Maurer, Rainer

Working Paper

International trade and economic growth: A survey of empirical studies

Kiel Working Papers, No. 660

Provided in cooperation with:
Institut für Weltwirtschaft (IfW)

Kieler Arbeitspapiere
Kiel Working Papers

Kiel Working Paper No. 660

International Trade and Economic Growth

- A Survey of Empirical Studies

by

Rainer Maurer

Dezember 1994

Institut für Weltwirtschaft an der Universität Kiel

The Kiel Institute of World Economics

Institut für Weltwirtschaft

Düsternbrooker Weg 120

D- 24105 Kiel

Kiel Working Paper No. 660

International Trade and Economic Growth

- A Survey of Empirical Studies

by

Rainer Maurer

Dezember 1994

"...therefore, the most advantageous method in which a landed (*i.e. agricultural*) nation can raise up artificers, manufacturers and merchants of its own, is to grant the most perfect freedom of trade to the artificers, manufacturers and merchants of all other nations. It thereby raises the value of the surplus produce of its own land, of which the continual increase gradually establishes a fund, which in due time necessarily raises up all the artificers, manufactureres and merchants whom it has occasion for. When a landed nation, on the contrary, oppresses either by high duties or by prohibitions the trade of foreign nations, it necessarily hurts its own interest..."

Adam Smith, 1776, An Inquiry into the Nature and Causes of the Wealth of Nations[1]

"Since the Trojans were given a wooden horse by the Greeks, it has become a dangerous thing for one nation to accept presents from others."

Friedrich List, 1841, The National System of the Political Economy[2]

---

[1] A. Smith (1994), p.728, text in brackets added by me.

[2] F. List (1841), p.218.

1. Introduction[1]

1.1. Abstract

This paper surveys the empirical literature on the relation between international trade and economic growth. It distinguishes between the Market Expansion Hypothesis, which postulates a positive relation of international trade on economic growth, and the Trade Hysteresis Hypothesis, which pronounces the possibility of a negative relation between international trade and economic growth. The main conclusion is that, though the empirical observations are not unequivocal, there seems to be more empirical evidence against the Trade Hysteresis Hypothesis than against the Market Expansion Hypothesis.

Both hypotheses, which reach at least back to Friedrich List (Trade Hysteresis Hypothesis) and Adam Smith (Market Expansion Hypothesis) and have now been formalized by new theories on economic growth and international trade, are discussed in section 1.2.. Section 1.3. sketches the development of trade regimes in a historical perspective. Some methodological considerations on case studies and statistical tests (section 2.1.1.) as well as on measurement problems of trade regimes (section 2.1.2.) precede the discussion of the case studies (section 2.2.) and statistical tests (section 2.3.). Section 3 draws conclusions and presents some complementary stylized facts. Appendix 2 includes four tables (appendix tables 4 - 7) that briefly scatter all the empirical studies surveyed in this paper.

---

[1] I am grateful to Henning Klodt for critical comments. Any errors are my responsibility. This paper is part of a research project "The social market economy - New challenge and conceptual response" supported by the Bertelsman Foundation, the Nixdorf Foundation and the Ludwig Erhard-Foundation.

1.2. The competing hypotheses

The hypothesis that free trade stimulates economic growth goes at least back to Adam Smith (1776). The principal cause for improvements of productivity, he states, is division of labour.[2] Division of labour between economic agents is possible, if they are able to trade freely: The extent of the division of labour is limited by the extent of the market.[3] Hence, the extent of productivity improvements is limited by the extent of the market too.

According to Smith division of labour generates improvements of productivity, because it generates learning effects. Division of labour means that one activity is split up into several activities, such that one worker reaches a higher output per kind of activity. This enables a worker to learn more about how to improve the execution of his activity, i.e. how to improve his productivity.[4]

Following Smith there is yet another way division of labour generates productivity improvements: Division of labour allows to separate the process of research and development (R&D) from the process of commodity production.[5] This way the output per R&D-activity is increased, such that more improvements of R&D-productivity through learning effects are made possible. As the output of the R&D sector is technological knowledge, which serves to improve the productivity of the other sectors, the productivity of the whole economy is improved by separating R&D from commodity production.

To sum up, the Smithsonian theory states that free trade leads not only to an once and for all time, static increase of productivity but to a permanent higher rate of productivity

---

[2] "The greatest improvement in the productive powers of labour, and the greater part of the skill, dexterity, and judgement with which it is any where directed, or applied, seem to have been the effects of the division of labour." Smith (1994), p. 3.

