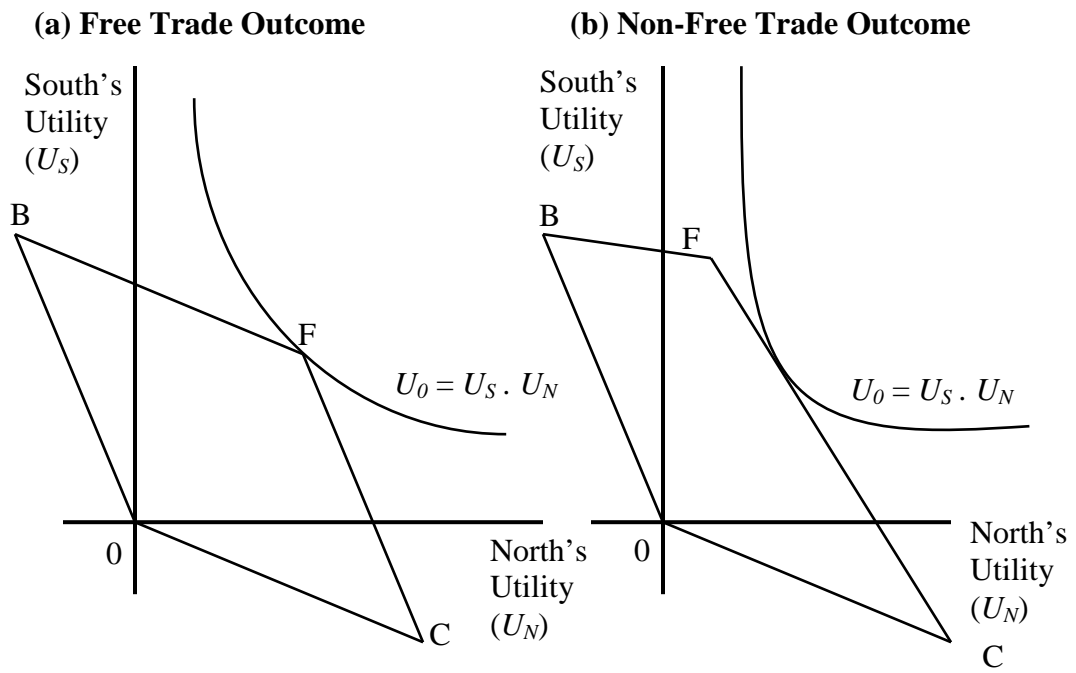
Next chapter will analyze the policy options of developing country governments in dealing with the unfavorable policy options under the age of neoliberal globalization. Our inquiry will focus on a comparative analysis of industrial and trade policies used in Turkey and Malaysia. While the per-capita GDP in Turkey was twice as much as the one in Malaysia in 1960, four decades later the development experience of Malaysia stands out with a higher per capita income, a higher growth rate of income, a low unemployment rates, and a presence in high-technology manufactured export markets. These divergent paths of development call for further analysis.

**Figure 5.1** The Negotiation Sets



Source: Riezman (1982).

**Figure 5.2** Nash Cooperative Solution



Source: Riezman (1982).

**Table 5.1** Non-Cooperative Global Game  
North

		<i>F</i>	<i>O</i>
South	<i>F</i>	$(b, b')$	$(a, d')$
	<i>O</i>	$(d, a')$	$(c, c')$

Source: Author's formulation.

**Table 5.2** Average Tariff Rates on Manufactured Products for Selected Developed Countries in Their Early Stages of Development  
(weighted average; in percentages of value)<sup>1</sup>

	1820 <sup>2</sup>	1875 <sup>2</sup>	1913	1925	1931	1950
Austria <sup>3</sup>	R	15-20	18	16	24	18
Belgium <sup>4</sup>	6-8	9-10	9	15	14	11
Denmark	25-35	15-20	14	10	n.a.	3
France	R	12-15	20	21	30	18
Germany <sup>5</sup>	8-12	4-6	13	20	21	26
Italy	n.a.	8-10	18	22	46	25
Japan <sup>6</sup>	R	5	30	n.a.	n.a.	n.a.
Netherlands <sup>4</sup>	6-8	3-5	4	6	n.a.	11
Russia	R	15-20	84	R	R	R
Spain	R	15-20	41	41	63	n.a.
Sweden	R	3-5	20	16	21	9
Switzerland	8-12	4-6	9	14	19	n.a.
United Kingdom	45-55	0	0	5	n.a.	23
United States	35-45	40-50	44	37	48	14

Source: Chang (2002: 40) adopted from Bairoch (1993), Table 3.3.

Notes:

R= Numerous and important restrictions on manufactured imports existed and therefore average tariff rates are not meaningful.

1. World Bank (1991, p. 97, Box table 5.2) provides a similar table, partly drawing on Bairoch's own studies that form the basis of the above table. However, the World Bank figures, although in most cases very similar to Bairoch's figures, are *unweighted* averages, which are obviously less preferable to *weighted* average figures that Bairoch provides.

2. These are very approximate rates, and give range of average rates, not extremes.

3. Austria-Hungary before 1925.

4. In 1820, Belgium was united with the Netherlands.

5. The 1820 figure is for Prussia only.

6. Before 1911, Japan was obliged to keep low tariff rates (up to 5%) through a series of "unequal treaties" with the European countries and the USA. The World Bank table cited in note 1 above gives Japan's *unweighted* average tariff rate for *all goods* (and not just manufactured goods) for the years 1925, 1930, 1950 as 13%, 19%, 4%.



**Table 5.3** Hypothetical Payoff Matrix (until 1950s)  
North

		<i>F</i>	<i>O</i>
South	<i>F</i>	(3, 3)	(-5, 5)
	<i>O</i>	(5, 0)	(1, 1)

Source: Author's formulation.

**Table 5.4** Hypothetical Payoff Matrix after Northern Industrialization (1950-1980)  
North

		<i>F</i>	<i>O</i>
South	<i>F</i>	(3, 4)	(-5, 5)
	<i>O</i>	(5, 2)	(1, 1)

Source: Author's formulation.

**Table 5.5** Hypothetical Payoff Matrix after Southern Industrialization (1980s-onwards)  
North

		<i>F</i>	<i>O</i>
South	<i>F</i>	(3, 4)	(-5, 5)
	<i>O</i>	(5, -1)	(1, 1)

Source: Author's formulation.

## CHAPTER 6

### INDUSTRIAL PERFORMANCE AND THE ROLE OF THE DEVELOPMENTAL STATE: A COMPARATIVE ANALYSIS OF TURKEY AND MALAYSIA

#### 6.1 Introduction

The significance of diversifying their export structures for middle-income countries has grown with the widespread free trade agreements either under the new WTO rules or through bilateral agreements. Among these countries, some have succeeded to diversify their export base into more technology-intensive products but many others have failed to do so. While Malaysia is closer to the successful end of this spectrum, Turkey is considered less successful, although certainly not a complete failure. Both countries are under pressure of rising competitiveness in their export markets. In order to stay competitive in world markets, both countries need to upgrade their industrial structures and invest in local content. While Malaysia has the advantage of having an export-oriented MNC-led industry in high-technology manufactures, Turkish export structure is relatively weaker and stagnant when it comes to increasing its technology content. Its low-technology textile and manufacture industries, that have higher real wage levels, face difficulties in competing with low-wage countries. In more sophisticated parts of manufacturing, Turkish firms have difficulties in competing against high-technology European firms.

This chapter compares and contrasts the role of the developmental state of past and present industrial performance for Turkey and Malaysia. It takes a historical perspective on comparing different phases of manufacturing experiences, and the role of state policies in restructuring these experiences. One of the central questions that this chapter aims to answer arises from Figure 6.1. Malaysia experienced a more or less stable

trend in net barter terms of trade until the end of ISI period, which was followed by an improvement with the beginning of liberalization. In contrast, Turkey experienced a decline in its net barter terms of trade until trade liberalization and a slightly increasing trend until 1994, and a further deterioration after the currency devaluation following the financial crisis of 1994. More importantly, however, the purchasing power of exports measured by income terms of trade increased dramatically in Malaysia, while it displayed only a modest increase in the case of Turkey. The critical questions, therefore, are the following: Why do we have these divergent paths in the terms of trade trends and how are they associated to different development trajectories of Turkey and Malaysia?

This chapter addresses these questions by arguing that the rapid transformation of Malaysian exports into manufactured goods with higher technological content is partly responsible for the upward movement in relative export prices and for the massive expansion in the volume of these high-tech exports. Likewise, specializing in low-tech manufactured exports has resulted in deteriorating relative export prices and a much lower rate of increase in the volume of Turkish exports. The existence of higher rates of unemployment in Turkey is also partly responsible for keeping real wages lower, and thus, resulting in lower prices of exported goods in case of Turkey. In contrast, Malaysia's lower rate of unemployment has led to higher rates of increase in real wages, which was also reflected in rising terms of trade. Section 6.5.3.2 provides empirical evidence in support of this view.

The outline of this chapter is as follows. Section 2 provides the analytical framework on (i) the role of technology in the distribution of Schumpeterian rents which influence terms of trade trends, and (ii) the impact of technological structure of exports

on export performance and economic growth. Section 3 presents an overview of stylized facts about industrialization processes in Turkey and Malaysia. Section 4 analyzes in great detail how differences in state policies (industrial and trade policies in particular) generated different outcomes in industrialization, balance of payments problems, and technological diversification of exports. Section 5 analyzes the evolution of technological structure of manufactured exports, considers the prospects for Turkey and Malaysia to sustain competitiveness in world markets, and provides empirical evidence on the relationships between structural changes in manufacturing and export performance, economic growth, and the terms of trade movements. Section 6 discusses the instruments of technological upgrading by situating Turkey and Malaysia within the group of exporters of manufactured goods. Section 7 evaluates empirically the relative impact of a trade policy, namely trade liberalization, on the growth of their exports, imports, and the resulting changes in their trade balance. Section 8 draws the conclusions.

## **6.2 Analytical Framework: Technology, Terms of Trade, and Export Structure**

In his 1998 article, “Beyond Terms of Trade: Convergence/Divergence and Creative/Uncreative Destruction,” Singer explained the implications of his proposed extension of the Prebisch-Singer hypothesis from different types of commodities to different types of countries as follows:

The manufactures exported by developing countries tended to be technologically simpler than the manufactures imported from developed countries – hence the extension of the PST from commodities to countries also involved a shift from emphasis on industrialization and diversification to an emphasis on building up technological capacity, entrepreneurial skills, and of ‘human capital’ in general. Without such a technological capacity, a shift into manufactures required foreign investment or aid (Singer 1998: 14-15).

The emphasis on building up technological capacity in the revisited PST, as a driving force for growth and development, was greatly influenced by Schumpeter's conception of technical innovation. In this respect, PST can be considered as part of the neo-Schumpeterian approaches to development. Singer interpreted Schumpeter's concept of creative destruction in the following sense: "The creation of new technologies replacing primary commodities or economizing in their use or using them more efficiently for the production of higher quality goods creates destruction for the producers of primary commodities" (1998: 20). According to Singer, the innovation process begins in the industrialized countries and in the industrial sectors with the creation of new commodities, new methods of production, new forms of organization, and new trade routes and markets, and new sources of supply while the destructive elements of this process is felt in the primary producing countries and the primary producing sectors.

It must be clear, however, that the process of creative destruction is not limited to the technological discrepancy between industrial and primary producing sectors or countries. A more generalized interpretation needs to include the technological divisions among the different forms of technological intensities of manufactured goods: high-technology, medium-technology, low-technology, and resource-based manufactures. While the high ends of the technical innovation generates rents (or super-profits in the Marxian sense) for the entrepreneurs operating in high-technology industries, the producers using standardized technologies receive no rents and often suffer from excessively competitive markets.

Schumpeter's original conception of the process of creative destruction involves innovations that cluster in time: a phase of revolution and later a phase of absorption of the results of the revolution.

While these things are being initiated we have brisk expenditure and predominating "prosperity" ... and while [they] are being completed and their results pour forth we have the elimination of antiquated elements of the industrial structure and predominating "depression" (Schumpeter 1954: 68).

These innovative impulses that gather *in time*, generating long phases of prosperity and depression, can also be seen as clustering *in space* (Arrighi, Silver, and Brewer 2005: 26). In the quote above, one can replace "while" with "where" and "read it as a description of a spatial polarization of zones of predominating 'prosperity' and zones of predominating 'depression'" (*ibid*: 26).

This kind of reading is indeed present in two prominent theories of economic development inspired by Schumpeterian view of innovations: Akamatsu's "flying geese" model (1961) and Vernon's "product-cycle" model. Both models picture the diffusion of industrial innovations as a "spatially structured process" that originates in the more developed countries and is gradually imitated by the less developed countries. The innovation process tends to begin in developed countries because "high incomes create a favorable environment for product innovations; high costs create a favorable environment for innovations in techniques; and cheap and abundant credit creates a favorable environment for financing these and all other kinds of innovations" (Arrighi *et al.* 2005: 27). The receipt of high rewards relative to effort in the form of rents further improves the environment for innovations, creating "a self-reinforcing 'virtuous cycle' of high incomes and innovations" (*ibid*: 27).

Low-income countries tend to receive hardly any benefits of these innovations taking place in high-income countries since they are no longer innovations once they arrive to poor countries; instead, they are standardized technologies yielding average rates of return due to intense competition. Moreover, the destructive aspects of major innovations affect developing countries disproportionately because their low levels of income and accumulated wealth leave their residents with a much lower capacity to adjust socially and economically to the disruptive effects of innovations. Through the asymmetric impacts on regions where innovations originate and regions where innovations dissipate, the process of creative destruction reproduces uneven development seen as a spatially structured process of divergence.

The effect of creative destruction process on terms of trade tends to favor the “innovation-intensive” products especially thanks to the significant barriers for entry into these product markets which allow the Schumpeterian rents to be appropriated by the innovating group of entrepreneurs. This point is also made by Kaplinsky: “...the real terms of trade will be not so much between commodities and manufactures, but between innovation-intensive products (benefiting from Schumpeterian rents) and non-innovation-intensive products” (2006: 992).

Since innovation-intensive products tend to be technology-intensive (products that require the use of higher or more sophisticated technologies have a greater tendency to be improved through new innovations), the export structures dominated by technology-intensive commodities have better growth prospects than others do. This can be further explained by the interaction mechanisms emphasized by the North-South model (Botta 2009) introduced in chapter 4:

- (i) Manufacturing activities that are subject to rapid product or process innovation enjoy faster growth of demand compared to technologically stagnant activities. This effect is illustrated by the positive (negative) impact of the technological content variable ( $\phi$ ) on the income elasticity of exports (imports). There is also considerable empirical evidence that most of the dynamic products in world trade use complex and sophisticated technologies (Ocampo, Rada and Taylor 2009: 72-73, Lall 1998).
- (ii) Technology-intensive manufacturing activities are less susceptible to entry by rival producers compared to activities with low technological content, which require low levels of scale, skill, and technology in general. Although a low-technology export structure might be a good starting point for a labor-surplus economy, it cannot sustain export growth over time unless it takes market shares from other exporters of low technology manufactures. Under the slow growth of final goods markets, gaining market shares is possible, but rather difficult. It requires substantial technical effort and investments in skill formation, as well as R&D.
- (iii) Structural change involving higher shares of manufacturing activities in higher ends of the technological spectrum allows higher rates of growth due to (a) spillover effects from technology-intensive activities to other productive activities and to the national system of technology; (b) ability to respond faster to changing competitive conditions in global markets; and (c) the higher learning potential and greater opportunity for application of science to technology. The coefficient for share of manufacturing GDP ( $\alpha$ ) captures this positive effect on productivity and greater growth potential in our model.
- (iv) Adjusting to global market forces and specializing along static comparative advantages impedes the process of industrialization in developing countries by confining



them to their original productive pattern (Greenwald and Stiglitz 2006). The industrial policies geared towards expanding key manufacturing sectors, with selective protective measures and discretionary incentives, can counteract negative impacts of market forces and allow developing countries to specialize along dynamic comparative advantages. This effect of industrial policies is captured by the policy variable ( $\sigma$ ) in our model. Very low values of this variable correspond to a 'market-friendly' institutional environment, which avoids the adoption of infant-industry policies (Botta 2009: 64). The effect of trade liberalization can also be interpreted from this perspective.

In light of these propositions, the rest of this chapter will focus on the following questions. First, comparing the Malaysian economic performance with Turkey, which economy portrays a more dynamic growth path coupled with a faster structural change in its sectoral composition? Second, what is the role of industrial policy in creating the differences in growth performance and structural change? Third, what are the trends in terms of trade and what are the major factors generating these trends? Can they be partly explained by the changes in technological-intensity of manufacturing activities (benefiting from Schumpeterian rents)? Forth, how is the growth performance affected by technological composition of manufactured exports? Fifth, what is the role of technological efforts in attracting FDI, formation of skills, R&D expenditures on promoting technology-intensive activities and economic growth? Sixth, how has the liberalization of trade flows affected the relative growth of exports vis-à-vis imports and the net effect on balance of payments?

### **6.3 Late-Industrialization in Turkey and Malaysia: Some Stylized Facts**

In 1968, Malaysia's per capita income (\$1,084 at 2000 prices) was only half of Turkey's per capita income (\$2,038 at 2000 prices). Due to its rapid industrial transformation, Malaysia caught up with Turkey in the late 1990s (Figure 6.2). In PPP terms, its per capita income has exceeded Turkey over the past decade (see Table 6.1). Malaysia's GDP grew at an average annual rate of 7.4 per cent during 1981-1997, led by a manufacturing sector that expanded at 12.3 per cent (Lall 1995: 759). In contrast, Turkey's GDP, in contrast, grew on average at a rate of 5 percent during the same time period, and the expansion of the manufacturing sector was also much slower. While the Turkish and Malaysian economies have grown at similar rates since the 1998 Asian Crisis, the rate of structural transformation has been much faster in the case of Malaysia, whose share of manufacturing in GDP rose from 14 percent in 1971 to 30 percent in 1993, while shares of traditional sectors (mining and agriculture) declined from 43 to 24 percent. These figures stand out when compared to the case of Turkey, whose manufacturing share increased from 16 percent in 1971 to 21 percent in 1993, and the traditional sectors' share fell from 37 to 17 percent (State Planning Organization, Turkey, 2010).

Massive structural transformation within the Malaysian economy is reflected in rapid technological upgrading of its export composition. Figures 6.3a and 6.3b show the technological composition of exports in Turkey and Malaysia respectively, over the period of 1962 to 2006. The share of high-technology manufactures in Malaysian exports has risen from almost nothing in 1962 to about 60 percent in 2006, and that of primary commodities has declined from 75 percent to less than 10 percent. In comparison, the

Turkish exports are dominated by a large share of low-technology exports (mainly textiles and garments), and the share of manufactures with high technology content is less than 10 percent. Section 5 will examine in greater detail the recent trends in the technology intensities of exports.

When examining the macroeconomic performances of Turkey and Malaysia in a comparative perspective, Table 6.1 shows that Malaysia has outperformed Turkey in a number of indicators:

First, Malaysia has been much more successful in attracting foreign direct investment (FDI), partly due to its earlier experience with British colonial capital exports to its resource-based industries, namely rubber, tin and palm oil. The average share of FDI in Malaysia's GDP was 2.2 per cent during the 1960s, then increasing to 3.1 percent in the 1970s and 4.6 percent until the East Asian currency crisis hit in 1998. Even after the crisis, it has remained around 3.3 percent over the past decade. For the Turkish GDP, on the other hand, the share of FDI has always been rather low—historically it has been less than 1 per cent and only exceeded that mark during the last decade.

Second, the share of exports in GDP is much higher for Malaysia in all successive periods due to its experience with export-oriented industrialization prior to their independence in 1957. Over the past decade, Malaysia's share of exports to its GDP has grown remarkably, reaching 114 percent, while the same figure for Turkey was only 23 percent. The average annual percentage growth of exports has also been higher for Malaysia than for Turkey.

Third, while the value of imports, as a percent of GDP, has been much higher in Malaysia, the imports grew at a faster rate in Turkey. The rapid growth of imported

commodities often caused current account deficits, especially during the late 1970s as the workers' remittances deteriorated. According to recent IMF Economic Outlook reports, Turkey has one of the highest shares of current account deficit relative to its GDP. This is a major concern for maintaining economic stability since these deficits are financed by short-term capital inflows that are very volatile and that tend to fly out as the fragilities increase, for example, during the financial crisis of 1994. In contrast, Malaysia has run a current account surplus at an average rate of 12.4 percent to its GDP, and it also instituted capital controls during the financial crisis of 1998 to maintain stability of its financial sector. This contrasts with the experiences of other Asian countries such as Korea and Thailand, which practiced IMF-led austerity programs to recover from the crisis.

Fourth, another concern for the Turkish macroeconomic performance is the rising total debt service ratio. As a share of exports of goods, services, and income, this ratio has reached an average of 36 percent over the past decade, whereas it is only 6 percent in the case of Malaysia. As a share of the Turkish GNI, the total debt service rose from an average of 6 percent over 1981-97 to 8.7 percent since the year 1998. Malaysia has reduced this ratio from 9.7 percent to 7.3 percent over the same time periods.

Fifth, Turkey has faced a relatively much higher rate of inflation since the 1970s compared to Malaysia, which had inherited a low-inflation and fairly stable macroeconomic dynamics from their previous British colonial period. Turkey's fluctuations in relative prices, due to high inflation, have been one of the reasons for the reluctance of the manufacturing sector to invest in long-term projects (Rodrik and Aricanli 1990). With single-digit inflation on average, Malaysia has been more successful in sustaining price-stability.

## **6.4 Industrial Policy in Turkey and Malaysia**

Late industrialization in case of Turkey and Malaysia has unfolded through successive phases of industrial policies having common characteristics but yet being very distinct in their capacity to achieve competitiveness in world markets. Although both countries began industrializing earlier than the 1960s, we will focus on the period beginning with 1960s due to the difficulties with data availability for the previous periods. One can trace four phases of industrial development considering the historical experiences of Turkey and Malaysia:

- (i) Import-Substituting Industrialization (ISI): 1957-1970 in Malaysia, 1954-1976 in Turkey
- (ii) ISI Second Round and Exhaustion: 1971-1985 in Malaysia, 1977-1980 in Turkey
- (iii) Liberalization and Export-Oriented Industrialization: 1986-1997 in Malaysia, 1981-2000 in Turkey
- (iv) Crisis Management: 1998-2008 in Malaysia, 2001-2008 in Turkey

### **6.4.1 Import-Substituting Industrialization (ISI)**

The first phase for Malaysia begins with gaining independence in 1957 and ends with a drastic shift in industrial policies in 1970. This period involves a moderate degree of protection for import-substituting activities and measures to attract foreign direct investment (FDI) into export activities. In case of Turkey, a similar period of import-substituting industrialization (ISI) has taken place over the period 1954-1976.<sup>40</sup> In both countries, the state played an active role in promoting infrastructural development and

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<sup>40</sup> Note, however, that the first industrialization efforts in Turkey took place during 1930-39. We shall come back to this point in Section 6.4.1.3.

nurturing the import-competing industries with protective trade policies and tax incentives. The main difference between the two countries' experiences over this period was that the Malaysian industrial policies were focused on export promotion in resource-based manufactured goods while Turkish industrial policies were predominantly targeting domestic market until the 1980s. The Malaysian Industrial Development Authority (MIDA), which was set up in the late 1960s to enhance export growth, became a major actor in encouraging electronics multinational corporations (MNCs) in the USA to shift their production units to Malaysia. This was happening during the semiconductor assembly boom in the developing countries and Singapore—Malaysia's greatest role model—was reaching out to the MNCs to upgrade its labor-intensive assembly to more complex activities. Having the same motivation, MIDA's efforts to attract electronics MNCs became eventually successful partly due to generous fiscal incentives (due to the rich tax base from resource-based sectors) and a favorable investment climate, as well as an English speaking labor force that was well-trained and disciplined. It was thanks to the combination of these factors that Malaysia could launch on its high-technology export growth path (Lall 1995, Jomo 2008).

#### **6.4.1.1 Path Dependence: Colonial and Semi-Colonial Experiences**

In contrast to the Malaysian development, Turkey has neither set up an institution to attract foreign investment nor promoted export activities to a degree that Malaysia has done. One of the significant factors that induced these different trajectories has been the path-dependence. When Malaysia became independent in 1957, it had already a developed resource-based sector in exporting processed tin, rubber, and food, and this sector was previously developed by the British to satisfy its industrial raw material needs.

This provided Malaysia with a strong taxable base for raising government revenues to be directed into other sectors. The Malaysian government preserved the tradition of export-orientation and welcoming attitude to foreign investors, but only strived to upgrade it from low-skill, resource-based activities to more sophisticated lines of production.

Turkish industrial efforts were also partially path-dependent to follow previous historical achievements. Despite being never officially colonized, when Turkey was founded in 1923 (after a brutal independence war against European powers after the World War I), it inherited a semi-colonial economic structure from the defeated Ottoman Empire: First, small industrial producers were driven out by European competitors during the course of the 19<sup>th</sup> century. Almost all of industrial goods were imported and the only export commodities consisted of raw materials. Although Ottoman Empire was self-sufficient in textile products at the beginning of the 19<sup>th</sup> century, a century later 80 to 90 % of its domestic consumption was obtained from imported garments and textile products. Secondly, and more importantly as an indicator of semi-colonial status, Ottoman Empire had accumulated a large amount of external debt that it had increasing difficulties to service. The lender countries from Europe, as a result, had begun to dictate terms not only in economic decisions, but also in political and military realms with growing sanctions for the Ottoman Empire. In short, the newly-established Turkish state took over an economically backward and dependent productive sector coupled with a weak financial structure and a huge debt stock that it had to pay over a short period of time (Boratav 1988).

#### **6.4.1.2 Differences in Manufacturing Experiences before WWII**

Amsden classifies prewar manufacturing experience into three categories: pre-modern, émigré, and colonial. Since it is based on small-scale artisan handicrafts, the Ottoman Empire's experience falls into the first category. Pre-modern manufacturing was also seen in China, India, and Mexico, and was of longest standing among all. Malaysia's experience, in contrast, arose from the know-how transferred by permanent or quasi-permanent emigrants from China and India, and thus falls into the émigré type of prewar manufacturing together with Indonesia, Taiwan, and Thailand. Manufacturing industries in Turkey and Latin America received also emigrants from North Atlantic countries, but this type of émigré experience differed from Malaysia's and others' experience since the influence of foreign individuals was felt before the arrival of foreign firms (Amsden 2001: 15). In case of Turkey, these individuals were mostly wealthy merchants who were sometimes engaged in money-lending, but they were hardly any entrepreneurs engaged in industrial production. By contrast, in Malaysia, Chinese emigrants played an important role in earlier forms of industrial organizations in export and import processing. Amsden's third category, colonial prewar manufacturing experience, represents the know-how emerging from formal colonial organizations established by the North Atlantic countries (as in India) or by Japan (as in Korea, Taiwan).

The distinction between émigré and colonial experience allows Amsden to differentiate the long-run technology strategies among late-comers—whether to “make” or to “buy”. Those that invested heavily in national firms and national skills—China, India, Korea, and Taiwan—all had colonial manufacturing experience, whereas those that had attracted foreign direct investment and were slow to invest in advanced skills—



Argentina, Brazil, Chile, Mexico, and Turkey—all had North Atlantic émigré experience. The reason behind this differentiation lies in the transition to national-state formation. While the previously-colonized countries could in the postwar period nationalize, expropriate, and acquire foreign-owned business enterprises and seize “first-mover” advantage in expanding industries with large economies of scale, the countries with North Atlantic émigré experience had no comparable discontinuity and the nascent national enterprises were often crowded out by multinational firms (Amsden 2001: 16).

Note, however, that the Turkish case differed from the Latin American experience since there was some discontinuity with the end of the Independence War and the establishment of the Turkish Republic in 1923. What differentiates the North Atlantic émigré experience from the colonial one, in our opinion, is not that the existence of foreign direct investment *per se*, but rather the *nature* of that foreign direct investment. Malaysia had also attracted large sums of FDI under Chinese émigré experience, and did not carry-out a whole-scale nationalization of the existing foreign enterprises. Yet, the impact was mostly positive, especially in terms of upgrading from resource-based manufacturing to more complex activities such as electronics in the later periods. For countries with North Atlantic émigré experience, the problem was not simply the existence of “a large stock of foreign direct investment” and the crowding-out problem, but rather the fact that the existing foreign capital was employed either as merchant capital, that is, for buying cheap and selling dear without engaging in production, or as interest-bearing capital, that is, to lend money for earning interest on it. Thus, the problem was the almost complete non-existence of factory-scale manufacturing activity (see Boratav 1988 for the Turkish case). Amsden tends to underplay this factor (the

absence of productive capital), focusing more on the differences between national and foreign capital.

### **6.4.1.3 First Industrial Interventions in Turkey**

The first industrial move of the Turkish state took place during the Great Depression, when the imports of industrial commodities from developed countries came to a halt. Under a significant degree of protection and statist policies, state economic enterprises (SEEs) began to emerge as the main industrial enterprises. The major industrial activities consisted of the production of consumer goods such as flour, sugar, and garments, and industrial raw materials such as iron and other metals. State took also an active role in maritime transportation, municipal services, and the energy sector.

In 1934, the First Five-Year Industrial Plan was designed to guide public investments in strategic sectors. While some of the investment projects were completed by 1938, others were interrupted by the Second World War.<sup>41</sup> After the war, for the first time in the history of the Turkish Republic a multi-party system was set up. The new ruling party, the Democrat Party, implemented drastic changes in economic policies including a new external-orientation, the reduction of protective measures for the domestic industry, and prioritizing investments in agriculture, mining, and infrastructure. As a result, imports grew by more than a 100% while exports remained stagnant in 1947—which resulted in a large trade deficit for the first time since the foundation of the Turkish Republic. The trade deficits took a chronic form after 1947 as the share of the

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<sup>41</sup> Turkey did not participate in this war. However, it has seen the negative impacts of the war through the significant reduction in export earnings and the postponement of the industrial planning activities until the end of the war due to the rising share of military expenditure in total income.

industry shrank from 15.2% to 13.4% from 1946 to 1952, which made it increasingly dependent on imported inputs. This situation continued until the limits of external borrowing were reached and the consumer demand stagnated in 1954. Under these pressures, the Democrat Party shifted back to a more protective set of policies<sup>42</sup> and direct public investments in SEEs, encouraging import-substitution. However, ISI did not take the form of a stable industrial plan until the 1960s.

Beginning in 1963, Turkey instituted three five-year industrial plans with a focus on promoting the production of chemicals, commercial fertilizers, iron, steel and metallurgy, paper, petroleum, cement, and vehicle tires. While the first of these plans prioritized state initiatives and enterprises in taking the lead, the second and third industrial plans gave the priority to private capital accumulation supported by subsidies and incentives, limiting the role of the state to merely support private enterprises. Over the period 1962-1976, the SEEs became more active in intermediate goods sector while the private enterprises took the lead in producing consumer goods. Machinery production was largely undertaken by SEEs, but it was not sufficient by any means, which led to significant spending on imported machinery. Although final goods industries' share in GDP rose over this ISI period, the dependence on imported inputs and investment goods was not reduced—which tended to keep trade deficits significantly high as a share of GDP. These deficits were financed either by external borrowing or workers' remittances

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<sup>42</sup> The import-controlling programs were established in 1958 and they placed importable goods in one of the three lists: the Liberalized List 1 (LL1), the Liberalized List 2 (LL2), and the Quota List (QL). Unless a good was included in one these lists, it was prohibited to be imported. Tariff rates tended to be the lowest for raw materials and intermediate goods that were not domestically produced, and highest for final goods that were domestically produced (Katircioglu *et al* 1995: 34). These restrictions remained intact until the trade liberalization of 1980 and the new Import Program of 1983.

(which increased over time and became the main source that balanced the current account).

#### **6.4.1.4 Early Attempts of Performance Requirements**

Despite the targets in industrial plans for a large increase in exports and the promotion of textile industry, there was only limited achievement. One of the attempts of the Turkish government in the 1960s was to promote exports by making them a condition for capacity expansion by foreign firms. A German multinational, Mannesmann, formed a joint venture with a Turkish development bank, Sumerbank, to produce steel pipes. Both the Turkish and German managers recognized that the Turkish government was constantly willing to assist the joint venture in its operations. However, foreign investors were worried about the condition that each capital increase could only take place with the consent of the Turkish government. It became a government policy to allow for a capital increase by forcing companies to take on export commitments. Moreover, the government placed the condition that any profit transfers had to be covered by export earnings. However, the steel pipes produced by the joint venture could not yet compete at world market prices and the export sales led to losses (Friedman and Beguin 1971: 209-10). Hence, although the promotion standards set by the Turkish government resembled significantly to the treatment of the Korean government in terms of its monitoring and disciplining big capital, the Turkish case was of little success—perhaps because it was not maintained long enough to bear its fruits as it takes significant periods of time to complete ‘technology transfer’; or because the government failed to subsidize the losses from export sales.

In the Malaysian case, in addition to the activities of MIDA to attract electronics MNCs from USA in the late 1960s, “the 1958 Pioneer Industries Ordinance (PIO) provided incentives and tariff protection for the development of import substituting manufacturing. Firms enjoyed tariff protection and tax relief depending on the level of investment” (Li and Imm 2008: 83). However, the implementation of performance requirements and guided promotion of exports had not started until the small domestic market began to show signs of saturation and the rate of employment creation proved to be insufficient. Furthermore, the linkages between the export sector and domestic import-competing sectors were very few and weakly-developed, and only a few of these domestic enterprises had the capacity to upgrade themselves to internationally competitive levels (Lall 1995: 764).

#### **6.4.2 ISI Second Round and Exhaustion**

The second phase, 1971-85 for Malaysia and 1977-80 for Turkey, represent a second-round of ISI for Malaysia, and an exhaustion of ISI for Turkey. It is possible to say that Malaysia had a longer period of import-substitution, especially with the government’s effort to build heavy industry in the 1980s. By the time Turkey reached 1980s, it had pretty much exhausted its potential for pursuing import-substitution under a highly-protected domestic market and the export promotion strategies had not been effective as in the case of Malaysia.

The second-round of ISI in Malaysia began by the launch of the New Economic Policy (NEP) in 1971 as a response to the ethnic disturbances in 1969. The NEP sought to improve the living standards of *bumiputeras* (indigenous Malays) by increasing their employment in the domestic industries as workers as well as owners of capital. The

government's most significant intervention in this period was to take over domestic shares of foreign-owned plantations and import-competing enterprises, and to establish state enterprises, which were later transferred to Malay capitalists. The number of SEEs increased substantially as these nationalizations gained speed. Malay-owned enterprises, whether big or small in scale, were strongly preferred in government financing and support. Moreover, employment and education quotas were used as policy tools to improve the labor participation rate of the Malay population.

#### **6.4.2.1 Heavy Industrialization in Malaysia and Turkey**

Aside from the inter-ethnic redistribution taking place during this period, there were also significant industrial interventions to improve the linkages between the MNC-led export sector and the Malay enterprises that were expanding under generous government finance. The central initiative involved in these interventions was the establishment of the Heavy Industries Corporation of Malaysia (HICOM) in 1980. The Malaysian government was imitating for the most part the Korean drive for the Heavy and Chemical Industry in the 1970s. Its primary focus was the expansion of manufacturing activities outside of the Free Trade Zones (FTZs) and the improvement of inter-industry linkages. Nevertheless, HICOM faced large losses since the mid-1980s and several other state enterprises also displayed a poor performance.

These weak performances are regarded by the proponents of neoliberal policies as a costly failure and the modification of the governments' policies after 1985 are seen as a refutation of Malaysian industrial policy at large (see World Bank 1993). Lall and others have argued that this view is largely "unwarranted" because "the design of the interventions in Malaysia was not ideal, and so does not constitute a proper test for the

effectiveness of industrial policy; and the period over which effectiveness should be assessed may need to be longer when complex learning processes are involved” (Lall 1995). The design of these policies was not ideal because “the NEP was addressed primarily to redressing social imbalances and not to gaining world market competitiveness in a new set of industrial activities. HICOM and other state industrial enterprises were set up to serve domestic markets and establish local linkages, and there was no systematic attempt to guide or monitor their technological development process... [unlike Korea]” (Lall 1995: 765). This point also applies to the comparison between Turkey and Malaysia because the design of interventions was also not ideal in Turkey, and therefore, does not represent an appropriate test for the effectiveness of industrial policy in Turkey. Similar to Malaysia, the great majority of state enterprises in Turkey targeted the domestic market and their technological development process was not guided or monitored as in the case of Korea.

In Turkey, the same period of 1971-85 witnessed the Third Five-Year Industrial Plan (1972-76), the exhaustion of inward-oriented, protective, import-substituting manufacturing (1977-79), and the launch of the first economic liberalization program in 1980. The difference of the 70s import substitution from the earlier periods was the efforts of the government to create import-competing industries that produced investment goods and intermediate inputs. While the main instrument was the foreign trade regime, the investments in “heavy industry” were mostly achieved through direct state involvement in production. An additional incentive for increasing investment began in 1968 with the issuance of “certificates of encouragement” to private enterprises by the State Planning Organization. The investment projects eligible for these certificates

enjoyed subsidized credits, tax breaks, and were partially exempt from customs duties. However, the realization rates of these projects were rather low, and there was no process of guiding or monitoring after the certificates were issued. Furthermore, the government provided substantial export subsidies to exporting firms since the early 1960s in order to compensate for the overvalued exchange rate. Yet, these subsidies were also not effective in many cases to upgrade domestic industries to internationally competitive levels (Erzan 1995).

#### **6.4.2.2 Turkish Debt Crisis, 1977-79**

During the last few years of 1970s, the recessionary pressures in the world-economy were severely felt in Turkey. As exports fell by \$ 200 million from 1976 to 1977, imports still continued to rise by \$ 660 million and export/import ratio declined to 30 %. Consequently, trade deficit was over \$ 4 billion. The workers' remittances, which were financing a large part of this deficit in early 1970s, were adversely affected by the overvaluation of the currency and the austerity programs that were implemented in Europe after the first oil shock. To finance the increasing current account deficits, the Turkish government came up with a plan to provide exchange-rate guarantee to the Turkish firms accumulating short-term debts from European banks. This form of subsidized foreign financing became increasingly costly as the currency became progressively overvalued. By mid-1977, foreign banks refused to lend any further, which created a severe liquidity crises in Turkey (Rodrik and Aricanli 1990: 1344). This period also corresponds to escalating civil unrest and political tensions in the parliament. It came to an end by a military coup in September 12<sup>th</sup>, 1980 and the military government implemented a far-reaching stabilization program under the guidance of the IMF.



### **6.4.2.3 Comparison of ISI Experiences**

Before getting into the details of this program, it will be useful to compare the Malaysian ISI experience with the Turkish one.

First, Malaysia did not encounter the balance of payments problem to the degree that it was faced in Turkey, for two reasons: (i) Malaysia had relatively strong market positions in tin, rubber, and palm oil, and promoted its export-oriented industries effectively so that its export growth never lagged too much behind its import growth; and (ii) the import-competing industries were more successful in building backward linkages and deepening ISI into the second-round of intermediate and investment goods sectors. The second reason is at least as important as the first one because the protected infant industries in final goods sector can become mature only in the presence of local suppliers of the inputs required. In case of Turkey, although state enterprises were actively engaged in intermediate goods production, they have often made losses due to inadequate know-how and imperfections in knowledge transfers. But, perhaps more importantly, they were not given enough time to absorb complex organizational and production technologies. By contrast, Malaysia had an additional five years of ISI (1980-85), substantially investing in its heavy industry drive through state-owned enterprises. Turkey could not afford waiting longer due to its rising trade deficit that was becoming increasingly unsustainable.

Second, as a more general point, the divergence in growth paths is to a great extent influenced by the comparative strength of the Malaysian trade and fiscal positions, both of which reflect structural differences in international specialization patterns and their impact on tax base as compared to Turkish. This is an exogenous difference that is

path-dependent and structural and thus, cannot be reduced to relative effectiveness or strength of economic policies implemented.

Third, both the Turkish and Malaysian interventions were carried out by public sector enterprises with ‘soft budgets’, lacking an initial learning basis for effectively using new production technologies. This aspect contrasts significantly with other Asian latecomers such as Korea, whose drive for machinery and chemical industries were undertaken by giant private conglomerates (the *chaebol*) with an already strong and diverse production base and an already internationally competitive export performance.<sup>43</sup> Nonetheless, while the Malaysian enterprises were successfully restructured and gained such capabilities through being subject to performance requirements in the late-1980s, the Turkish counterparts have only been privatized and financially encouraged through subsidies, tax incentives, etc.—but they were hardly monitored for their performance, which has not improved to desired levels. Thus, as I will explain in the next section in detail, the Turkish manufacturing experience differed considerably from successful East Asian latecomers in one respect: Turkish state failed to develop institutions that could provide guidance and monitoring to the manufacturing enterprises for enabling them to compete at world market prices.

Fourth, neither the Turkish nor the Malaysian industrial policies were supported by supply-side measures to ensure sufficient development of skills or technology support. Despite having good basic educational institutions, both countries had a relatively small share of technical education provided at the level of university or vocational institutions. This was certainly a large constraint to industrial upgrading as the high-level technical

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<sup>43</sup> Note that Taiwanese industrialization was driven largely by small-scale firms. Thus, the large scale enterprises were not uniformly true for all East Asian latecomers.

and engineering skills were not well-developed at all. Yet, both countries have placed significant measures to improve skill development—but Malaysia has been more successful in creating a large pool of well-trained technicians and engineers compared to Turkey. Moreover, during import-substitution phase, both countries were short of an effective system for the development of industrial technology. Without such a system, it was rather difficult to establish linkages required to perform better. This factor also differs significantly from first-tier NICs such as Korea, where its industrial deepening was backed up by supply-side measures and this has accompanied interventions in industrial development.

Fifth, neither the Turkish nor the Malaysian governments had a clear-cut, *selection* strategy for identifying and rigorously supporting key industrial sectors during the import-substituting industrialization process. The Turkish interventions especially suffered from lacking a coherent strategy as all sectors—the agriculture, the import-competing sector, the export-oriented sector, the service sector—were tried to be supported all at once. Rodrik argues that the governments had indeed “good intentions”, yet a policy supporting agriculture often hurt the industry, or policies supporting import-competing sectors were detrimental to the performance of exporting enterprises. Thus, to target all sectors at the same time amounts to targeting none of them (Rodrik 1995). Malaysian ISI experience was similar to the Turkish case in this sense since selective industrial strategies began to be implemented only after 1985.

### **6.4.3 Liberalization and Export-Oriented Industrialization**

The third phase, 1985-1997 for Malaysia and 1980-2001 for Turkey, follows the recessions of the previous period and represents a radical turn towards opening up to the

world markets and promoting export-orientation at an increasing scale. The Malaysian government instituted measures to privatize and restructure state enterprises and started to implement a new set of incentives to attract MNCs. With the Investments Act of 1986, the requirements for local share-holdings of the NEP were relaxed and more generous investment incentives for the manufacturing sector were offered. Moreover, the value of the Malaysian ringgit declined (by 7% against the US dollar and by 20% against SDRs) and this nominal devaluation was reflected by a real effective exchange rate decline of about 20% in 1986. In the meantime, most of the East Asian currencies' value rose relative to the US dollar, raising comparative production costs. As a result of these developments, Malaysia began to receive an increased inflow of FDI with rising importance from the East Asian countries including Taiwan, Hong Kong, and Japan. The growth of FDI flows in this period is also attributed to the lower real wage costs (due to high unemployment rates over the mid-1980s) and the new labor laws that weakened workers' bargaining position and increased labor flexibility (Jomo 2008: 15).