[3] "As it is the power of exchanging that gives occasion to the division of labour, so the extent of this division must always be limited by the extent of that power, or, in other words, by the extent of the market." Smith (1994), p.19.

[4] Smith (1994), p.9.

[5] Smith (1994), p.11.

improvements. Hence, the principal gains from free trade are not static but dynamic.[6] Economies with larger markets grow faster, i.e. the extent of the market is positively related to the rate of economic growth.

It is not the principal rational behind this deep theory that was critized by the first opponents of free trade. The blessings of division of labour had been a too ostensibly manifest fact to deny it in those times of transition from agricultural to industrial economy. Indeed, Friedrich List, one of the first economists that presented a theory, according to which free foreign trade may have adverse growth effects, was a strong supporter of free trade. He was one of the most eager lobbyists, who initiated the foundation of the German "Zollverein", a customs union among the numerous German states.

However, List argued that a mutual advantageous division of labour by free trade only works between economies with an equal state of development of agriculture and industry. Free trade between economies with a different state of development is advantageous for the industrial economy but disadvantageous for the agricultural economy.[7] List derives this result from his theory of "productive forces". He defines "productive forces" to be what in modern terms is called human capital and institutional capital.[8] He postulates that the transition from an agricultural to an industrial economy increases the accumulation of human and institutional capital *within* the *whole* economy. Hence, he postulates positive

---

[6] It is interesting to note that not only Smith but also Ricardo presumed the principal gains from free trade to be dynamic. Although his famous theorem of comparative advantage that refers to the static gains from trade became the leading paradigm of neoclassical theory of international trade, he himself directed much more effort in building a dynamic model of trade and growth (Ricardo, 1815, Essay on the influence of a low price of corn upon the profits of Stock, published in Ricardo (1951), vol. IV, pp, 1-42). Several formalizations of this model have been undertaken (Samuelson (1959), Pasinetti (1960), Findlay (1974)). Findlay derives in his version of the Ricardian model a steady state solution for the small country case with a positive per capita growth rate. This is made possible by an assumption that is by now the cornerstone of the so called New Growth Theory: He postulates an accumulatable production factor that exhibits the property of non-diminishing marginal returns (i.e. labor stock in the production function of manufacturing (Findlay 1974, equation (1)). However, the Ricardian model of trade and growth comprises some assumptions that are not met by modern market structure and consumer behaviour. Especially the assumption of a "natural" subsistence wage and a labour force that uses all his income to do nothing but reproduce itself, seems to be not in accordance with contemporary facts - at least in developed countries.

[7] List (1841), e.g. pp. 18, 193, 218-219.

[8] List (1841), p. 208-209.

externalities of industry, that are bounded within a country. These positive externalities lead to both, increases of productivity in agriculture and industry. Therefore, in the long run, a specialization on industry enables an economy to reach a higher rate of per capita income growth.[9]

Under free trade these positive externalities of industry (which are bounded within a country) allow an industrial economy to produce industrial goods at lower costs than an agricultural economy. This cost advantage, built on a higher stock of human and institutional capital, leads to a growing specialization of the industrial economy in industry and of the agricultural economy in agriculture. Consequently, free trade perpetuates the low level of economic productivity and productivity growth of the agricultural economy. Free trade leads to structural hysteresis of economic development.

The cure to prevent this hysteresis, following List, is a temporary protection by tariff, or, as he calls it, an "infant tariff". Temporary protection allows an industry sector that is still in its infancy to become internationally competitive. Once this stage of development is reached, and the economy has a stock of human and institutional capital high enough, the economy should open itself for free trade and enjoy the advantages of the international division of labour.

It is interesting to note, that Smith himself discussed the effects of trade between agricultural and industrial economies too. However, he argued that the easiest way for an agricultural economy to rise industry is to allow free trade with industrial economies. This way the profits of the agricultural sector grows and "gradually establishes a fund, which in due time necessarily raises up all the artificers, industries and merchants whom it has occasion for".[10] This fund enables the agricultural economy to import industrial goods that helps to transfer technological knowledge from industrial economies.[11] Imports of industry machines allow an agricultural economy to learn the use and the construction of industry machines, and helps this way to develop an industrial sector in the agricultural economy.

---

[9] List (1841), pp. 212-213. List goes so far to say that manufacture favours not only the economic but even political development of a country. This enormous appreciation of manufacturing by List may have been a reflection of the lead the first manufactural country, the United Kingdom, hold on these fields.