Although similar downward trends in real wages and exchange rates are also observed in Turkey (due to massive nominal devaluation and anti-labor laws passed after the 1980's stabilization program), the response of FDI flows has been quite stagnant. There has been an increase in the number of investors from 100 in 1980 to 610 in 1986. However, FDI has predominantly been concentrated in foreign trade financing and investment banking—areas where foreign investors had a clear advantage over domestic ones. The banking sector was receiving 4% of foreign investment in 1979, but this figure rose to 20% in 1986 (Rodrik and Aricanli 1990: 1348). The contribution of FDI flows to manufacturing activity has been very disappointing, especially considering the

liberalization efforts (simplification of the approval process, reductions in bureaucratic impediments, etc.) that took place. It has been often argued that foreign investors doubt the long-term existence of reforms and the stability of the financial system. Overall macroeconomic instability appears to be an important concern given the high rates of inflation, interest, and exchange rate depreciation. Political instability, of course, is another factor that keeps FDI in real sectors relatively low.

Apart from the differences in the flows of foreign investment, the Turkish case differs from the Malaysian industrialization in this period by the absence of a more selective strategy in its industrial policy design. In 1985, the Malaysian government replaced the NEP with the New Development Policy (NDP), which was much more similar to the industrial policies adopted by other East Asian NICs. The capabilities and requirements of the manufacturing activities were systematically analyzed, which formed the basis of the Industrial Master Plan (IMP) from 1986 to 1995. The emphasis of this plan was to develop a more selective strategy targeting automated manufacturing, microelectronics, advanced materials, biotechnology, and information technology (Lall 1995: 767). These targeted sectors were promoted by investments in education, training, technical support, finance, and quality improvement.

#### **6.4.3.1 Selective Import Protection and the ‘Flying Geese’ effect in Malaysia**

Import protection in Malaysia became more *selective*. While tariff protection was reduced to an average of 20 percent, *infant industry protection was preserved*, for example, in case of light aircraft production in the public sector. It is important to stress this point because it constitutes a major difference compared to the more comprehensive elimination of import protection in Turkey. Moreover, a technology plan formed the core

of IMP, improving the infrastructure of science and technology institutions and inducing R&D expenditures in private enterprises. The re-organized public enterprises kept their significant role in industries requiring large investments that have long gestation periods, such as automotive, petrochemical, iron and steel, and cement. Selective strategies showed themselves also in the regulation of export-oriented MNCs. MIDA provided incentives to direct FDI into higher-value added activities and higher-technology processes, replicating the experience of Singapore. However, unlike Singapore, Malaysia began to use incentives for increasing local content. Foreign suppliers in FTZs were denied their full privileges and started to be treated as local firms. Malaysian government also attempted to direct the investments into labor-intensive activities from Penang into Johor, by building a 'growth triangle' with Singapore and Indonesia (Lall 1995: 767).

These changes in Malaysian industrial policy were accompanied by high growth rates in exports and national income. However, much of this strong performance is attributed to the attraction of the MNCs to the new incentive structure and the rising costs of production in the other East Asian countries (Jomo 2008: 16). Thus, being part of the "East Asian" area constitutes another structural factor favoring Malaysia. These regional dynamics reflect the 'flying geese' effect: as production costs rise over time in mature developing countries, companies migrate to lower-cost producers in search for higher profit rates for the same working capital. Migration of Korean and Taiwanese firms to Malaysia is a case in point for the flying geese effect. In the meantime, Malaysia succeeded in 'maturing' some of its import-substituting industries as these firms developed technological and managerial capabilities over time and began to compete in external markets.

### 6.4.3.2 Non-selective Export Promotion in Turkey

In comparison, the reform package in Turkey was mainly designed to put the economy on an outward-oriented course and promote export industries as the main engine of growth. This promotion strategy, however, did not take a *selective* character as in the Malaysian case. Its basic instruments consisted of a large nominal devaluation (that led to a sizable real depreciation of 50% from 1979 to 1987) and a generous program of export subsidies composed of tax rebates, export credits, and foreign currency retention. While currency depreciation made exporting firms more competitive, the export subsidies were dispersed across the sectors without much targeting based on the dynamic comparative advantages. There was only one clearly promoted sector, textiles and clothing, which has received an increasing number of investment incentives over this period (Erzan 1995: 94). Thus, while the impact of the export incentives on the apparent export boom of the early 1980s is obvious, their net contribution to capacity building has been disappointing. After capital account liberalization in 1989, there were massive capital inflows in 1989 and 1990 and the Turkish lira appreciated substantially. This appreciation led to a fall in profit margins of export-oriented firms. Although export volume did not decline, its high levels are attributed to the export subsidies received. In other words, without export subsidies in place, it would be very difficult for these firms to compete at world market prices. What is more disappointing, however, is the fact that private investment in tradables has been stagnant. Exporting firms relied for the most part on existing capacity (Rodrik and Aricanli 1990: 1347).

#### **6.4.3.3 Non-selective Import Protection in Turkey**

The Turkish strategy in trade liberalization has also not been selective in its targeting. The main policy tool in controlling foreign trade—quantitative restrictions (or non-tariff barriers (NTBs))—was abolished with the new Import Program in 1984. This program specified which commodities could not be imported, and which commodities were subject to license. Under the previous system, all commodities that were not listed in the ‘liberalized lists’ were prohibited. The new Import Program, therefore, constitutes a shift from the ‘positive list’ to the ‘negative list’ and reduces the role of non-tariff barriers significantly. However, this amounted to an overall reduction of NTBs without reserving some degree of protection for the existing infant industries. There was some adjustment of import tariffs upwards and some special import levies were imposed to finance extra-budgetary funds. In 1985-6, the highest tariff rates were on capital goods (20.8%), relatively lower rates were on non-durable consumer goods (8.2%), and the lowest rates on intermediate goods (7.0%) (Katircioglu 1995: 35). These measures, however, were far from replacing the protective role of the quantitative restrictions and the competition in domestic markets became much more intense. Moreover, starting in 1988, these tariff rates declined across all commodity groups as part of Turkey’s tariff harmonization efforts with the European Union.

#### **6.4.3.4 Capital Account Liberalization in Turkey**

Turkey liberalized its capital account in 1989. This became a policy maneuver paving the way for liquidity injection into the domestic economy in the form of short-term foreign capital, i.e. flows of “hot money”. These capital inflows served a double-purpose: to finance the growing public sector expenditures and to cheapen the cost of



imports by providing cheaper short-term credit. This policy was thus an attempt to offset the twin structural weaknesses, of trade and fiscal deficits. As a result, the lower cost of imported intermediates provided another stimulus for growth over the period 1990-1994 (Yeldan 2006: 1999).

Despite the advantages of lower costs, however, private investment in manufacturing—domestic and foreign—has on the whole been stagnant after the 1980s. By increasing the instability of the financial sector and raising the interest rates on credit beyond reasonable levels, capital account liberalization has been partly responsible for this stagnancy.<sup>44</sup> High inflation rates also contributed to dampen investment levels by creating uncertainty due to the fluctuations in relative price levels. The high rate of real depreciation coupled with high relative tariffs has increased the cost of capital goods. Although overall investment incentives increased substantially, the share of manufacturing sector has declined (from 75% to 6% from 1980 to 1988) at the expense of the service sector<sup>45</sup> (Senses and Taymaz 2003: 4). All these factors induced by the policy reforms after the 1980s generated major weaknesses in the Turkish manufacturing sector in terms of a low saving and investment rate, increased short-sightedness, and unable to stimulate the future growth of the economy. Analysts agree that the success of the export sector in expanding exports in the early 1980s also owes significantly to the

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<sup>44</sup> The idea behind capital account liberalization was the opposite: to lower the cost of credit by having access to cheap sources of foreign borrowing. However, the cost of borrowing increased tremendously with the rise of interest rates due mostly to increased speculative activity related to arbitrage earnings that attracted inflows of short-term capital.

<sup>45</sup> Housing and tourism were the two highly-promoted service sectors experiencing a remarkable private investment activity.

“accumulation of industrial capacity in the earlier period” (Rodrik and Aricanli 1990, Boratav 1988, Senses and Taymaz 2003).

#### **6.4.4 Crisis Management**

The fourth phase, 1998-onwards for Malaysia and 2001-onwards for Turkey, begins with the spread of the East Asian currency crises to Malaysia and with a few years delay to Turkey. Its distinct characteristic has been the abandonment of the industrialization strategy due to the exigencies of crisis management. The crisis has been managed through the implementation of capital controls in Malaysia, while Turkey resorted to another IMF-led stabilization plan. Despite differences in the forms of crisis management, both countries seem to prioritize the management of the financial system at the expense of the manufacturing sector (Jomo 2001, Senses and Taymaz 2003).

Management of the Asian financial crisis of 1997-98 differed significantly among the worst affected economies in the region. While Thailand, South Korea and Indonesia responded by calling in the IMF and embarking on IMF-designed programs to secure emergency credit flows from the IMF, Malaysia was never in serious need of IMF credit facilities due to its lower levels of foreign debt and stricter central bank prudential regulation. Unlike Thailand, South Korea and Indonesia—which committed to float their exchange rates, raise interest rates, constrain fiscal spending, liberalize their financial markets opening to foreigners, close troubled banks, and implement other conditions to secure financial assistance from the IMF, Malaysia took a very different path. The Malaysian authorities decided to impose comprehensive controls on capital-account transactions, fix the exchange rate at RM3.80 per US\$ (a 10 per cent appreciation), reduce interest rates, and follow a policy of reflation. These policy changes were

undertaken during the summer of 1998 as the financial crisis was deepening in Malaysia compared to other affected countries.

There is some controversy on whether the implementation of capital controls produced a faster recovery from the economic crisis and a better economic performance than would have been possible in its absence. Some have shown using econometrics that the capital controls have “produced faster recovery, smaller declines in employment and real wages, and more rapid turnaround in the stock market” (Rodrik and Kaplan 2001). Opponents of capital controls disputed these claims (Dornbush 2000), arguing that South Korea, Thailand, and Indonesia had positive growth rates beginning in the first quarter of 1999, whereas the Malaysian recovery took off later in the second quarter. There is also an argument in between these two poles, which suggests that “the nature of the experiences do not allow strong analytical or policy conclusions to be drawn” (Jomo 2001: 13)—due to strong differences in the pre-crisis regulation schemes and exposure to foreign borrowing. Malaysia could preserve a strong prudential regulation that was designed as a response to its late 1980s-crisis, while other countries deregulated their financial systems much more. This was important for Malaysia’s successful implementation of transparent capital controls, which would have been harder to undertake in more financially-liberalized economies of South Korea, Thailand, and Indonesia. Moreover, the recovery in Malaysia was also accompanied by Keynesian reflationary efforts and favorable external conditions, most notably the electronics boom. Hence, it is unreasonable to attribute the successful elements of crisis management merely to the imposition of capital controls.

Compared to Malaysia, Turkey's crisis management resembles to the experiences of more financially-liberalized economies of South Korea, Thailand, and Indonesia. Turkey was forced to call in the IMF and undertake IMF-designed programs to cope with its financial crisis in 2000-2001. Unlike Malaysia, its banking regulation system was very weak and the indebtedness to foreign banks was rather high—which made the implementation of such capital controls rather difficult, even though several critics have argued that capital controls are necessary for the management of Turkish financial system (Akyuz and Boratav 2003)

A greater concern in the long-term is the change in the nature of bank loan portfolios. The Malaysian banks increased their lending for residential property loans and raised their limits in purchases of shares. These developments took place at the expense of loans for productive purposes, especially in manufacturing, but agriculture and mining as well. Given the declining trend in FDI inflows since 1996, the redirection of bank loans away from productive sectors would restrain investments in the real sector substantially (Jomo 2001). Moreover, the emphasis on the official development policy on attracting high value-added investments and moving up the technological ladder is suspended after the crisis. Economic policy became all about managing the crisis and stabilizing the economy, and much less about strategic and long-sighted industrial policies. Human resource development, in particular, continued to lag behind first-tier NICs after the Asian financial crisis.

The post-crisis developments in Turkey resembled those in Malaysia with its neglect of long-term priorities in high productivity, high technology investments. Monetary policy was tightened and the IMF-designed inflation-targeting programs were

implemented. While inflation rate was kept at lower figures, the contractionary effects of tight monetary policy were reflected in very high rates of unemployment, economic expansion did not create new jobs, and the bargaining power of workers deteriorated further resulting in declining real wages (Yeldan 2006, Senses and Taymaz 2003). These trends and their relationship to terms of trade movements will be analyzed in the next section.

## **6.5 Export Performance: Turkey, Malaysia, and other NIEs**

### **6.5.1 Growth of Manufactured Exports**

This section will consider Turkey's export performance and structures in comparison to Malaysia and other newly industrializing economies (NIEs). Table 6.2 indicates the values and growth rates of manufactured exports for 13 leading developing countries. The largest exporter is China, with 2,140 billion of manufactured exports in 2008, followed by Korea and Mexico with about 330 billion and 208 billion respectively. The smallest ones are Argentina and Indonesia; Turkey is next with 101 billion. The fastest growing exporters over the 1980-2008 period are China, Thailand, Mexico each with over 14 percent annual growth, followed by Turkey and Indonesia (see Table 6.3). The slowest growing are Hong Kong, Brazil and Argentina. It is important to notice that the 13 countries listed in Table 6.2 account for nearly 80% of the developing countries' total manufactured exports in 2005. The analysis of export patterns from developing countries thus eventually amounts to explaining what drives exports from these few NIEs.

The growth rates of Turkey's manufactured exports were particularly high in the early 1980s, but they slowed down after mid-1980s. In 1997-98, when world trade growth fell dramatically as a result of economic crises in NIEs and in Russian Federation, Turkey's export performance suffered significantly, its growth declining from 10.5% in 1990-95 to 6.8% in 1995-2000. On the other hand, since the year 2000, Turkey's manufactured exports have been accelerating at an annual rate of more than 21 per cent (Table 6.3). In contrast, Malaysia's manufactured exports seem to have slowed down especially in the last few years.

### **6.5.2 Technological Composition of Manufactured Exports**

Table 6.4 shows the technological structure of exports. Turkey has the weakest structure of the group—having only 3.8 per cent of its manufactured exports in high-technology products. 45 per cent of Turkey's manufactured exports are accounted for by low-technology (LT) products and 3.2 per cent by resource-based (RB) products. The sum of medium technology (MT) and high-technology (HT) products contribute 51.4% of its exports. This is a very low figure compared to Malaysia, whose 74 per cent of exports consist of MT and HT products. Even China, despite its specialization in labor-intensive LT exports, has been shifting to produce a much higher share of medium- and high-technology products, and its proportion of HT products has slightly outweighed that of LT share in 2008.

The export structure of Turkey is not only technologically weak, but also relatively stagnant. Over the period 1985-2008, the total share of HT and MT products has risen by 26.9 percentage points, a tiny rise in the share of HT largely complemented by the rise in that of MT products (Table 6.4). Although the rise in the share of MT

products in Turkey has been remarkable since 1995, it pales in comparison to the extent and speed of structural change in Malaysia and other NIEs. Given the rapid transformations in the structure of world trade and rising importance of products with higher technology content, Turkey's structural stagnation is a major problem that needs to be addressed. Table 6.5 provides the values and growth rates of each category of exports for these countries.

Considering the whole period from 1985 to 2008, Table 6.5 shows that Turkey has its highest growth rates in exports of HT products. However, this high rate is only an indicator of its small beginning level. In absolute terms, its high-tech exports in 2008 are a small proportion (3-4%) of those from Singapore, Hong Kong, and Korea, and only about 1% of China's. Apart from that, the highest overall growth comes from MT products, whose growth rate began to exceed LT products especially since the late-1990s. This provides evidence for a significant structural change towards products with higher technological content—from LT towards MT products. However, the tiny share of HT products in total exports and the slowdown in their growth rates since 1995 continues to pose significant challenges for the dynamic transformation of Turkey's export structure. In short, the figures in Table 6.5 suggest a recurring structural problem in Turkey's exports, with a dominance of LT and MT products and small evidence of an ability to shift to more dynamic HT products.

One of the problems with having a high share of low-technology products in Turkish exports is that most of these products are textiles and garments—whose international markets are becoming increasingly competitive due to East Asian newcomers. Turkey is considerably a high-wage country compared to countries such as

China, India, Indonesia, and Philippines. Given this cost-disadvantage, the Turkish textile industry has been investing in equipment, quality improvements, and design capabilities. However, Asian textile firms have also upgraded their productive capacity and invested in such capabilities. It remains to be seen if the Turkish exporters will be able to establish a reputation of quality and retain their market shares, especially in Europe.

Malaysian HT exports tended to grow at a slower rate during the late 1990s and early 2000s, particularly due to the Asian currency crisis in 1998. However, despite being lower compared to the previous period, the growth rate of HT products' exports was higher than goods with lower technological content over the period 1995-2008. These exports also form the major stimulating force in the Malaysian economy that relies significantly on the performance of export-oriented MNCs. These companies began to invest in local content, which involves large sunk costs and makes it harder for the productive activities of MNCs to be "footloose". To put another way, the local content investment ties the export-oriented MNCs to the hosting country and encourages them to upgrade their exports to remain competitive in world markets.

If Turkey desires to mobilize itself to compete in advanced export activities in the Malaysian fashion, it has to upgrade its domestic activities in more sophisticated technologies to global levels of efficiency. Such an upgrading requires a significant degree of technological learning. Although the previous instruments of industrial policy to promote such learning are no longer applicable under the new global agreements, there are yet other tools of policy that could be carefully designed to encourage and stimulate the process of technological learning to compete at world market prices. The next section



examines these instruments and their relative effectiveness focusing on Turkey and Malaysia.

### **6.5.3 Structural Change in Manufacturing Sector, Export Performance, and the Terms of Trade**

#### **6.5.3.1 Impact of the Share of High-Technology Exports on Export Performance and Economic Growth**

The brief theoretical review in Section 6.2 provided us with three testable propositions: (i) Manufacturing activities with rapid product or process innovation enjoy faster growth of demand compared to technologically stagnant activities; (ii) Technology-intensive manufacturing activities are less susceptible to entry by rival producers compared to activities with low technological content; (iii) Structural change involving higher shares of high-technology manufacturing production allows higher rates of growth. In order to assess whether the empirical evidence gives support to these propositions, we use indicators of technological intensity of export structures and plot them against indicators of international competitiveness and export dynamism. This provides suggestive evidence in favor of these relationships.

The share of high-technology exports in total exports ( $X_{tech}/X_i$ ) is an indicator of technological intensity of the specialization pattern. In Figure 6.4 this indicator is plotted against a measure of international competitiveness—the country's share in total world exports—for Turkey and Malaysia between 1962 and 2008. The dark line represents the path followed by Malaysia and the light one represents that of Turkey. We expect that a country can capture a larger share of world markets if it increases its specialization in high-technology manufactures whose markets pose higher barriers to

entry and grow at a faster rate (the first two propositions). Figure 6.4 shows that there is a strong positive association between the technological intensity of the export structure and international competitiveness measured by market shares. The Pearson correlation coefficient between the two indicators is 0.91 for the two countries, which is highly significant. It also illustrates that Turkey remained in the lower corner of the technology intensity-market share space, exhibiting a small share of high-technology exports coupled with a small rate of participation in world markets. In contrast, while Malaysia started from a similar position to Turkey in the early 1960s, the technological upgrading of her export structure allowed her to reach the upper corner of the technology intensity-market share space in the first decade of twenty-first century.

Figure 6.5 and Figure 6.6 plot the growth rate of the share of high-technology exports in total exports against the growth rates of manufactured exports and of export share in world markets for the leading exporters of manufactured goods (Hong Kong, Singapore, Thailand, Korea, Indonesia, China, India, Brazil, Mexico, Argentina, Turkey, and Malaysia) over the period 1962-2008.

Two results emerge from Figure 6.5. First, countries that had higher rates of technological upgrading experienced higher rates of growth in their total manufactured exports. The correlation coefficient between high-technology share exports and the value total manufactured exports is 0.30, and the correlation coefficient between the former and the log of the latter is 0.60 (Table 6.6). Second, while Turkey has experienced a relatively high rate of export growth along with a relatively lower rate of technological upgrading, the opposite is true for Malaysia. Given that higher rates of technological efforts at any

point in time yield higher rates of expansion in more dynamic sectors, the prospects for future growth of manufactured exports is brighter for Malaysia compared to Turkey.<sup>46</sup>

Figure 6.6 shows that countries that raised their high-technology export shares in 1962-2008 also tended to capture a larger share of world export markets than the average in the same period. Korea, China, Malaysia, and Thailand cover the upper corner with successful structural transformation and export performance, while Turkey, India, and Latin American countries occupy the lower corner of Figure 6.6.

Furthermore, it is seen from Figure 6.7 that the countries that remained competitive in world markets over the period 1962-2008 were also the ones that attained higher rates of income growth in per capita terms. Turkey performed only slightly better than Argentina, Brazil, and Mexico in terms of increasing the average income level of its citizens. All Asian countries achieved to raise their average income levels at a faster rate due to rapid transformation in their export structure towards manufactured commodities with greater technological content. Malaysia could have performed even better than it did given the high rate of growth in its high-technology share of manufactured exports.

### **6.5.3.2 Structural Changes in Manufacturing and the Terms of Trade Trends**

Let us now consider how the patterns of structural change in productive sectors influence the trends in terms of trade for Malaysia and Turkey. As we have mentioned in the beginning, we expect that the rapid transformation of Malaysian exports into manufactured goods with higher technological content has generated an upward movement in relative export prices and a massive expansion in the volume of these high-

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<sup>46</sup> The relatively high rate of growth of manufactured exports in Turkey is attributable to the growth of its low- and middle-technology industries, which have so far been the driving export sectors.

tech exports. Figure 6.8 displays the evolution of net barter terms of trade vis-à-vis the rise in share of high-tech exports in total exports for Malaysia from 1962 to 2007. It is possible to see a parallel upward movement towards the end of ISI period and the beginnings of the export-led growth in late 1970s and early 1980s.

The parallel movement is even more apparent in the trends of income terms of trade and the share of high-tech exports seen from Figure 6.9. This means that rising relative prices of Malaysian exports accompanied rising volume of exports that resulted in a steep rise in her income terms of trade, at least in part because of rising shares of high-technology manufactured goods in its total exports. The Pearson correlation coefficients for terms of trade indices and high-technology export shares are 0.79 for net barter and 0.91 for income terms of trade, which are highly significant.

As we described in great detail in the previous sections, Malaysia has been very successful in attracting multinational corporations in electronics manufacturing from the US and mature Asian economies during the boom in electronics demand worldwide. This has played a very significant role in its technological upgrading and future prospects of economic growth. It has also benefited from the regional structural factors as we explained under the “flying geese” effect in the previous section. Thus, it was a combination of internal factors such as a guided technological effort to attract FDI in high-technology sectors along with favorable external factors such as a good trade and fiscal position initially and following movement of other Asian firms into Malaysia that provided a positive cumulative causation mechanism between industrialization and economic growth.

Turkey, on the other hand, experienced a downward trend in its net barter terms of trade for most of the period over 1962-2007 and the share of its high-technology manufactured exports was significantly low throughout this period (see Figure 6.10). We expect the specialization in low technology-intensive manufactures to generate a tendency for the relative export prices to deteriorate over time and a much lower rate of growth in the volume of exports (that is, a modest rise in income terms of trade). The very low levels of high-tech export share indicate that the overwhelming majority of Turkish manufactured exports are low or medium technology-intensive (also shown from Table 6.4). Due to high levels of competition in these types of manufactures, the relative prices tend to deteriorate over time (UNCTAD 2005). Since 1994 Customs Union with European Union, the net barter terms of trade declined 14 percent over 1994-2007. The collapse in Turkey's net barter terms of trade in 1970s is primarily due to the rising prices of oil—which is a net import commodity for Turkey—during the oil price shocks of 1973 and 1979.

Figure 6.11 provides evidence for a positive relationship between Turkey's income terms of trade and high-technology export share. However, most of the gains in export volume since 1980s has been a product of the expansion in low-technology and (later) middle-technology exports. The relatively low shares of high-technology exports account for the much lower rate of growth in income terms of trade in Turkey in comparison to the massive expansion in Malaysian income terms of trade. Table 6.8 displays the Pearson correlation coefficients for NBTT, ITT, and HST for Turkey. While ITT is strongly positively correlated to HTS, NBTT is negatively correlated to HTS.

We also expect that higher rates of unemployment in Turkey to create a tendency for keeping real wages lower, and thus, resulting in lower relative prices of exports of Turkey. Inversely, we expect that the lower rates of unemployment in Malaysia will tend to push real wages upwards, which would be reflected in rising net barter terms of trade for Malaysia. In order to assess whether empirical evidence supports this view, we provide the evolution of real wages in manufacturing sector, the rate of unemployment, and the net barter terms of trade for Turkey and Malaysia in Figures 6.12 and 6.13, respectively.

Figure 6.12 shows that the rise in the rate of unemployment<sup>47</sup> after 1996 significantly lowered the collective bargaining power of workers and lowered real wages, which was also reflected in an overall decline in terms of trade since the late-1990s. Table 6.9 provides the correlation coefficients for these variables. Net barter terms of trade for Turkey is positively correlated with real wages (0.51) and negatively correlated with the unemployment rate (-0.40), as we had previously expected.

Figure 6.13 illustrates the trends in manufacturing real wages, unemployment rates, and the net barter terms of trade (NBTT) for Malaysia. It is seen that during the steep rise in NBTT in mid-1980s unemployment rate was rapidly declining and real wages were soaring. Table 6.10 shows that the correlation coefficient of NBTT with unemployment rate was significantly negative (-0.96) and with real wages significantly positive (0.72), supporting our observation from Figure 6.13. These correlations are stronger in case of Malaysia compared to Turkey.

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<sup>47</sup> The highest rise in unemployment rate took place during the 2001 Currency Crisis and unemployment rate remained high since the crisis.

## **6.6 Instruments of Export Upgrading and Competitiveness**

Theorists of technological learning and capabilities have emphasized three sets of factors that might enhance or undermine the pace of learning in a late-industrializing country: the incentive framework, the factor markets, and institutions (see, for example, Lall 1992). Considering the first one, one can argue that Turkey has developed economic incentives conducive to raising overall productivity. Fostering the manufacturing industry under a regime of import-substitution relying on state protection, ownership, and interventions, Turkey has implemented a liberal policy regime since the 1980s. This has mainly been accomplished through lowering trade barriers, abolishing all NTBs, systematizing and reducing tariff rates, and entering a free trade agreement with the European Union since 1994. The Turkish government also restructured its tax incentives and preferential credit system, reformed the SEEs, and liberalized the FDI regime. Accompanying these developments was a shift in state investments from sectors of potential competition with private sectors into complementary sectors of infrastructure provisions such as transportation and communications (Lall, 2000). Similar changes have also taken place in the case of Malaysia, but as we have emphasized, in a more carefully-planned, and strategically-selective fashion.

The liberalization of Turkish policy regime has significantly restrained the capacity of the developmental state to use industrial policy in support of new activities. Under the WTO rules and as part of its free trade agreement with the EU, the traditional instruments of industrial policy—infant industry protection, the use of subsidies to promote local productive enterprises, local content regulations, and selective acceptance of FDI—are no longer permitted. Before liberalization, Turkey could implement some of

these policy tools, but as we have seen, with limited success, partly due to insufficient degree of selective targeting to encourage domestic enterprises for entering sectors with complex technologies. Given the new rules of international agreements, however, Turkey can still make use of other instruments of competitiveness that are commonly applied by industrial countries and NIEs: upgrading of skills, planning to promote science and technology, technology support for private enterprises, R&D incentives, and attracting FDI. This still consists of a large pool of instruments that middle-income countries such as Turkey and Malaysia can successfully implement.

Let us now consider some of the indicators of the effectiveness of these instruments as far as they were used in Turkey and Malaysia, and compare their performance with other NIEs and some industrialized countries. We will follow two sets of indicators: (i) skill upgrading and R&D expenditures, and (ii) the attraction of FDI inflows into productive sectors.

### **6.6.1 Skill Upgrading and R&D Expenditures**

The nature of technological change in the twenty-first century brings greater demands for skills and the skill formation needs to be flexible enough to be responsive to emerging industrial requirements. To move from one pattern of competitiveness, thus, requires transforming the formation of new skills and the interaction of this skill-generation process with the productive system as it uses and contributes to skill upgrading. In short, to enhance competitiveness in manufacturing sector, skill upgrading should be continually taking place and encouraged by the governments' supportive policies towards education and R&D expenditures.



Table 6.11 shows the share of the labor force having tertiary education and the school enrollment percentages on the one hand, and R&D expenditures as a percentage of GDP, researchers and technicians in R&D per million people on the other. This is the data for 2007 or most recent year available for the NIEs and some earlier industrializers. Malaysia's share of tertiary educated labor force in its total labor force is 20 per cent, which is about 50 percent larger than Turkey's share, 13 per cent. These figures are way below compared to industrialized countries such as Japan and UK, but they are also much lower than most of the NIEs, such as Korea, Hong Kong, and Singapore. Turkey and Malaysia's percentage of tertiary educated labor force is only higher than some of the Latin American countries, including Brazil and Mexico.

In school enrollment ratios, Turkey has a higher percentage of tertiary enrollments than Malaysia, but notice that the Malaysian figure is a year older. In gross secondary enrollment rate, Turkey has also a higher share compared to Malaysia. However, in net terms, they are equal as seen from the fourth column in Table 6.11. These figures lag behind Korea, Thailand and Argentina, but better or on a par with Hong Kong, Indonesia, India, China, Brazil and Mexico. However, they lag much behind all of the selected industrialized countries. Note here that Korea has the highest tertiary enrollment rate, 95 percent, much above the industrialized world. These enrollment rates in formal education are a major indicator of skill generation, but they are certainly not the only one. In particular, they exclude other forms of training, such as within-firm training. The comparisons of enrollments also neglect the differences in quality and completion rates between countries. In Turkey, for example, a student appears as enrolled to the secondary school even when he/she discontinues school after one or two years. The rate of

completion, therefore, is much lower than the rate of enrollment. The percentage of the labor force with tertiary education is a better indicator of human capital formation since it does not suffer from such overestimation problems. Despite its exclusion of other forms of training, it captures a critical process in skill formation, and it is the only data available comparable across countries.

Compared to export structures across countries, Turkey appears to have a skill base that is further advanced relative to the technological complexity of its manufactured exports. With a lower or equal level skill endowment, countries in Southeast Asia, in particular Malaysia and Thailand, have been able to develop export bases with higher technological content by specializing in simple assembly electronics led by MNCs. Seen from this perspective, Turkey has excess skills for the assembly part of high-tech manufactures. On the other hand, if Turkey aims to develop capabilities embedded in domestic enterprises such as Korea and Taiwan, its skill base needs much improvement. This is also the case in comparison to European countries such as France and Germany, which have much stronger skill endowments than Turkey. For meaningful integration with the EU in terms of using its advanced technologies as a full member and not merely as a supplier of cheap labor, Turkey needs to face the deficiencies in its skill base and implement carefully-designed measures to overcome them.

The R&D expenditures as a percentage of GDP are about 1 per cent in Turkey and Malaysia, as well as other NIEs, with the exception of Singapore and Korea: the ratios of R&D spending in GDP for these two countries are at the same levels as the previously industrialized countries. In the number of researchers in R&D expenditures, Turkey has a slightly greater figure than Malaysia, but the latter's figure are two years

older. Thus, it might be the case that in two years time, Malaysia could have improved in this indicator. In comparison of the number of technicians in R&D expenditures, the figures are for the same year of 2004 and Malaysia appears to have a greater number than Turkey. However, these numbers still lag much behind most of the NIEs, especially Singapore, Korea, and Hong Kong. Needless to say, they are also much smaller than the number of researchers and technicians in the industrialized world. Singapore and Korea appear to be two outstanding countries closest to the performance of the industrialized countries, followed by Hong Kong. Malaysia and Turkey follow them from a ten-fold distance.

One of the reasons behind the poor performance in R&D efforts in Turkey is the absence of a tradition for conducting R&D due to a high reliance on imported technologies and new products. This passive reliance is reflected in low levels of R&D spending by the private sector (Boratav 2009). The majority of R&D is financed by the government and takes place in public universities and institutes. This R&D activity has little linkages to the industrial sector as there has been very little collaboration between the private industry and public universities. This is partly due to a mismatch between the technical needs to the industry and the research conducted at the universities. The infrastructure for technological activities is unable to satisfy industrial needs, especially in competitive export sectors. There are a large number of Small and Medium Enterprises (SMEs) that comprise the bulk of Turkish industry, but these have few sources of financing their technological investments and thus tend to lag in technology. In face of these deficiencies, the Turkish government has been implementing improvements in tax incentives for industrial R&D, direct procurements to stimulate technological effort, and

more importantly, to improve linkages between industry and science community. On a more personal note, during my last visit to Turkey in December 2009, one of my friends who is a research assistant at mechanical engineering in the Middle East Technical University shared his experience with an industrial research project conducted for the private sector. One of the automobile assemblers needed a mechanism to keep the hood of the car open as they were painting it. My friend was quite surprised that all those engineers employed by the firm were incapable of designing such a simple mechanism. All they do, he said, is to talk on the phone and make business arrangements, rather than solving technical problems. In short, the linkages between the scientists and private industry are crucial in advancing technological learning and building industrial capabilities.

### **6.6.2 FDI Inflows into Fixed Capital Formation**

Unlike Malaysia and other Southeastern late-comers, Turkey has not been able to attract very large FDI inflows in relation to gross domestic fixed capital formation—this is despite the fact that it has liberalized its FDI regime and provided incentives to international investors.

During the last few years there has been a rise in FDI inflows as a share of domestic fixed capital formation. It has reached two-digit levels in 2005 and 2006, 13.8 per cent and 25.3 per cent respectively. However, these inflows have been primarily through acquisitions in financial services, particularly the domination of foreign investors in the banking sector. This contrasts starkly with the Malaysian experience where most of the FDI was invested into export-oriented manufacturing activities. Such inflows of FDI have not generally materialized in the Turkish manufacturing industry. In order to attract

export-oriented FDI, especially in high-tech manufactures, a developing country needs to offer a disciplined, trained, and self-monitoring labor force specialized in modern technical skills. This should be accompanied by a well-maintained infrastructure, standardized procedures, reduced business costs, provision of intermediates at world market prices, priority treatment for MNCs and a stable macroeconomic environment. An effective FDI promotion strategy is further required to target high-technology investors and meet their needs. Although Turkey has some of these aspects, it lacks in others. For instance, uncertainties in its macroeconomic dynamics might hinder MNCs to commit themselves to outsourcing components from Turkey. Its industrial infrastructure may not be able to compete with Eastern European countries. Furthermore, the promotion and targeting of FDI may not suffice to change previous perceptions that Turkey is hostile to foreign investors, and these perceptions can act as a disincentive to prospective investors. In short, Turkey could take some lessons in MNC-targeting from Malaysia, whose FDI as a percentage of its capital formation has been significantly high and its promotion of the electric MNCs from USA to outsource their assembly activities has succeeded to bear fruit.

### **6.7 The Effect of Trade Liberalization on Exports, Imports, and Balance of Payments**

Trade liberalization is often implemented with the purpose of stimulating economic growth through a more efficient allocation of resources under a more competitive market system, a growing flow of knowledge and investment across borders, and eventually a rising rate of capital accumulation and technical improvement. This traditional view of trade liberalization has several times been refuted by a growing body

of literature by Chang, Amsden, and others. However, the point is that even under this supply side view, while the trade liberalization affects exports and imports positively by increasing their growth, the effect on trade balance and balance of payments remains uncertain. The latter depends on the relative impact of liberalization on export and import growth, and on the changes in relative prices of traded goods. If the balance of payments worsens in the post-liberalization period due to a larger increase in import growth relative to export growth, economic growth might be constrained from the demand-side. This is particularly the case when payments deficits are not sustainable by increasing amounts of capital flows or are not eliminated by changes in relative prices.

Turkey and Malaysia exemplify two countries that have undergone excessive trade liberalization in 1984 and 1988 respectively. To assess the relative impact of these liberalizations on export and import growth, we specify standard equations for export growth and import growth and add to the normal determinants of trade performance (e.g. domestic income, foreign income, and price competitiveness) a measure of trade liberalization that interacts with income and price variables.<sup>48</sup> We test for the effect and significance of liberalization using different estimation techniques including OLS with Newey-West standard errors that are heteroscedasticity and autocorrelation corrected (HAC), and cointegration techniques of dynamic OLS (DOLS) and fully-modified OLS (FMOLS) (after testing for unit roots and cointegration). The results from the cointegration techniques should be treated with caution due to the limited degrees of freedom.

The export performance of a country depends primarily on competitiveness (measured as the price of a country's exports relative to the foreign price of related goods

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<sup>48</sup> The methodology used in this section follows Santos-Paulino and Thirlwall (2004).

expressed in a common currency) and the level of world demand (measured by the world GDP minus the GDP of the own country). This yields the following export function:

$$\ln X_t = \beta_0 + \beta_1 \ln W_t + \beta_2 \ln PX_t + u_t \quad (6.1)$$

where  $\ln PX$  is the logarithm of relative prices;  $\ln W$  is the logarithm of world income; and  $u$  is a stochastic error term.

The export equation can be modified by introducing the measure of trade liberalization: a dummy variable (*lib*) for the year of significant trade liberalization. This provides an augmented equation of the form:

$$\ln X_t = \beta_0 + \beta_1 \ln W_t + \beta_2 \ln PX_t + \beta_3 lib_t + v_t \quad (6.2)$$

The second modification allows us to see the impact of trade liberalization on the price and income elasticities of demand for exports, and involves including the interaction dummies  $lib \ln W$  and  $lib \ln PX$ . These slope dummies capture the joint effects of the elimination of trade barriers on income and price elasticities respectively:

$$\ln X_t = \beta_0 + \beta_1 \ln W_t + \beta_2 \ln PX_t + \beta_3 lib_t + \beta_4 lib_t \ln W + \beta_5 lib_t \ln PX + v_t \quad (6.3)$$

Following the same methodology, the import equation can be specified as a function of domestic income and relative prices:

$$\ln M_t = \alpha_0 + \alpha_1 \ln Y_t + \alpha_2 \ln PM_t + e_t \quad (6.4)$$

where  $\ln PM$  is the logarithm of relative prices;  $\ln Y$  is the logarithm of world income; and  $e$  is a stochastic error term.

Including the shift dummy for taking account of the trade liberalization, we can rewrite (6.4):

$$\ln M_t = \alpha_0 + \alpha_1 \ln Y_t + \alpha_2 \ln PM_t + \alpha_3 lib_t + \varepsilon_t \quad (6.5)$$

Another version of equation (6.5) can be obtained by adding the interaction dummies:

$$\ln M_t = \alpha_0 + \alpha_1 \ln Y_t + \alpha_2 \ln PM_t + \alpha_3 lib_t + \alpha_4 lib \ln Y + \alpha_5 lib \ln PM + \varepsilon_t \quad (6.6)$$

Let us now consider the regression results for export equations in (6.2) and (6.3), and for import equations in (6.5) and (6.6). First, we see that the income elasticity for exports is estimated to be lower than that for imports in case Turkey (Tables 6.13 and 6.14). Pre-liberalization income elasticity for exports is 0.82 with OLS estimates, or 0.80 with fully-modified OLS. Trade liberalization had a significant positive impact on export growth, increasing exports by 0.82 per cent for one per cent increase in foreign income in the post-liberalization period.

The cointegration results also show similar increases, with 1.79 per cent using FMOLS estimates. However, the impact of liberalization on import elasticities was much more pronounced. The income elasticity of imports rose from 1.04 over 1971-1983 to 2.46 over 1984-2006, with a 1.42 per cent additional increase after the trade restrictions were liberalized. Cointegration results are also broadly similar; however, the pre-liberalization income elasticities are insignificant with dynamic OLS estimation. It would be more valid to draw results from the fully-modified OLS estimates, whose elasticity estimates are significant for both income variables and their interaction dummy variables.

Second, for the Turkish case, we find that the shift dummies showing the impact of liberalization on real export/import performance were found to be significant and negative. This implies that removing trade restrictions had an overall negative impact on both exports and imports. However, the negative impact was greater for exports relative to imports in real terms.



Third, the first and second points together imply that the impact of trade liberalization was negative on the trade deficit and thus on balance of payments, exacerbating the effect of the relatively larger import income elasticity in the pre-liberalization period.<sup>49</sup> If the worsening in trade balance is not sustainable through capital inflows, downward income adjustment is necessary to keep the balance of payments at a sustainable level. What is worse, the economy becomes dependent on foreign capital inflows that very highly volatile. Their attraction depends on keeping interest rates high. However, such high rates of interest lower the return on productive capital and reduced productive investments. This is exactly what has been taking place in the Turkish economy since the implementation of the new Import Program in 1984.

Fourth, in case of Malaysia, we see that the export income-elasticity was already higher than the import one in the pre-1988 period. With the remarkable reductions in trade barriers in 1988, there was an increase in income elasticities of export and import demands. Note, however, that the increase in export income-elasticities was significantly larger than that in import income-elasticities (Tables 6.15 and 6.16). While the increase in import elasticity ranged from 0.59 to 0.66 per cent, the rise in export elasticity ranged between 0.94 and 1.19, depending on which estimation technique is used. In short, the relative impact of trade liberalization on income-elasticity of exports was greater than that of imports, relaxing the balance-of-payments constraint even further in case of Malaysia.

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<sup>49</sup> The negative impact on the trade balance could at least be partially explained by financial/capital account liberalization, leading to higher interest rates and exchange rate appreciation, and thus current account deficits.

In conclusion, the impact of trade liberalization might vary across countries with different manufacturing experiences. Countries having a more carefully planned and strategic manufacturing experience, such as Malaysia, might benefit from liberalization that is conducted in a timely-fashion—allowing infant industries to reach some maturity. By contrast, countries failing to use strategic industrial policy in a selective manner to nurture targeted manufacturing sectors, such as Turkey, is likely to be constrained by balance of payments restraints and high interest rates detrimental to the growth of new industrial activities.

## **6.8 Conclusion**

Flows of international trade influence the patterns of growth divergence among countries through differences in the types of goods and services countries produce and in the potential for export growth in international markets for these goods and services. Those specializing in innovation-intensive commodities with higher technological content tend to experience dynamic gains from trade—benefiting from Schumpeterian rents retained in a rising trend of terms of trade as well as higher rates of growth in their export volumes and per capita income levels. The East Asian countries that have achieved to sustain this high-road to industrialization have adopted strategic industrial policies to develop their infant industries and make them competitive at world market prices. In other words, diversification into technology-intensive sectors has never been an automatic outcome of integration into the world economy and specialization along static comparative advantages. Quite the opposite, all successful latecomers including the today's developed countries such as the United States and Germany have made extensive

use of interventionist policies to counter the adverse effects while taking advantage of the positive effects of external economic relations.