[10] Smith (1994), p.728.

[11] Smith (1994), p. 738.

Hence, one might say that Smith contrary to List hold positive externalities of industry that are bound within a country to be not important.

The discussion of Smith and List might give raise to the thinking that the basic arguments pro or contra free trade have not changed that much since their times. However, new attempts to formalize their theories have helped to make explicit all the assumptions necessary to derive their hypotheses. In the beginning of these new attempts stood the detection that, in order to obtain a long run steady state growth rate without assuming an exogenously rate of technological progress, the assumption of an accumulatable production factor that exhibits the property of non-diminishing marginal returns is necessary (Romer (1986)). As Romer (1990) argued, it is most sensible to impose this property on technological knowledge capital, for - contrary to material productions factors - a doubling of technological knowledge may lead to a doubling of output without complementation by other production factors.[12] Based on this assumption the theoretical research on the relation between foreign trade and economic growth started to develop a large class of new models that wears the label "New Growth Theory".[13]

Among the models of the New Growth Theory that of Romer/Rivera-Batiz (1991a) and (1991b) probably captures best the ideas of Smith. This model has three production sectors: A consumption goods sector, a capital goods sector and a R&D-sector. The production functions of the consumption and capital goods sector are identical. They use labour, human capital and production goods as input. The way capital goods join the production function implies that a higher variety of production goods increases productivity. This has the interpretation that a higher variety of production goods allows a higher degree of division of labour and, this way, increases productivity. The production function of the R&D-sector

---

[12] Some models assume human capital to be an accumulatable production factor with non-diminishing marginal returns (Lukas (1988), Young (1991), Mulligan/Sala-i-Martin (1992)). However, as Romer (1990) argues, this implies that human capital per capita can be infinitely increased. This may stand at odds with the fact that the intellectual capacity of every human being is more or less bounded.

[13] However, the probably first (though partial equilibrium) endogenous growth model that linked foreign trade with economic growth was presented by Bardhan/Kletzer (1984) some years before the New Growth Theory started. The Bardahn/Kletzer model is a vintage-capital model where labour productivity grows via learning by doing with total output. Earlier works on foreign trade and economic growth based on the neoclassical growth theory à la Solow (1956) were not able to model a *steady state* relation between the growth rate and foreign trade (e.g. Bardhan (1965), Oniki/Uzawa (1965), Herberg (1970)).

uses human capital and the accumulated technological knowledge to produce new technological knowledge. One unit of new technological knowledge allows the production of a new type of capital good and is sold as a perpetual patent. This implies a market structure that induces monopolistic competition between the producers of the R&D-sector. The specification of the R&D-production function implies that human capital is the more productive the more technological knowledge has been accumulated in the past, i.e. learning increase productivity. Hence, this model comprises two features that play an important role in the Smithsonian theory on foreign trade and economic growth: Division of labour and learning by doing. However, to make the model run another assumption is necessary, namely that the amount of accumulated technological knowledge joins the R&D-production function with non-diminishing marginal returns. As mentioned above, this is the critical ingredient to derive a positive steady state growth rate.

Opening this economy to foreign trade with a perfect symmetrical economy under the condition, that accumulated technological knowledge is perfectly mobile between both economies and can be gratuitously absorbed by the R&D-sectors of both countries, has two principal effects: *First,* by the assumption of perfect symmetry of both economies and perfect mobility of technological knowledge, free trade implies a doubling of the stock of technological knowledge, which doubles the available variety of production goods and leads, this way, to a doubling of productivity in all three production sectors (knowledge transfer effect). *Second,* doubling the markets for production goods leads - because of the assumption of monopolistic competition in the R&D-sector - to a doubling of the R&D-profits (market expansion effect). This induces the a reallocation of human capital from the consumption and capital goods sector to the R&D-sector, such that the steady state output of R&D is increased. As the output of the R&D-sector is technological knowledge that rises the productivity of the consumption and capital goods sectors, this leads to a higher steady state GDP growth rate of both economies.