The historical comparison of manufacturing experiences of Malaysia and Turkey provides further evidence in support of the careful design and strategic use of industrial policies. Some of the critical points can be summarized as follows:

(i) The export-led growth strategy of Malaysia involved a preceding import-substitution phase along with an active export diversification strategy. Malaysia used a series of interventions including infant industry protection (even after lowering average rate of tariffs substantially), export subsidies and targets, performance requirements, allocation of credit, local content rules, investment in human capital, skill-formation, and local R&D capabilities, as well as loose protection of intellectual property rights to allow for reverse engineering. Turkey made use of some of these interventions as well; however, it eliminated a great part of its protective measures much faster and did not subject the promoted firms to performance criteria once they received the export subsidies. Thus, the measures of neither the import protection nor export promotion were *temporary* and *conditional* to the achievement of precise performance criteria in Turkey to the extent that it was in Malaysia.

(ii) Previous experiences of developing countries in manufacturing create important cumulative effects of path-dependency. British colonial experience provided Malaysia with well-established manufacturing sectors in resource-based exports such as tin, rubber, and palm oil, and thus a strong tax base for raising government revenues. The semi-colonial Ottoman experience, in contrast, resulted in a very weak manufacturing base with a poor trade performance and a fragile basis for fiscal purposes (not to forget the

massive debt payments made to the European countries that won the First World War). In sum, although Turkey was never formally colonized, it inherited a semi-colonial economy with a “twin weakness” in trade and fiscal conditions much worse than the colonial Malaysia.

(iii) Location of Malaysia in the rapidly-growing East Asian region also provided another exogenous effect that benefited from external economies of the “flying geese” pattern. These benefits were not available to Turkey which, to a great extent, remained as a peripheral economy to the central economies of Europe. It never attracted export-oriented FDI from Europe to the extent that Malaysia did from the rest of Asia, although it benefited from preferential access to the European market for the growth of its textile industry.

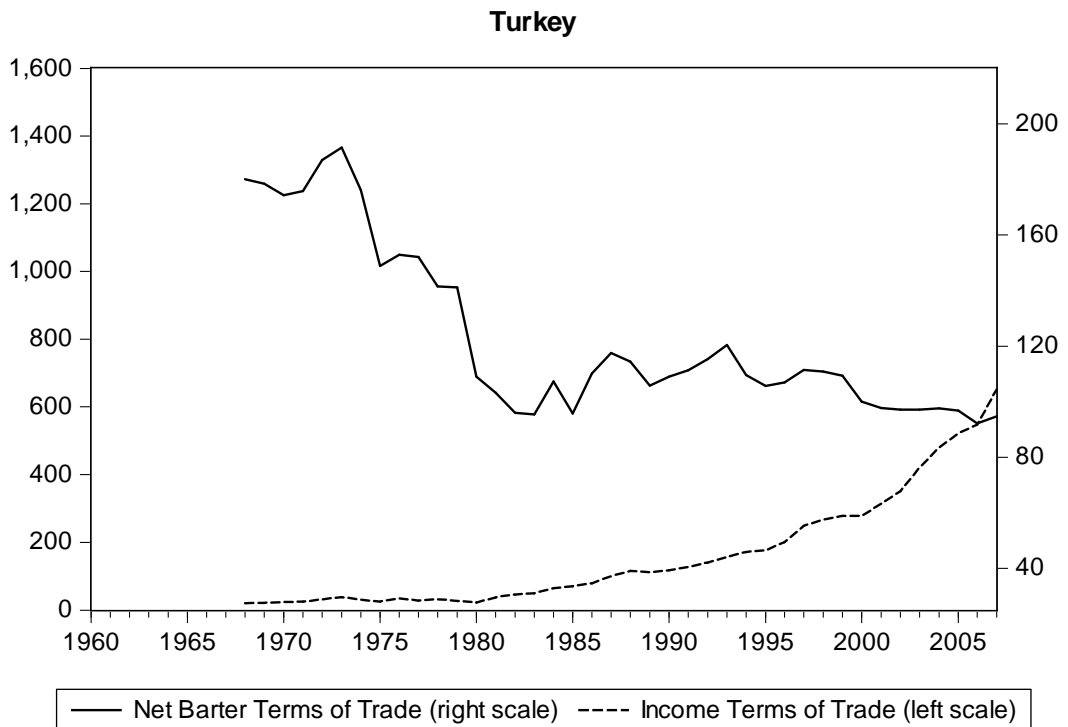
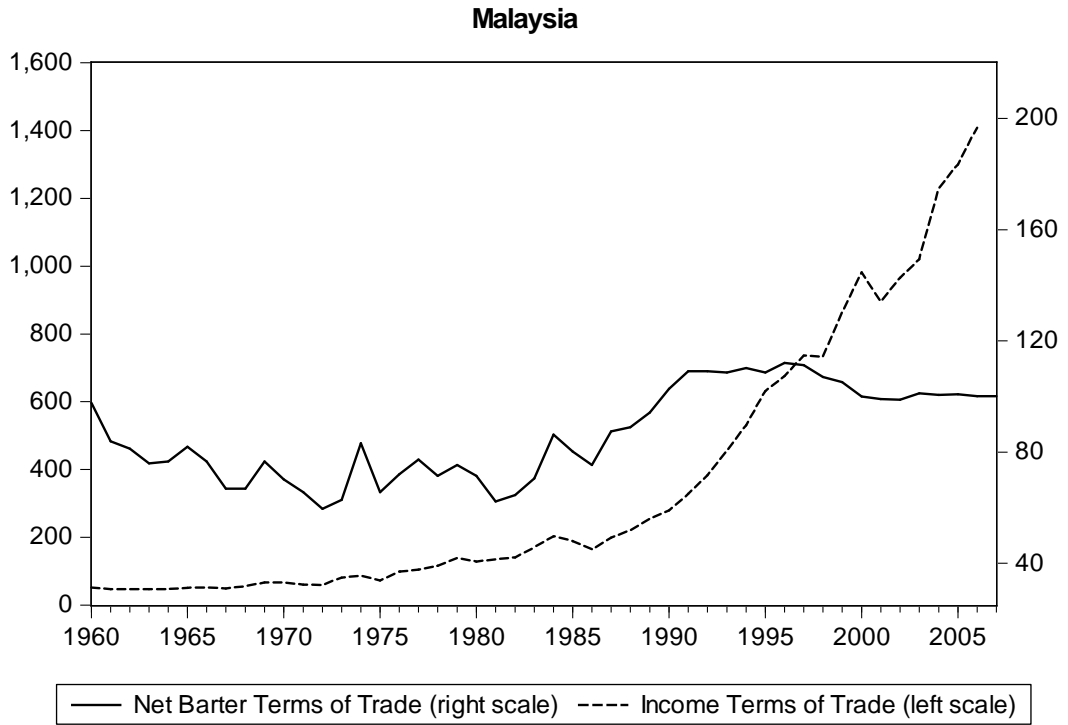
(iv) The terms of trade dynamics, especially the trends in income terms of trade, suggest a strong positive correlation between the share of technology-intensive manufactured exports and the income terms of trade for both Turkey and Malaysia. However, the rise in income terms of trade has been much more pronounced in case of Malaysia due to its ability to diversify into high-technology manufactures with growing global demand. Moreover, the changes in real wages and unemployment rates play an additional role in determining the net barter terms of trade movements. Significant rises in real wage indices (or falls in rates of unemployment) tend to create higher export prices, which lead to rises in net barter terms of trade, *ceteris paribus*.

(v) Trade liberalization in Turkey increased the income-elasticity ratio by creating a stronger positive impact on income elasticity of demand for imports. In contrast, Malaysian trade liberalization reduced the income-elasticity ratio with a relatively larger

positive impact on export income-elasticity. The differences in the outcomes of trade liberalization may be attributed to the timing of the liberalization (earlier in Turkey), the way of liberalization (more gradual and selective in Malaysia), and the other complementary policy changes such as the methods of export promotion (conditional to export performance in Malaysia).

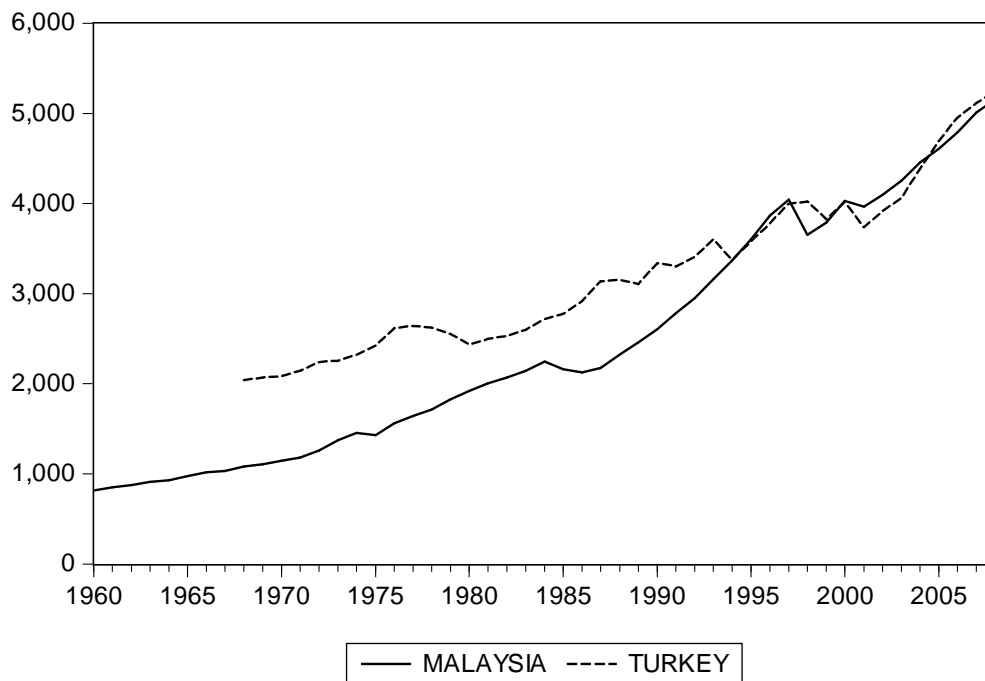
Additional points could be drawn, but these points outline the arguments of critical importance in making a case for the use of industrial policies to overcome the balance of payments constrained growth mechanisms and take advantage of upcoming opportunities for realizing dynamic gains from international trade.

**Figure 6.1** Malaysia-Turkey, Terms of Trade Trends, 1960-2007.



Source: World Bank WDI 2009 online database, IFS Supplement of Trade Statistics, Author's calculations.

**Figure 6.2** Turkey-Malaysia, GDP per capita, 1960-2008, in constant 2000 US\$.



Source: World Bank WDI 2009.

**Figure 6.3** Composition of Exports in Turkey and Malaysia, 1962-2006

Figure 6.3a. Composition of Exports in Turkey

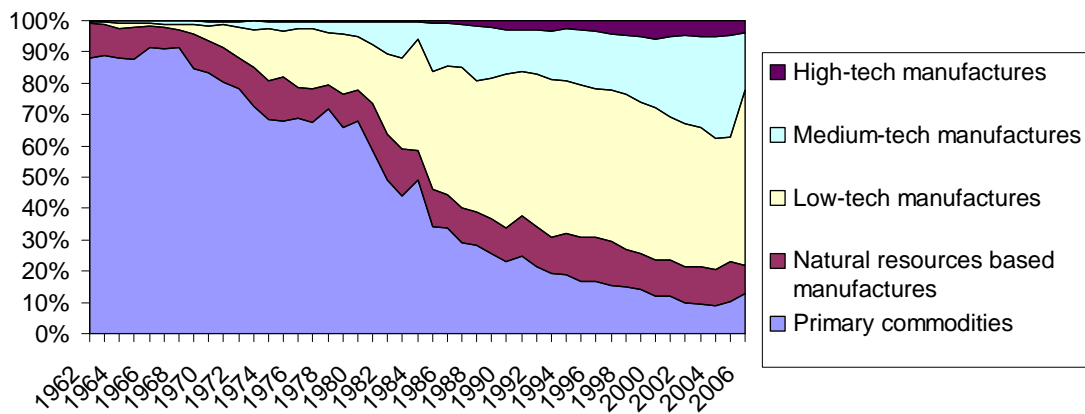
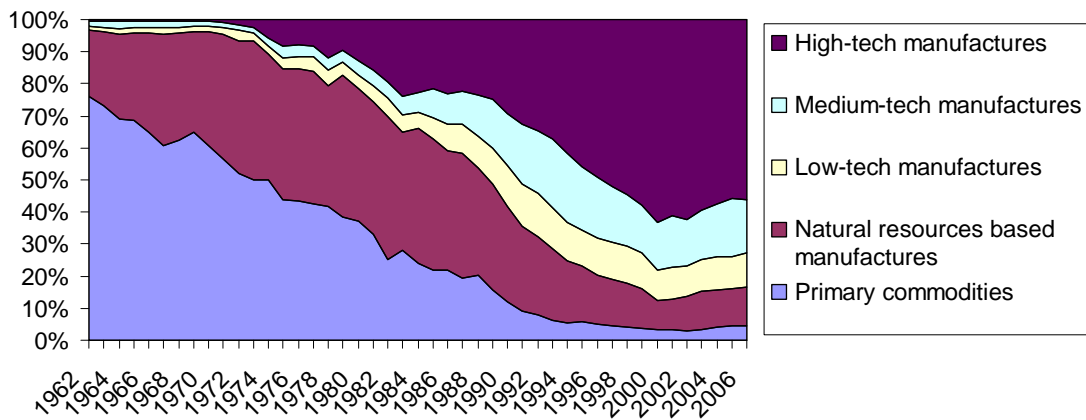


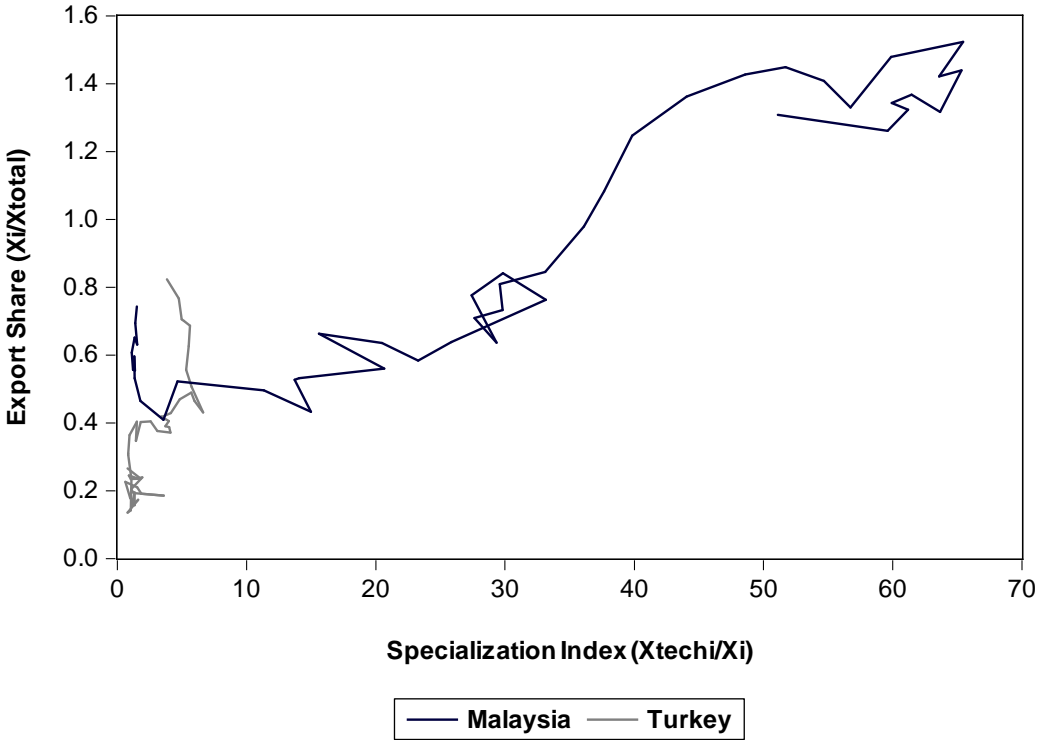
Figure 6.3b. Composition of Exports in Malaysia



Source: Feenstra et al (2005) and author's calculations from COMTRADE database.

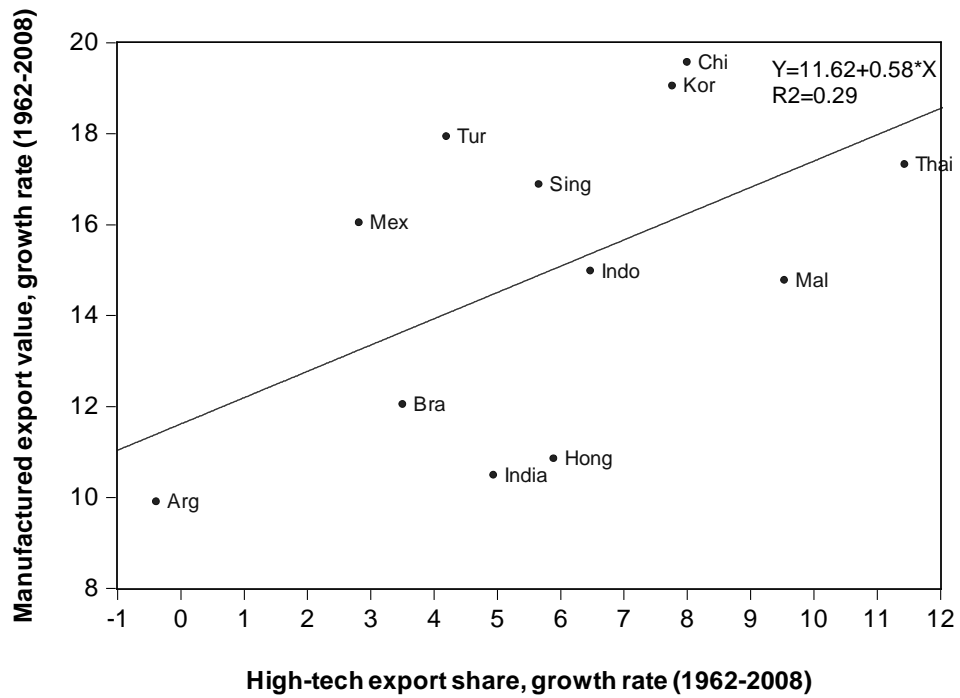


**Figure 6.4** Structural Change and Export Share Patterns: Malaysia, Turkey (1962-2008)



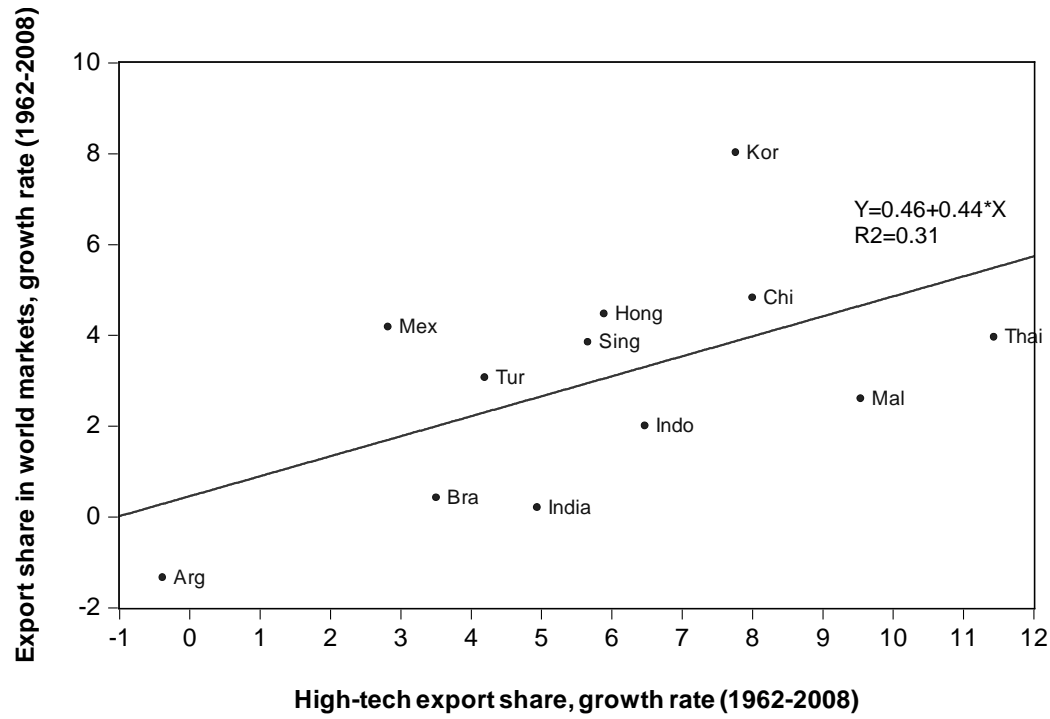
Source: UNCTAD Handbook of Statistics provides data for export shares of individual countries in world trade. Specialization index is calculated from the technological composition of exports provided by Feenstra et al (2005) and author's extensions based on COMTRADE database.

**Figure 6.5** Structural change in the manufacturing sector and its growth performance



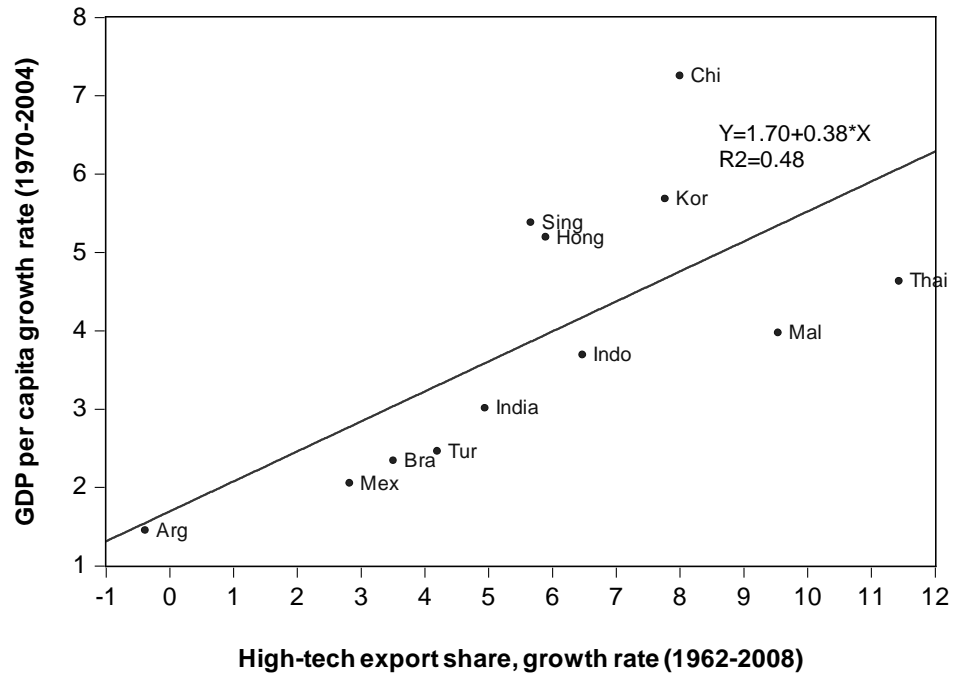
Source: Author's calculations based on Feenstra et al. (2005) and COMTRADE data. The growth rates are annual growth rates in percent.

**Figure 6.6** Structural change in the manufacturing sector and its competitiveness



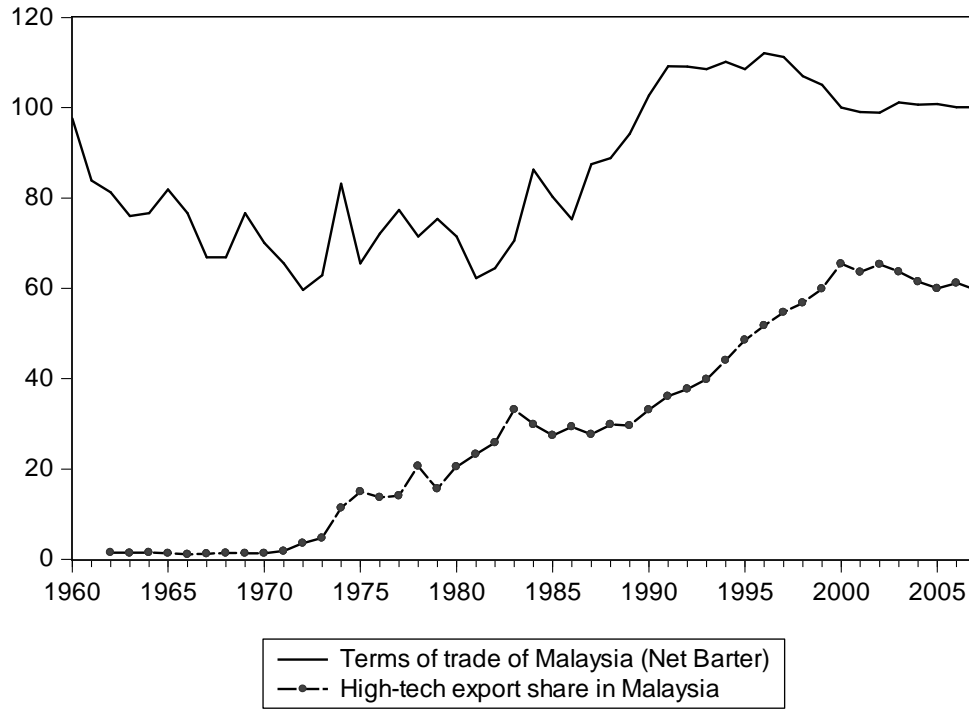
Source: Author's calculations based on Feenstra et al. (2005) and COMTRADE data, and UNCTAD Handbook of Statistics for export shares in world markets.

**Figure 6.7** Structural change in manufacturing and per capita income growth



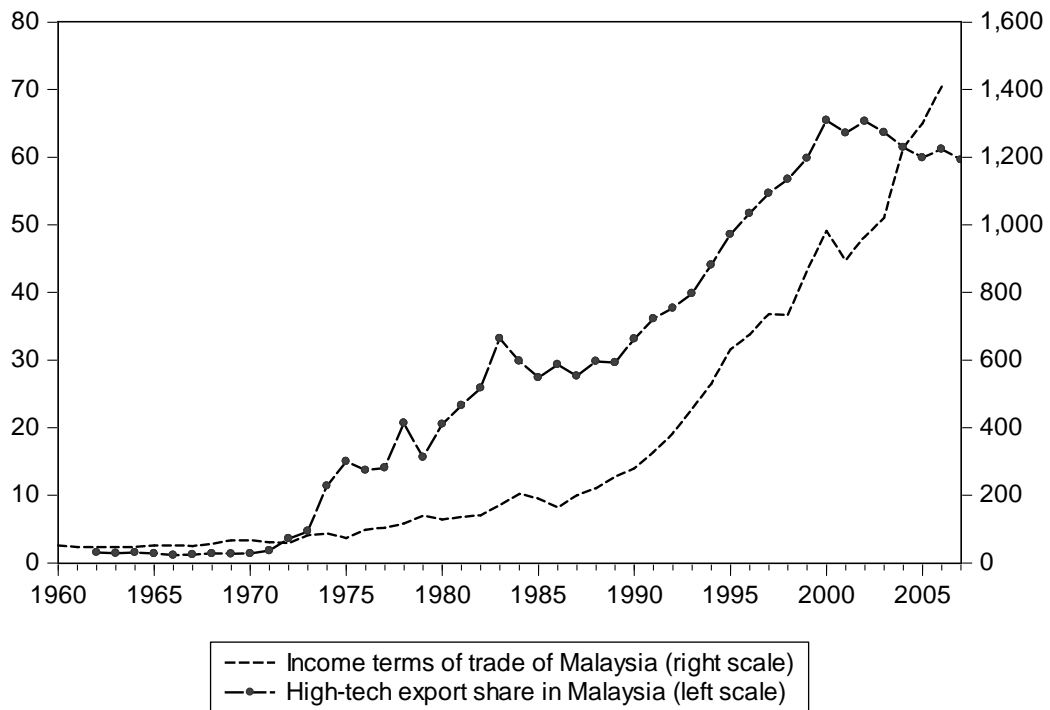
Source: Author's calculations based on Feenstra et al. (2005) and COMTRADE data, and World Development Indicators for GDP per capita growth rate (annual percent growth rate averaged over time).

**Figure 6.8** Net Barter Terms of Trade and High-Technology Export Share in Malaysia



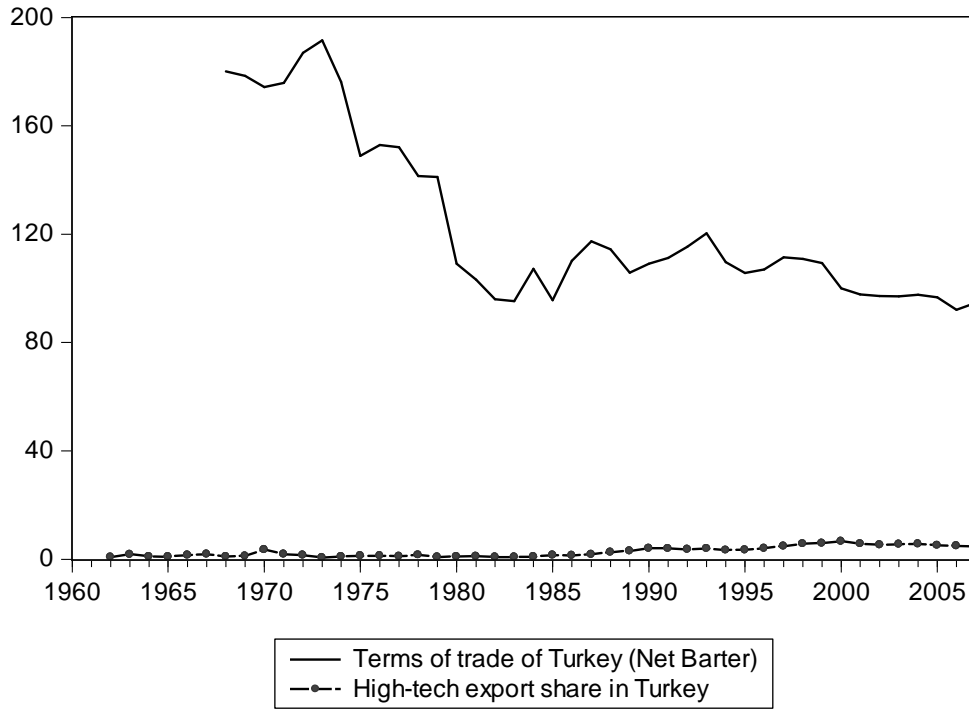
Source: World Bank WDI 2009, IFS Supplement of Trade Statistics, COMTRADE.

**Figure 6.9** Income Terms of Trade and High-Technology Export Share in Malaysia



Source: World Bank WDI 2009, IFS Supplement of Trade Statistics, COMTRADE.

**Figure 6.10** Net Barter Terms of Trade and High-Technology Export Share in Turkey



Source: World Bank WDI 2009, IFS Supplement of Trade Statistics, COMTRADE.

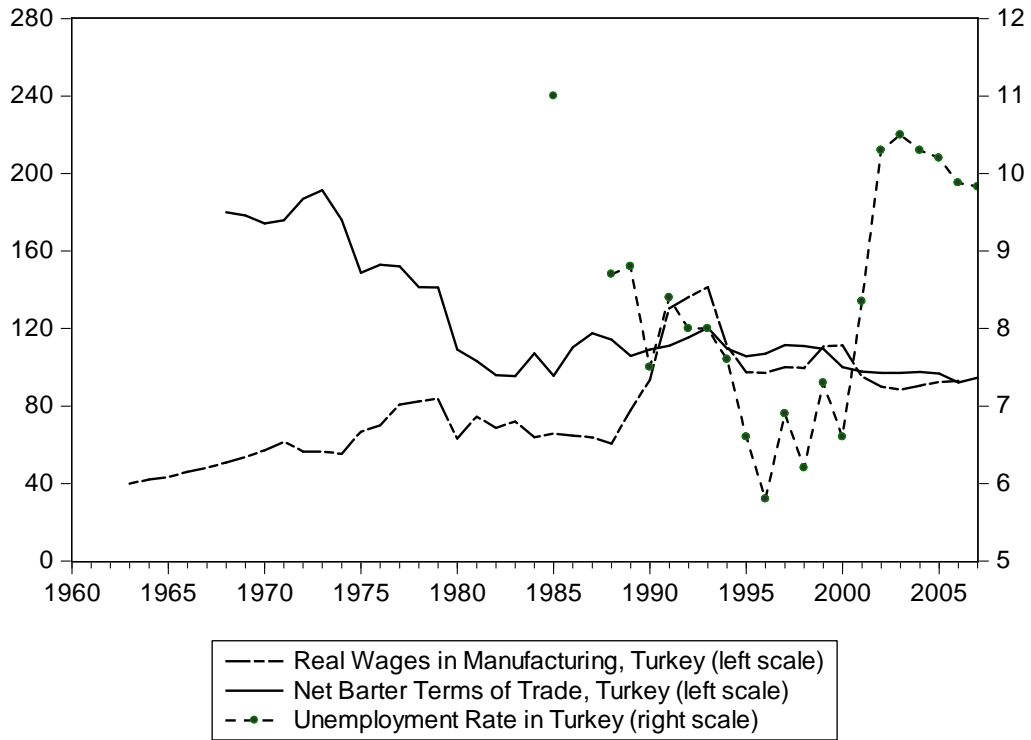
**Figure 6.11** Income Terms of Trade and High-Technology Export Share in Turkey



Source: World Bank WDI 2009, IFS Supplement of Trade Statistics, COMTRADE.

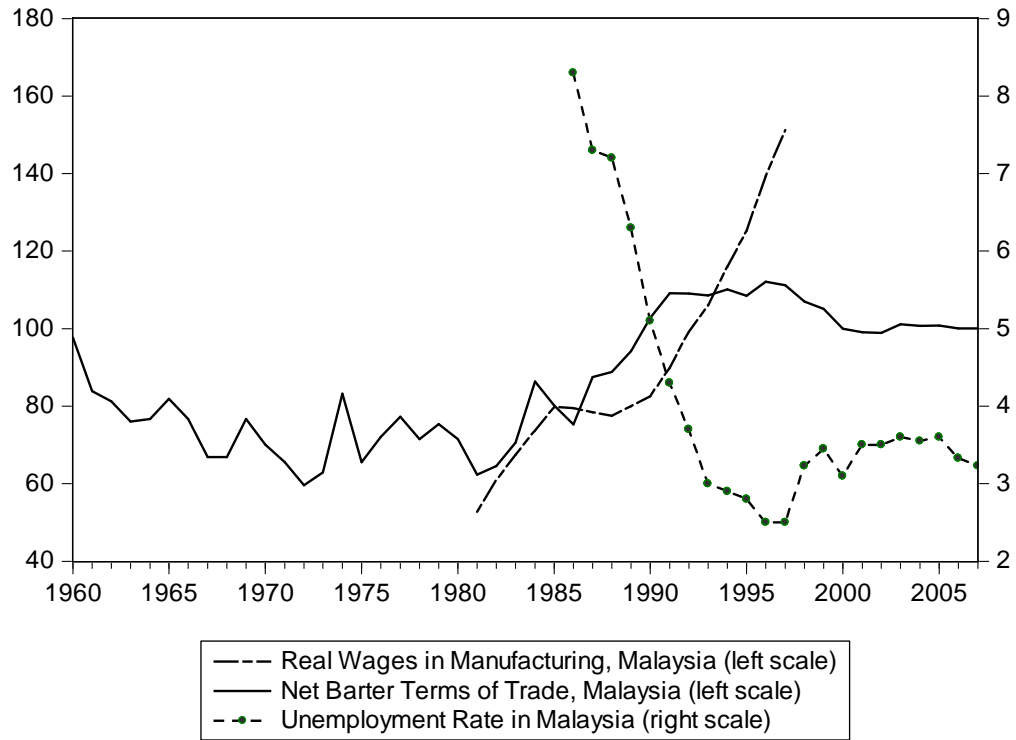


**Figure 6.12** Real Wages, Unemployment, and Terms of Trade in Turkey



Source: Real wage index is calculated from Boratav (1988), Yeldan (2006) and State Planning Organization online database. Unemployment rate is provided from IFS. NBTT is calculated from IFS Supplement on Trade Statistics and WDI.

**Figure 6.13** Real Wages, Unemployment, and Terms of Trade in Malaysia



Source: Real wage index is taken from ILO labor statistics database and adjusted to fit the left scale. Unemployment rate is provided from IFS.

**Table 6.1** Macroeconomic performances of Turkey and Malaysia in comparative perspective

	1960-1970		1971-1980		1981-1997		1998-2008	
	Turkey	Malaysia	Turkey	Malaysia	Turkey	Malaysia	Turkey	Malaysia
<b>1. Income Growth and Per Capita Income</b>								
GDP Growth (%)	3.6 <sup>a</sup>	6.5	4.1	7.9	5.0	7.4	4.0	4.4
Real GDP per capita (US\$)	2063	977	2424	2276	3165	2711	4359	4345
Real GDP per capita (PPP constant 2005 international \$)	n.a.	n.a.	n.a.	n.a.	7407	6908	10202	11075
<b>2. FDI, Export Growth, Composition of Exports</b>								
Foreign direct investment, net inflows (% of GDP)	0.3 <sup>b</sup>	2.2 <sup>b</sup>	0.1	3.1	0.3	4.6	1.4	3.3
Exports of goods and services (% of GDP)	3.9 <sup>c</sup>	42.5	5.0	45.7	15.9	70.1	22.7	114.2
Exports of goods and services (annual % growth)	n.a.	5.9	n.a.	8.1	10.7 <sup>d</sup>	11.9	6.6	6.9
<b>3. Import Growth, Composition of Imports</b>								
Imports of goods and services (% of GDP)	5.4	37.9	9.5	41.7	19.2	69.0	24.4	93.6
Imports of goods and services (annual % growth)	n.a.	4.2	n.a.	11.2	12.8 <sup>d</sup>	12.1	8.7	6.1
Manufactures imports (% of merchandise imports)	75.9	52.3	66.6	63.7	61.0	77.9	68.1	81.0
<b>4. Current Account, Total Debt Service</b>								
Current account balance (% of GDP)	n.a.	n.a.	-3.3	0.3	-1.1	-4.2	-2.7	12.4
Total debt service (% of exports of goods, services and income)	n.a.	n.a.	22.4	7.8	30.6	13.4	35.8	5.9
Total debt service (% of GNI)	1.0 <sup>b</sup>	2.0 <sup>b</sup>	1.3	3.4	6.0	9.7	8.7	7.3
<b>5. Real Wages Growth Rate</b>								
Private manufacturing	5.6		2.3		3.3		1.6	
Public manufacturing	5.9		3.6		5.4	6.9	6.0	
<b>6. Unemployment Rate</b>	n.a.	n.a.	n.a.	n.a.	7.6	4.7	8.9	3.4
<b>7. Inflation Rate, Terms of Trade</b>								
Inflation, consumer prices (annual %)	4.0	0.9	33.6	6.0	60.3	3.4	34.5	2.7
Net barter terms of trade (2000 = 100)	n.a.	n.a.	109.1 <sup>f</sup>	71.4 <sup>f</sup>	107.9	93.0	99.3	101.3
Source: World Development Indicators 2009 online database. Notes: Figures are simple averages over the periods. a 1960-68 data missing; b 1970's figure; c 1960-1967 data missing; d Pre-1987 data missing; e Pre-1989 data missing; f 1980's figure.								

**Table 6.2** Values of Manufactured Exports by Leading Developing Countries (mil. US\$)

Country	1962	1970	1980	1985	1990	1995	2000	2005	2007 <sup>a</sup>	2008 <sup>a</sup>
Turkey	46	104	987	4,340	10,044	17,455	24,644	65,970	86,003	101,812
Malaysia	312	760	7,593	9,531	24,632	73,150	104,223	136,566	160,639	134,294
Hong Kong	632	2,109	14,744	17,493	44,154	49,542	54,732	80,275	89,183	93,267
Singapore	152	304	7,113	10,622	32,714	75,153	87,506	131,385	155,697	164,358
Korea	20	646	15,193	24,713	59,825	112,821	165,485	274,739	329,650	n.a.
Taiwan	n.a.	n.a.	18,214	28,295	62,211	103,987	115,896	133,075	140,013	140,393
Indonesia	137	361	3,858	3,069	11,725	31,519	47,650	55,018	64,605	72,147
Thailand	127	146	2,563	3,649	17,249	45,380	63,788	101,144	121,253	131,313
China	272	878	8,920	25,844	73,722	213,684	379,672	983,318	1,834,942	2,140,775
India	822	1,450	4,842	6,601	16,653	27,270	33,854	70,319	92,134 <sup>b</sup>	113,589 <sup>b</sup>
Argentina	215	533	2,996	2,985	6,175	10,919	11,131	15,791	22,677	27,679
Brazil	362	1,084	13,271	17,321	25,758	36,578	44,382	87,692	105,945	111,343
Mexico	226	712	5,021	9,848	25,920	62,101	135,565	164,301	200,405	208,818
Total	3,323	9,087	105,315	164,311	410,782	859,559	1,152,632	2,407,490	3,056,729	2,608,422
All LDCs	9,022	22,190	156,788	206,593	470,546	988,546	1,514,270	3,081,775	n.a.	n.a.
Total % LDCs	36.8%	41.0%	67.2%	79.5%	87.3%	87.0%	76.1%	78.1%	n.a.	n.a.

Source: Feenstra and others (2005)  
Notes: <sup>a</sup> Calculated from UN Comtrade data and adjusted to Feenstra and others (2005)  
<sup>b</sup> 2007 and 2008 data for India includes Sikkim whereas the rest of the years excludes this region.

**Table 6.3** Growth Rates of Manufactured Exports by Leading Developing Countries  
(Percent per annum)

Country	1962-70	1970-80	1980-85	1985-90	1990-95	1995-2000	2000-2005	2005-2008	1962-80	1980-2008
Turkey	8.6	21.8	23.2	18.0	10.5	6.8	21.3	25.7	20.4	13.9
Malaysia	10.7	24.0	6.0	20.7	21.6	5.5	7.1	-0.9	18.0	12.6
Hong Kong	14.7	19.5	3.9	19.7	0.2	1.4	8.6	4.7	17.5	6.2
Singapore	10.0	29.7	10.0	24.2	16.7	1.3	10.2	6.8	24.2	11.6
Korea	40.8	32.6	9.1	18.8	11.9	6.7	12.3	9.1	36.4	11.4
Indonesia	11.5	22.7	-0.2	29.1	19.6	7.3	3.2	8.9	20.9	13.5
Thailand	0.7	28.1	6.9	31.8	18.7	5.6	10.5	8.1	18.4	15.1
China	13.4	20.5	17.0	21.5	20.8	10.6	20.9	16.8	16.8	18.8
India	6.0	14.0	7.4	20.7	10.5	4.1	15.8	15.5	10.9	11.2
Argentina	9.4	18.4	-2.4	17.0	10.9	0.7	5.9	18.6	15.8	8.4
Brazil	12.9	23.7	5.2	10.5	7.3	3.1	14.4	8.0	21.0	7.2
Mexico	13.2	19.7	14.4	20.1	17.2	14.9	3.7	7.6	18.2	14.4
Total	11.8	22.6	8.6	20.1	15.0	7.5	16.0	11.9	18.8	13.5
All LDCs	10.4	19.6	5.7	17.6	14.6	7.6	15.5	15.6	15.8	12.5

Source: Author's calculations based on Feenstra and others (2005)  
Notes: Data for 2007 and 2008 are calculated from UN Comtrade data. 2007 and 2008 data for India includes Sikkim whereas the rest of the years exclude this region.

**Table 6.4** Structure of Manufactured Exports by Leading Developing Countries (%)

	1985				1995				2008			
	RB	LT	MT	HT	RB	LT	MT	HT	RB	LT	MT	HT
Turkey	18.4	57.1	23.0	1.5	16.9	58.1	21.5	3.5	3.2	45.4	47.6	3.8
Malaysia	52.5	8.4	11.7	27.4	18.4	11.9	21.1	48.6	9.8	16.1	23.0	51.1
Hong Kong	4.1	62.3	19.1	14.5	5.8	44.6	19.4	30.2	0.4	28.0	17.5	54.1
Singapore	14.7	13.3	31.1	40.9	7.7	7.0	21.1	64.2	2.5	6.6	26.6	64.3
Korea	6.8	49.0	30.0	14.3	6.7	22.0	36.0	35.2	1.1	11.4	45.8	41.7
Indonesia	68.9	18.1	7.7	5.2	38.6	37.3	16.4	7.7	31.7	28.2	28.3	11.8
Thailand	37.8	36.3	13.2	12.6	17.2	28.1	17.7	37.0	5.7	19.7	39.1	35.5
China	14.3	44.3	33.0	8.5	7.6	57.1	19.7	15.7	0.6	37.0	25.2	37.2
India	33.7	50.0	11.8	4.5	31.8	49.2	14.1	4.9	35.8	31.4	23.4	9.4
Argentina	56.9	18.6	18.6	5.9	46.0	22.0	28.3	3.7	35.2	11.4	48.3	5.1
Brazil	43.6	21.2	30.4	4.8	43.6	18.2	33.9	4.3	32.4	12.7	44.1	10.8
Mexico	14.2	14.2	46.8	24.8	7.9	17.4	50.7	24.0	0.6	18.1	48.8	32.5

Source: Author's calculations based on Feenstra and others (2005)  
Notes: Korea's export structure for 2008 is based on 2007 figures.

**Table 6.5** Exports of Leading Developing Countries by Technological Categories

	Values (\$ million)			Growth Rates (% p.a.)			Values (\$ million)			Growth Rates (% p.a.)		
	1985	1995	2008	1985- 1995	1995- 2008	1985- 2008	1985	1995	2008	1985- 1995	1995- 2008	1985- 2008
	<b>Resource Based</b>						<b>Medium Technology</b>					
Turkey	797	2,955	3,237	12.7	4.3	8.7	1,000	3,747	48,426	12.0	20.7	16.3
Malaysia	5,005	13,443	13,152	10.0	1.1	3.4	1,113	15,440	30,880	28.0	6.4	12.9
Hong Kong	723	2,888	372	13.8	-8.4	1.6	3,339	9,597	16,329	9.1	5.0	3.3
Singapore	1,560	5,757	4,095	12.8	-0.3	5.3	3,302	15,873	43,741	15.9	8.6	9.2
Korea	1,672	7,532	3,642	12.8	3.1	8.5	7,410	40,669	151,106	15.1	10.9	12.1
Indonesia	2,115	12,164	22,887	16.7	4.2	8.4	236	5,185	20,424	32.2	9.6	17.1
Thailand	1,381	7,811	7,429	16.0	2.2	7.9	483	8,024	51,359	28.7	14.6	18.4
China	3,685	16,196	13,458	13.8	5.3	10.6	8,520	42,100	539,267	18.5	20.7	18.8
India	2,224	8,675	40,705	12.3	16.7	12.7	777	3,840	26,607	16.7	15.8	14.4
Argentina	1,699	5,026	9,736	10.5	3.8	6.6	555	3,085	13,359	16.2	8.3	12.0
Brazil	7,550	15,932	36,072	7.1	8.1	7.2	5,270	12,392	49,113	8.1	10.9	7.9
Mexico	1,403	4,878	1,243	9.7	-0.9	6.1	4,606	31,476	101,955	18.0	8.4	13.1
	<b>Low Technology</b>						<b>High Technology</b>					
Turkey	2,478	10,149	46,235	13.0	11.5	11.2	66	603	3,913	22.9	14.3	17.3
Malaysia	801	8,736	21,623	24.0	6.6	11.9	2,612	35,530	68,639	26.6	6.8	16.0
Hong Kong	10,893	22,099	26,113	6.0	1.4	1.9	2,538	14,959	50,454	16.1	10.4	10.8
Singapore	1,415	5,282	10,767	12.7	5.8	6.3	4,345	48,240	105,755	23.0	6.4	12.4
Korea	12,104	24,869	37,452	5.3	3.1	2.7	3,527	39,751	137,450	20.5	11.5	15.3
Indonesia	556	11,758	20,312	32.0	3.1	12.8	161	2,413	8,524	33.3	7.8	22.3
Thailand	1,323	12,748	25,911	21.7	6.0	9.7	461	16,797	46,614	34.7	7.7	17.9
China	11,449	121,931	791,269	23.6	14.8	16.1	2,190	33,457	796,781	30.9	26.2	27.8
India	3,302	13,417	35,625	13.6	8.1	9.3	297	1,338	10,653	11.5	15.1	14.0
Argentina	554	2,403	3,162	10.8	2.3	5.8	177	405	1,421	9.7	6.0	7.8
Brazil	3,675	6,672	14,098	7.0	6.9	4.9	826	1,581	12,060	5.0	14.4	12.0
Mexico	1,396	10,819	37,799	18.0	8.3	14.9	2443	14,929	67,819	17.0	10.1	14.9

Source: Author's calculations based on Feenstra and others (2005). Notes: Korea's export structure for 2008 is based on 2007 figures.

**Table 6.6** Correlations between high-tech export share (HTS), manufactured exports (MX), log of manufactured exports (LMX) and export share in world trade (WT) (based on panel data for leading exporters of manufactures from 1962 to 2008)

	HTS	MX	LMX	WT
HTS	1.00			
MX	0.30	1.00		
LMX	0.60	0.45	1.00	
WT	0.52	0.81	0.65	1.00

Source: Author's calculations based on Feenstra et al. (2005) and COMTRADE data, and UNCTAD Handbook of Statistics for WT.

**Table 6.7** Correlations between net barter terms of trade (NBTT), income terms of trade (ITT), and shares of high-technology exports (HTS) in Malaysia

	HTS	ITT	NBTT
HTS	1.00	0.91	0.79
ITT	0.91	1.00	0.72
NBTT	0.79	0.72	1.00

Source: World Bank WDI 2009, IFS Supplement of Trade Statistics, COMTRADE.

**Table 6.8** Correlations between net barter terms of trade (NBTT), income terms of trade (ITT), and shares of high-technology exports (HTS) in Turkey

	HTS	ITT	NBTT
HTS	1.00	0.80	-0.53
ITT	0.80	1.00	-0.58
NBTT	-0.53	-0.58	1.00

Source: World Bank WDI 2009, IFS Supplement of Trade Statistics, COMTRADE.

**Table 6.9** Correlations between real wages in manufacturing (RW), net barter terms of trade (NBTT), and unemployment rate (UN) in Turkey

	RW	NBTT	UN
RW	1.00	0.51	-0.40
NBTT	0.51	1.00	-0.60
UN	-0.40	-0.60	1.00

Source: Real wage index is calculated from Boratav (1985), Yeldan (2006) and State Planning Organization online database. Unemployment rate is provided from IFS. NBTT is calculated from IFS Supplement on Trade Statistics and WDI.

**Table 6.10** Correlations between real wages in manufacturing (RW), net barter terms of trade (NBTT), and unemployment rate (UN) in Turkey

	RW	NBTT	UN
RW	1.00	0.72	-0.85
NBTT	0.72	1.00	-0.96
UN	-0.85	-0.96	1.00

Source: Real wage index is taken from ILO labor statistics database and adjusted to fit the left scale. Unemployment rate is provided from IFS.



**Table 6.11** Tertiary- Secondary Education, R&D Expenditure (2007 or most recent year)

Country	Tertiary Educated (% of Labor Force)	School Enrollment, Tertiary (% gross)	School Enrollment, Secondary (% gross)	School Enrollment, Secondary (% net)	R&D Expenditure (% of GDP)	Researchers in R&D (per million people)	Technicians in R&D (per million people)
Turkey	13	36	80	69	1 <sup>a</sup>	577 <sup>a</sup>	46 <sup>c</sup>
Malaysia	20	30 <sup>a</sup>	69 <sup>b</sup>	69 <sup>b</sup>	1 <sup>c</sup>	503 <sup>c</sup>	63 <sup>c</sup>
Hong Kong	26	34	86	79	1 <sup>c</sup>	2090 <sup>c</sup>	416 <sup>c</sup>
Singapore	24	n.a.	n.a.	n.a.	2 <sup>a</sup>	5713 <sup>a</sup>	476 <sup>c</sup>
Korea	35	95	98	97	3 <sup>a</sup>	4162 <sup>a</sup>	583 <sup>a</sup>
Thailand	n.a.	50	83	76	0 <sup>d</sup>	116 <sup>e</sup>	n.a.
Indonesia	6	17	73	68	n.a.	n.a.	n.a.
India	n.a.	12 <sup>a</sup>	55 <sup>a</sup>	n.a.	1 <sup>c</sup>	n.a.	n.a.
China	n.a.	23	77	n.a.	1 <sup>a</sup>	926 <sup>a</sup>	..
Argentina	30 <sup>a</sup>	67 <sup>a</sup>	84 <sup>a</sup>	78 <sup>a</sup>	0 <sup>a</sup>	895	366 <sup>a</sup>
Brazil	9 <sup>a</sup>	30	100	77	1 <sup>b</sup>	46 <sup>c</sup>	394 <sup>c</sup>
Mexico	17	27	89	72	1 <sup>b</sup>	432 <sup>c</sup>	219 <sup>c</sup>
<b>Selected Industrialized Countries</b>							
Japan	40	58	101	98	3 <sup>a</sup>	5546 <sup>a</sup>	572 <sup>c</sup>
France	29	56	113	98	2 <sup>a</sup>	3300 <sup>c</sup>	1739 <sup>c</sup>
Germany	24	n.a.	100	n.a.	3 <sup>a</sup>	3386 <sup>a</sup>	1063 <sup>c</sup>
UK	32	59	97	91	2 <sup>a</sup>	3033 <sup>a</sup>	n.a.
USA	61	82	94	88	3 <sup>a</sup>	4770 <sup>c</sup>	n.a.
Source: World Bank WDI 2009. Figures refer to the year 2007 unless otherwise is indicated.							
Notes: a 2006's figures, b 2005's figures, c 2004's figures, d 2003's figures, e 2001's figures							

**Table 6.12** Inward FDI as Percentage of Gross Domestic Fixed Capital Formation

	1970-79	1980-89	1990-99	2000-06	2003	2004	2005	2006
Turkey	0.9	0.9	1.9	9.7	4.7	5.4	13.8	25.3
Malaysia	13.9	10.3	18.5	14.1	10.8	19.1	15.2	20.1
Hong Kong	9.6	18.7	21.9	78.7	40.6	95.0	90.4	103.9
Singapore	15.8	26.2	28.9	59.7	52.2	77.5	57.6	79.5
Korea	3.0	0.8	1.8	3.2	2.4	4.5	3.1	1.9
Indonesia	10.7	1.6	3.9	-0.1	-1.3	3.4	13.5	6.4
Thailand	2.3	3.3	7.5	15.2	15.2	14.0	17.5	16.5
China	n.a.	1.6	11.1	8.6	8.3	7.7	7.7	6.1
India	n.a.	0.2	1.6	4.1	3.0	3.2	2.9	6.3
Argentina	1.3	3.4	14.4	13.8	8.4	15.6	12.7	13.6
Brazil	4.3	3.1	7.8	16.7	11.3	15.3	9.5	10.5
Mexico	2.9	6.8	11.9	15.2	12.7	16.7	13.3	11.7

Source: UNCTAD Handbook of Statistics online database.

**Table 6.13** Export Growth in Turkey, 1971-2006

Dependent variable: log of real exports (lnX) in Turkey						
	OLS with HAC s.e.		DOLS (-1, 1)		FMOLS	
	Eq. (6.3)	Eq. (6.2)	Eq. (6.3)	Eq. (6.2)	Eq. (6.3)	Eq. (6.2)
Explanatory Variables:						
Log of world income (lnW)	0.82**	1.62**	0.48	1.63**	0.80**	1.59**
Log of relative prices (lnPX)	-1.84**	-0.06	-2.39**	-0.12	-1.92**	0.17
Shift dummy ( <i>lib</i> )	-59.25**	0.33	-82.23**	0.31	-69.21**	0.37 <sup>§</sup>
Interaction dummy ( <i>liblnW</i> )	0.82**		1.15**		0.99**	
Interaction dummy ( <i>liblnPX</i> )	1.97**		2.58**		1.79**	
Constant	-23.93*	-81.50**	-0.66	-81.41**	-22.78	-80.71**
Diagnostic statistics						
R <sup>2</sup>	0.99	0.98	0.99	0.98	0.98	0.97
Omit <i>liblnY liblnPM</i>	11.07					
Serial Correlation	36	36	33	33	35	35
Number of obs.			-4.23*	-3.45	-4.23*	-3.45
Engle-Granger tau-stat			-23.84*	-23.28*	-23.84*	-23.28*
Engle-Granger z-stat.			-4.23*	-2.90	-4.23*	-2.90
Phillips-Quliaris tau			-23.74*	-13.61	-23.74*	-13.61
Notes:						
** indicates significance at the 1% level; * significance at 5% level, and <sup>§</sup> at the 10% level.						
In DOLS estimations, <i>lib</i> , <i>liblnW</i> , and <i>liblnPX</i> are estimated as deterministic regressors						
Unit root tests failed to reject the presence of a unit root for explanatory variables.						
Data sources are the same as in Appendix B, except for the relative price variables which are obtained from real exchange rates reported by Bahmani-Oskooee and Mirzai (2000).						

**Table 6.14** Import Growth in Turkey, 1971-2006

Dependent variable: log of real imports in Turkey							
	OLS with HAC s.e.			DOLS (-1, 1)		FMOLS	
	Eq. (6.6)	Eq. 6.6)'	Eq. (6.5)	Eq. (6.6)	Eq. (6.5)	Eq. (6.6)	Eq. (6.5)
Explanatory Variables:							
Log of domestic income (lnY)	1.04**	0.37	2.24**	0.51	2.09**	1.12**	1.93**
Log of relative prices (lnPM)	-0.70	-0.30	-0.37*	-0.31	-0.65	-0.61*	-0.80*
Shift dummy ( <i>lib</i> )	-33.39**	-51.83**	0.06*	-53.57**	0.09	-36.48**	0.25
Interaction dummy ( <i>liblnY</i> )	1.42**	2.02**		2.02**		1.34**	
Interaction dummy ( <i>liblnPM</i> )	-0.59	0.69		8.80		10.90	
AR(1)		0.51**	0.82				
Constant	-11.91	7.19	-40.79**	3.43	-38.41**	-13.46	-34.98**
Diagnostic statistics:							
R <sup>2</sup>	0.99	0.99	0.97	0.99	0.98	0.98	0.97
Omit <i>liblnY liblnPM</i>	15.10**	3.32*					
Serial Correlation	[0.004]	[0.16]	[0.73]				
Number of obs.	36	36	36	33	33	35	35
Engle-Granger tau-stat				-3.92 <sup>§</sup>	-2.18	-3.92*	-2.18
Engle-Granger z-stat.				-35.06**	-8.68	-35.06**	-8.68
Phillips-Quliaris tau				-3.55	-2.32	-3.55	-2.32
Phillips-Quliaris z				-19.43 <sup>§</sup>	-9.95	-19.43 <sup>§</sup>	-9.95
Notes:							
** indicates significance at the 1% level; * significance at 5% level, and <sup>§</sup> at the 10% level.							
In DOLS estimations, <i>lib</i> , <i>liblnW</i> , and <i>liblnPX</i> are estimated as deterministic regressors							
Unit root tests failed to reject the presence of a unit root for explanatory variables.							
Data sources are the same as in Appendix B, except for the relative price variables which are obtained from real exchange rates reported by Bahmani-Oskooee and Mirzai (2000).							

**Table 6.15** Export Growth in Malaysia, 1971-2006

Dependent variable: log of real exports in Malaysia							
	OLS with HAC s.e.			DOLS (-1, 1)		FMOLS	
	Eq. (6.3)	Eq.(6.3)'	Eq. (6.2)	Eq. (6.3)	Eq. (2)	Eq. (6.3)	Eq. (6.2)
Explanatory Variables:							
Log of world income (lnW)	1.13**	1.56**	1.89**	1.18**	1.46**	1.12**	1.41**
Log of relative prices (lnPX)	-0.02	0.03	0.09	0.26	-1.14 <sup>§</sup>	0.04	-0.74 <sup>§</sup>
Shift dummy ( <i>lib</i> )	-67.71**	-26.33	-0.02	-77.46**	0.002	-60.80**	0.19
Interaction dummy ( <i>liblnW</i> )	1.04**	0.42		1.19**		0.94**	
Interaction dummy ( <i>liblnPX</i> )	0.84	0.13		0.97		0.62	
AR(1)		0.70**	0.78**				
Constant	-50.35**	-76.78**	-97.33**	-54.79**	-65.00**	-50.31**	-63.94**
Diagnostic statistics							
R <sup>2</sup>	0.99	0.99	0.99	0.99	0.98	0.99	0.98
Omit <i>liblnY liblnPM</i>	18.71**	0.23					
Serial Correlation	[0.05]	[0.62]	[0.66]				
Number of obs.	36	36	36	33	33	35	35
Engle-Granger tau-stat				-3.40	-2.64	-3.40	-2.64
Engle-Granger z-stat.				-19.26 <sup>§</sup>	-10.46	-19.26 <sup>§</sup>	-10.46
Phillips-Quliaris tau				-3.36	-2.69	-3.36	-2.69
Phillips-Quliaris z				-18.70 <sup>§</sup>	-11.05	-18.70 <sup>§</sup>	-11.05
Notes:							
** indicates significance at the 1% level; * significance at 5% level, and <sup>§</sup> at the 10% level.							
In DOLS estimations, <i>lib</i> , <i>liblnW</i> , and <i>liblnPX</i> are estimated as deterministic regressors							
Unit root tests failed to reject the presence of a unit root for explanatory variables.							
Data sources are the same as in Appendix B, except for the relative price variables which are obtained from real exchange rates reported by Bahmani-Oskooee and Mirzai (2000).							

**Table 6.16** Import Growth in Malaysia, 1971-2006

Dependent variable: log of real imports in Malaysia						
	OLS with HAC s.e		DOLS (-1, 1)		FMOLS	
	Eq. (6.6)	Eq. (6.5)	Eq. (6.6)	Eq. (6.5)	Eq. (6.6)	Eq. (6.5)
Explanatory Variables:						
Log of domestic income (lnY)	1.10**	1.60**	1.13**	1.40**	1.11**	1.36**
Log of relative prices (lnPM)	-1.00**	-0.41 <sup>§</sup>	-1.17**	-0.06	-1.02**	-0.15
Shift dummy ( <i>lib</i> )	-12.77**	0.09	-15.04**	0.16	-12.33**	0.25**
Interaction dummy ( <i>liblnY</i> )	0.59**		0.66**		0.58**	
Interaction dummy ( <i>liblnPM</i> )	0.28		0.13		0.31	
AR(1)		0.72**				
Constant	-12.81**	-21.85**	-14.45**	-15.30**	-13.17**	-14.92**
Diagnostic statistics						
R <sup>2</sup>	0.99	0.99	0.99	0.99	0.98	0.97
Omit <i>liblnY liblnPM</i>	26.04**					
Serial Correlation	[0.20]	[0.73]				
Number of obs.	36	36	33	33	35	35
Engle-Granger tau-stat			-5.61**	-2.88	-5.61**	-2.88
Engle-Granger z-stat.			-33.98**	-12.48	-33.98**	-12.48
Phillips-Quliaris tau			-5.65**	-2.87	-5.65**	-2.87
Phillips-Quliaris z			-28.81**	-12.32	-28.81**	-12.32
Notes:						
** indicates significance at the 1% level; * significance at 5% level, and <sup>§</sup> at the 10% level.						
In DOLS estimations, <i>lib</i> , <i>liblnW</i> , and <i>liblnPX</i> are estimated as deterministic regressors						
Unit root tests failed to reject the presence of a unit root for explanatory variables.						
Data sources are the same as in Appendix B, except for the relative price variables which are obtained from real exchange rates reported by Bahmani-Oskooee and Mirzai (2000).						

## CHAPTER 7

### CONCLUSION: NEOLIBERAL GLOBALIZATION AND WIDENING NORTH-SOUTH AND INTRA-SOUTH GROWTH DIVERGENCE

#### 7.1 Eradication of Pro-industrialization Measures?

Several points deserve attention about the industrial policy structures in this globalized era. First, it is often overlooked that the implementation of industrial policies has been highly asymmetric between the developed and developing worlds. On the one hand in the developed world, governments have sought to protect their infant industries through high levels of tariffs and production related subsidies until the present.<sup>50</sup> On the other hand the Bretton Woods organizations (the IMF, World Bank, and WTO) have been extremely strict in making third world governments abandon their tariffs and export subsidies that distort relative prices for protecting domestic industrial producers. This unfair competition that the third world manufacturers have to now face with the mature first world manufacturers and multinationals has led to depressed returns both because of the deterioration in terms of trade (due to the “export desperation”, slowdown in Northern growth, and income-elasticity differentials) and only a modest increase in the volume of output sold in international markets (due to low price elasticity of demand) as I have shown in the case of the majority of developing countries which are still primary exporters. On top of this, the massive reduction in import tariffs along with the reduction in subsidies for industrial production by the Southern governments has led to widespread “deindustrialization”—a reversal of the previous gains from earlier industrialization efforts.

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<sup>50</sup> Even England, the greatest champion of free-trade policies, has taken advantage of protective measures to nurture its cotton industry (Chang 2008).

Second, the elimination of trade taxes which comprise a large portion of fiscal revenues for many developing countries (especially the relatively poor ones) has led to a shrinking tax base and weakening fiscal balance (Rao 1998b). Thus, instead of curtailing unproductive rent-seeking behavior<sup>51</sup>, eliminating tariffs curtailed the fiscal capabilities of third world governments and made them less effective in designing and implementing industrial policies.

Third, the initial structural differences and path-dependency matter for subsequent success in the process of industrialization as I showed in the case study of Turkey and Malaysia. The latter benefited, to a large extent, not only from a stronger fiscal and trade structure initially, but also from the geographical proximity and presence of transport and communications infrastructure among producers in the East Asian regional cluster. In the absence of these advantageous factors, many developing countries—including Turkey—face significant challenges in diversifying into technology-intensive manufactured exports. If the elasticity differentials are reduced through continuous technological upgrading and productive diversification as empirical evidence for leading exporters of manufactures suggests, then the difficulties associated with technological diversification reproduce North-South and intra-South growth divergence, often coupled with adverse terms of trade movements.

Fourth, the outward-orientation of successful East Asian economies including Malaysia does *not* constitute a liberal trade regime simply because they have practiced well-targeted trade and sectoral policies that consistently promoted the creation of technological capabilities in these countries. As I have discussed in detail, when Malaysia gradually lowered its tariffs in late 1980s, it still retained import protection for its infant

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<sup>51</sup> See Onis (1991) for the emergence of rent-seeking under liberalized trade regime of Turkey.



industries which were largely subsidized by the state. These pro-industrialization measures subject to performance criteria were largely responsible for the sustained export performance following liberalization and its positive impact on income-elasticity for exports relative to imports, as I have shown in the case of Malaysia.

Fifth, the conventional wisdom in the writings of the advocates of neoliberal globalization is that developing countries that remain isolated from global market integration will suffer the consequences because as national economies become more densely interconnected through trade and investment flows, their growth rates tend to converge. Greater integration requires specialization along comparative advantages and abandoning distortions in relative prices; in short, following signals of the global market. According to the neoliberal paradigm, therefore, any market-distorting policy pursued by the state should be condemned as creating rent-seeking behavior with no positive contribution in the productive sphere. Moreover, the multilateral trading regime should favor regulations under aimed at harmonizing tariffs across countries and reducing tariff dispersion across products for “leveling the playing field.” The inference that follows from this logic is that the state should refrain from pursuing production sector policies and its active role in development policy ought to be eradicated.

## **7.2 A Case for Production Sector Policies**

A case for production sector policies can be made on several grounds, some of which are listed below. First, despite the intense debate among economists on the rationale and effectiveness of government intervention in the production sector, it is acknowledged that all the success cases in the developed and developing world relied on some sort of production sector strategy to support industrialization and structural

transformation of their economies. These strategies included a complex set of unorthodox policies combining infant industry protection, licensing with special economic zones, subsidies for export-oriented investments, and other subsidized means of credit allocation to priority sectors—all of which required a strong political will to develop and catch-up with more advanced countries. Even in a more liberalized economic environment, the recent success cases in East and Southeast Asia, including China, Korea, and Malaysia, have continued to use production sector strategies to promote the emergence of new sectors and methods of production (see chapter 6, Wade 2005).

Second, a case can be made for production sector policies on the grounds of dynamic gains from trade (Ocampo 2005). According to this view, reliance on global market forces and static comparative advantages might yield efficiency gains in the short-run by allocating resources more efficiently. It fails, however, to shift resources from less to more dynamic sectors whose markets have a greater potential to expand and which are more innovation-intensive; and thus promote long-run dynamic gains from trade. These dynamic gains are enhanced through the emergence of linkages among firms and sectors and the diffusion of innovations throughout the economy. Without production sector strategies, the economy remains locked in methods of production that use less advanced technology and cannot diversify into more dynamic activities with increasing returns.

Third, a case can be made for production sector policies on the grounds of taking advantage of windfall gains from improvements in the terms of trade. From a development perspective, the use of additional income resulting from improvements in terms of trade is of crucial importance. For example, if the terms-of-trade gains from higher export prices accrue in the form of higher profits in the export-oriented sector, and

if these are reinvested for enhancing productive capabilities, the impact on growth would be much greater than in a situation where the gains accrue to foreign actors controlling the export-oriented sector, which are used for profit repatriation. The latter has taken place several times in history, and the most recent examples include two exporters of mining products, Chile and Zambia. Since their export activities were controlled by transnational corporations (TNCs), the gains from rising terms of trade during 2003-2008 were captured by TNCs and led to an increase in factor payments abroad (UNCTAD 2005: 104). Effectively designed and implemented production sector strategies could ensure the re-investment of the windfall gains from terms of trade changes into more dynamic sectors. In Malaysia, for instance, multinational corporations (MNCs) were required to invest in local content for continuing their operations in this country (Lall 1995). An argument to dismantle the production sector policies in the developing world is therefore to be faulted not only on historical and dynamic advantage grounds but also on economic sovereignty grounds.

### **7.3 An Alternative to Neoliberal Policies?**

A different set of policies can be advocated as alternatives to the present set of neoliberal globalization policies based on the analysis of the widening global divergence and the comparative analysis of two latecomers, Turkey and Malaysia.

*i) Improve Multilateral Trading Regime:* The new set of regulations in the WTO agreements does not allow previously-used tools of development policy such as local content and trade-balancing requirements. They have also increased the costs of technology transfer due to intellectual property rights protection. I argued above that these the implementation of these WTO agreements have effectively reduced the policy

space available to developing countries, and restricted the scope for production sector strategies. Although there are still more indirect ways of pursuing production sector strategies (involving public investments in skill formation, R&D expenditures, etc.), the international policy environment can be reformed to be more conducive in terms of facilitating dynamic structural changes in developing countries. In particular, infant industry protection provisions should be changed to eliminate compensation to injured parties. The latter has been an effective disincentive for developing countries not to invoke and make use of infant industry provisions (Ocampo and Vos 2008). Thus, if they were not required to compensate for the injured parties, they could use infant industry policies more often than they have done so far. In addition, intellectual property rights regulations should be changed to allow for reverse-engineering and compulsory licensing in case of developing countries that are engaged in technology transfer. Shifting epicenter of the global economy towards China<sup>52</sup> might be a means of empowerment of the South through G-20 and other initiatives relative to the North—and might change the ways in which global lending institutions function.

*ii) Diversifying Export Structure:* Diversifying into manufactured exports could potentially lead to higher productivity apart from being a long-term solution to problems of growth divergence and terms of trade deterioration. Note, however, that the relative export prices of major exporters of manufactures were also subject to significant deterioration over the past few decades. Yet this tendency resulted from commodity-like characteristics of manufactures with low technology content (Kaplinsky 2006). For example, while China's terms of trade deteriorated rather sharply, Korea's and Malaysia's terms of trade showed an improvement in the last two decades (UNCTAD

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<sup>52</sup> See Arrighi (2007) for an account of this shift.

2005). Moreover, the export volumes of manufacture exporters expanded rapidly, compensating for the losses from terms of trade deterioration for the group as a whole. As I have shown in Chapter 4, countries specialized in manufactures also experienced much higher rates of growth compared to those specialized in primary products. Due to greater potential for eliminating growth divergence and benefiting from rising dynamic gains from trade, it is of developing countries' best interest to use diversify their productive structures. In the transition period, revenues from primary exports can be used as a platform from which to move to the production of natural-resource based and low-technology manufactured exports.

*iii) Selective Targeting in Industrial Policy:* Developing countries should not only pursue to diversify their productive structures towards technology-intensive manufactures, but this diversification should involve a selection of key industrial sectors with high priority. This might depend on demand conditions in international goods markets, for example, the electronics boom in the case of Malaysia. Moreover, the provision of protective measures and subsidies should be temporary and conditional to the achievement of precise performance criteria, as it has been the case for Malaysia after 1985. The disappointing results of industrial policies in Turkey have been related to these factors: non-selective application of industrial promotion incentives and the absence of monitoring and disciplining the promoted firms and joint-ventures (see chapter 5).

*iv) Implement Land Reform:* The “miracle” of East Asian industrialization could not have happened without the foundation of land reforms that played an effective role in redistributing land more equitably and eliminating politically-powerful landlords and rich farmers (as in the example of South Korea, Taiwan, and China). The now-industrialized

countries also went through a significant transformation of their agrarian structures along with their industrial transformation. This policy prescription would increase agricultural productivity that would not only lower food prices but also improve the nutrition of the population and boost the demand for manufactured goods, contributing to the development of non-agricultural sectors. It also curtails the political power of landlords, and thus opens the way for economic policies geared towards promoting industrial sectors.

*v) Promote Regional Integration:* One of the central pillars of Prebisch's thought was the promotion of regional integration by means of regional trade agreements encouraging South-South trade and regional financial cooperation encouraging South-South financial flows (Ocampo 2001). Regional integration in South-South trade provides a source of trade flows with greater content of technology than those in North-South flows because the Southern manufactured goods that are not competitive in Northern markets can be competitive in other Southern markets. Indeed, Turkey experienced this discrepancy in late 1970s and early 1980s when its exports to Middle Eastern countries were much more technology-intensive than its exports to the European markets (Senses 1990). This has also been observed for Latin American countries under MERCOSUR as in 1991 manufactures comprised 81 per cent of intra-regional trade, and 65 per cent of total external trade (Ocampo 2001: 34). Complementary to the promotion of regional trading networks, similar attention should be given to the development of regional and subregional financial institutions. These might take the form of multilateral development banks such as the Inter-American Development Bank and Caribbean Development Bank, or multilateral lending institutions such as the Latin American Reserve Bank, the Bank of

the South, and the Chiang Mai Initiative that make use of accumulated foreign exchange reserves and swaps between Central Banks to provide immediate emergency lending for troubled developing countries.<sup>53</sup>

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<sup>53</sup> The latter lending institutions were founded based on the principle of mutual support in cases of financial emergencies that might trigger crises. Chiang Mai Initiative, for example, evolved as a response to the functioning of the IMF during the Asian financial crisis. See Erten and Rosero (2010) for a review of the evolution of these alternative institutions of regional financial integration.

## APPENDIX A

### DERIVATION OF PREBISCH-SINGER HYPOTHESIS UNDER UNBALANCED TRADE

$$TB = E(Y_N; 1/p) - pM(Y_S; p)$$

Differentiating with respect to time, we obtain the following identity:

$$\frac{\partial TB}{\partial t} = \frac{\partial E}{\partial Y_N} \frac{\partial Y_N}{\partial t} + \frac{\partial E}{\partial 1/p} (-1/p) \frac{\partial p}{\partial t} - \frac{\partial p}{\partial t} M - p \frac{\partial M}{\partial Y_S} \frac{\partial Y_S}{\partial t} - p \frac{\partial M}{\partial p} \frac{\partial p}{\partial t}$$

Dividing by  $E$  results in:

$$\frac{\partial TB}{\partial t} \frac{1}{E} = \frac{\partial E}{\partial Y_N} \frac{Y_N}{E} \frac{\partial Y_N / \partial t}{Y_N} - \frac{\partial E}{\partial 1/p} \frac{1/p}{E} \frac{\partial p / \partial t}{p} - \frac{pM}{E} \frac{\partial p / \partial t}{p} - \frac{\partial M}{\partial Y_S} \frac{Y_S}{M} \frac{\partial Y_S / \partial t}{Y_S} - \frac{\partial M}{\partial p} \frac{p}{M} \frac{\partial p / \partial t}{p}$$

$$\frac{\partial TB}{\partial t} \frac{1}{E} = e_s g_N + \eta_s \hat{p} + \left( -\frac{pM}{E} \right) \hat{p} - e_N g_s \frac{pM}{E} + \eta_N \hat{p} \frac{pM}{E}$$

$$\frac{\partial TB}{\partial t} \frac{1}{E} = e_s g_N - e_N g_s \frac{pM}{E} + \hat{p} \left( \eta_s + \eta_N \frac{pM}{E} - \frac{pM}{E} \right) \quad (*)$$

$$\frac{\partial TB}{\partial t} \frac{1/E}{\eta_s + \eta_N \frac{pM}{E} - \frac{pM}{E}} + \frac{e_N g_s \frac{pM}{E} - e_s g_N}{\eta_s + \eta_N \frac{pM}{E} - \frac{pM}{E}} = \hat{p}$$

Multiplying (\*) by  $E/TB$  to obtain  $\hat{TB}$ :

$$\hat{TB} = e_s g_N \frac{E}{TB} - e_N g_s \frac{pM}{TB} + \hat{p} \left( \eta_s \frac{E}{TB} + \eta_N \frac{pM}{TB} - \frac{pM}{TB} \right)$$

$$\frac{\hat{TB}}{\eta_s \frac{E}{TB} + \eta_N \frac{pM}{TB} - \frac{pM}{TB}} + \frac{e_N g_s \frac{pM}{TB} - e_s g_N \frac{E}{TB}}{\eta_s \frac{E}{TB} + \eta_N \frac{pM}{TB} - \frac{pM}{TB}} = \hat{p}$$



$$\frac{\hat{T}B}{\frac{pM}{TB}(\eta_s + \eta_N - 1) + \eta_s} + \frac{e_N g_s \frac{pM}{TB} - e_s g_N \frac{E}{TB}}{\frac{pM}{TB}(\eta_s + \eta_N - 1) + \eta_s} = \hat{p}$$

## APPENDIX B

### DATA DEFINITIONS AND SOURCES

- Log of imports in real terms<sup>54</sup> ( $m$ ):

The logarithm of total value of imports deflated by the index of unit value of imports (both measured in U.S. dollars). Source: UNCTAD Handbook of Statistics for import values, and *International Financial Statistics (IFS)*, *UNCTAD Handbook of Statistics*, *IFS Supplement on Trade Statistics* (1988) for import unit values.

- Log of real domestic income ( $y$ ):

The logarithm of GDP constant in 2000 US\$. Source: World Bank, World Development Indicators (WDI), 2009.

- Log of import prices relative to domestic substitutes ( $pm$ ):

Relative price of imports is measured by the ratio of the unit value of imports divided by the GDP deflator and adjusted by the exchange rate. Source: *International Financial Statistics (IFS)*, *UNCTAD Handbook of Statistics*, *IFS Supplement on Trade Statistics* (1988) for import unit values, *International Financial Statistics (IFS)* for GDP deflator and exchange rates.

- Log of imports in real terms ( $x$ ):

The logarithm of total value of exports deflated by the index of unit value of exports (both measured in U.S. dollars). Source: UNCTAD Handbook of Statistics for export values, and *International Financial Statistics (IFS)*, *UNCTAD Handbook of Statistics*, *IFS Supplement on Trade Statistics* (1988) for export unit values.

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<sup>54</sup> The specification in log-log form follows Wu (2005).

- Log of real foreign income ( $z$ ):

The logarithm of world<sup>55</sup> GDP constant in 2000 US\$. Source: World Bank, World Development Indicators (WDI), 2009.

- Log of relative export prices ( $px$ ):

Relative price of exports is measured by the ratio of the unit value of exports of each country to the unit value of world's exports. Source: *International Financial Statistics* (IFS), *UNCTAD Handbook of Statistics*, *IFS Supplement on Trade Statistics* (1988) for export unit values, *International Financial Statistics* (IFS) for the unit value of world's exports.

### Appendix Tables:

**Table B.1** Pedroni Cointegration Test for Import Equation: 1960-2006

Common AR coefs. (within-dimension)	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	2.83	0.00	1.90	0.03
Panel rho-Statistic	-2.85	0.00	-3.89	0.00
Panel PP-Statistic	-3.82	0.00	-4.93	0.00
Panel ADF-Statistic	-1.93	0.03	-3.27	0.00
Individual AR coefs. (between-dimension)	Statistic	Prob.		
Group rho-Statistic	-1.47	0.07		
Group PP-Statistic	-5.79	0.00		
Group ADF-Statistic	-1.36	0.09		

**Table B.2** Individual Unit Root Tests for the Variables in Import Equation

	log(m)		log(y)		log(pm)	
	Statistic	Prob.**	Statistic	Prob.**	Statistic	Prob.**
Null: Unit root (assumes common unit root process)						
Levin, Lin & Chu $t^*$	1.67	0.95	-6.25	0.00	-6.50	0
Null: Unit root (assumes individual unit root process)						
Im, Pesaran and Shin W-st	6.09	1.00	3.19	1.00	-5.92	0

<sup>55</sup> World GDP is used as a proxy for the world GDP minus GDP of the individual developing country (Santos-Paulino and Thirlwall 2004, Cimoli *et al.* 2010).

ADF - Fisher Chi-square	50.80	1.00	95.30	0.67	389.12	0
PP - Fisher Chi-square	46.50	1.00	102.28	0.47	217.37	0

**Table B.3** Pedroni Cointegration Test for Export Equation: 1960-2006

Common AR coefs. (within-dimension)	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	1.57	0.06	1.09	0.14
Panel rho-Statistic	-1.90	0.03	-1.23	0.11
Panel PP-Statistic	-3.23	0.00	-2.49	0.01
Panel ADF-Statistic	-3.11	0.00	-2.46	0.01
Individual AR coefs. (between-dimension)	Statistic	Prob.		
Group rho-Statistic	0.41	0.66		
Group PP-Statistic	-1.42	0.08		
Group ADF-Statistic	-1.33	0.09		

**Table B.4** Individual Unit Root Tests for the Variables in Export Equation

	log(rx)		log(f)		log(rpx)	
Null: Unit root (assumes common unit root process)	Statistic	Prob. **	Statistic	Prob. **	Statistic	Prob. **
Levin, Lin & Chu t*	1.33	0.91	-27.50	0.00	0.57	0.72
Null: Unit root (assumes individual unit root process)						
Im, Pesaran and Shin W-st	6.95	1.00	-14.86	0.00	-0.62	0.27
ADF - Fisher Chi-square	68.19	1.00	410.92	0.00	123.52	0.07
PP - Fisher Chi-square	91.07	0.77	893.88	0.00	110.69	0.26

## APPENDIX C

### ESTIMATION RESULTS

**Table C.1** Estimation Results for the Remaining Countries

<i>Yearly moving average estimation</i>	<i>Dependent variable</i>	<i>Constant</i>	$g_N$	$\tau$	<i>Adjusted <math>R^2</math></i>	$e_s/e_n$
<i>MA (3)</i>	$g_s$	2.69 (6.38)	0.27 (2.55)		0.11	0.38
	$\hat{p}$	0.70 (0.93)	-0.03 (-0.17)	8.00 (0.99)	-0.02	
<i>MA (4)</i>	$g_s$	2.30 (6.79)	0.36 (4.15)		0.28	0.75
	$\hat{p}$	1.36 (2.38)	-0.23 (-1.71)	6.73 (0.85)	0.03	
<i>MA (5)</i>	$g_s$	2.25 (7.09)	0.38 (4.65)		0.33	0.78
	$\hat{p}$	1.63 (3.04)	-0.28 (-2.20)	5.12 (0.65)	0.07	

Notes: Figures in parentheses are t-ratios. Remaining countries include all non-major exporters of oil and manufactures goods, that is to say, primarily exporters of primary commodities, classified in UNCTAD Handbook of Statistics. The data for terms of trade series and trade balance comes from UNCTAD Handbook of Statistics, and the data for growth rates (constant 2000 US\$) comes from WDI 2009.  $\tau$  represents the change in the trade balance divided by export volume.

**Table C.2** Estimation Results for the Major Exporters of Manufactures

<i>Yearly moving average estimation</i>	<i>Dependent variable</i>	<i>Constant</i>	$g_N$	$\tau$	<i>Adjusted <math>R^2</math></i>	$e_s/e_n$
<i>MA (3)</i>	$g_s$	4.55 (9.83)	.393 (3.44)		0.20	1.12
	$\hat{p}$	2.98 (3.90)	-.473 (-2.49)	10.1 (1.13)	0.13	
<i>MA (4)</i>	$g_s$	4.06 (11.19)	.532 (5.76)		0.49	1.74
	$\hat{p}$	3.398 (5.43)	-.62 (-3.77)	2.48 (0.26)	0.30	
<i>MA (5)</i>	$g_s$	3.91 (11.06)	0.57 (6.32)		0.49	1.74
	$\hat{p}$	3.68 (6.02)	-0.68 (-4.18)	-3.38 (-0.35)	0.30	

Notes: Figures in parentheses are t-ratios. The data sample includes all countries classified as major exporters of manufactures in UNCTAD Handbook of Statistics. The data for terms of trade series and trade balance comes from UNCTAD Handbook of Statistics, and the data for growth rates (constant 2000 US\$) comes from WDI 2009.  $\tau$  represents the change in the trade balance divided by export volume.

**Table C.3** Estimation Results for Major Exporters of Oil

<i>Yearly moving average estimation</i>	<i>Dependent variable</i>	<i>Constant</i>	$g_N$	$\tau$	<i>Adjusted <math>R^2</math></i>	$e_s/e_n$
<i>MA (3)</i>	$g_s$	-0.34 (-0.26)	1.60 (4.92)		0.35	1.47
	$\hat{p}$	-6.5 (-2.16)	2.4 (3.11)	-103.46 (-6.88)	0.52	
<i>MA (4)</i>	$g_s$	-2.01 (-1.69)	2.06 (6.82)		0.53	1.26
	$\hat{p}$	-6.28 (-2.25)	2.50 (3.32)	-123.95 (-6.95)	0.53	
<i>MA (5)</i>	$g_s$	-2.01 (-1.69)	2.06 (6.82)		0.53	1.06
	$\hat{p}$	-6.28 (-2.25)	2.50 (3.32)	-123.95 (-6.95)	0.53	

Notes: Figures in parentheses are t-ratios. The data sample includes all countries classified as major exporters of petroleum in UNCTAD Handbook of Statistics. The data for terms of trade series and trade balance comes from UNCTAD Handbook of Statistics, and the data for growth rates (constant 2000 US\$) comes from WDI 2009.  $\tau$  represents the change in the trade balance divided by export volume.

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