There are several assumptions, which make this model restrictive. Especially,, the assumption of two perfect symmetrical economies seems to be critical. Without this assumption free trade might lead to specialization of the economies on R&D or consumption and capital goods production - depending on their different resource endowments. However, it is possible to modify the model such that the production function of R&D is equal to the production functions of the other sectors. This version of the model

does not imply a specialization of countries with different resource endowments in case of free trade but shares most of the other properties of the above described model.[14]

A model that allows to study the effects of specialization and captures many ideas of List's structural hysteresis theory was presented by Grossman/Helpman (1991), Chapter 8.[15] This model has four production sectors: A low tech good (LTG) sector, a high tech intermediate good (HTIG) sector, a high tech final good (HTFG) sector and a R&D-sector. The only primary resource in this model is labour. One unit of labour can be used to produce one unit of the LTG or one unit of any known variety of the HTIG sector. In the R&D-sector one unit of labour can be used to produce an amount of blueprints for new HTIGs, that equals the number of blueprints, which have been produced in the past of this economy. This assumption has three important implications: *First,* it models the idea that the production of blueprints induces learning effects such that the productivity of labour in R&D grows with the number of blueprints produced in the past. *Second,* it implies that blueprints are an accumulatable production factor with constant marginal returns. This insures that a positive long run steady state growth rate is possible. (These implications the Grossman/Helpman model has in common with the Romer/Rivera-Batiz model.) *Third,* it implies that these learning effects are completely spilled over as positive externalities to the R&D firms of *this* economy. However, they are not spilled over to R&D firms in *other* economies. (This implication distinguishes the Grossman/Helpman model from the Romer/Rivera-Batiz

---

[14] This version of the model is called "lab equipment model" by Rivera-Batiz/Romer (1991b).

[15] Krugman (1980) presents a model of trade and growth that captures as well List's idea that externalities of manufacture may be a reason for trade hysteresis. Growth in this model is generated by the assumption that capital is an accumulatable production factor with non-diminishing returns in the production function of manufacturing. However, a limitational manufacturing production function in labour and capital and a finite labour force sets an upper boundary for the accumulated capital stock and hence for economic growth. The setup of this model implies the country, that has a marginally higher stock of capital in the beginning of the growth process, is able to produce manufacturing goods with lower costs, because the higher stock of capital makes production cheaper via its positive externalities. Therefore - in case of free trade with manufacturing goods - the manufacture sector of the country, which starts with the higher capital stock, can outperform the manufacturing sector of the other country. In the long run a steady state results, where only the country that starts with the higher stock of capital produces manufacturing goods, while the other country produces only agricultural products. As wages in manufacture are higher that wages in agriculture, workers in the manufacturing country fare better. Unfortunately, Krugman's model is restrictive in some aspects - especially concerning the demand side assumptions. However, as Krugman assures, it can be generalized without changing the basic results.

model.) This is the crucial assumption that makes a scenario possible, where free foreign trade leads to structural hysteresis.

Indeed, opening an economy A to free foreign trade and free financial transactions with an economy B, which has an endowment of technological knowledge that is only slightly lower, will necessarily lead to a steady state, where the production of HTIGs and blueprints are concentrated in country A. Production of LTGs takes place in economy A only in case of factor price (i.e. wage) equalization (FPE) between both countries. As the LTG sector uses neither blueprints nor HTIGs as input, there is no productivity growth in the LTG sector. Hence, economy B that is completely specialized in the production of LTGs will not grow in steady state, while economy A has a growing R&D and HTFG sector. Free trade has devastating effects on economic growth in economy B.

The reason for this extreme effects of free trade is - just as List stated it in his theory for the whole industry sector - the cost advantage in the production of blueprints in economy A. This cost advantage results from the higher initial endowment with technological knowledge that increases the productivity of the R&D sector in economy A via its positive externalities.

However, it is most astonishing that this extreme effect of free foreign trade on economic growth does not imply that households in economy B are necessarily worse off. Whether they are worse off, depends on whether a steady state with FPE emerges or not. Namely, in a steady state with FPE households in economy B fare as well as households in economy A, because their wages do not differ and - thanks to free trade and free international finance markets - households in economy B can as well consume HTIGs (resp. HTFGs) and invest in the production of blueprints as households in economy A. Hence, trade hysteresis does not necessary imply welfare hysteresis. However, List would most likely have critized this formalist argument by referring to the possibility that the government of economy A could monopolize the technological knowledge, which is concentrated in economy A only, and use it to blackmail economy B. In this case, free trade may not be a dominant strategy for a technologically leading country.

Whether a steady state with FPE emerges or not, depends on the structural parameters of the economy and on the endowment with labour. As Grossman/Helpman show, given the structure of their economy, a steady state with FPE is not very likely to occur, if labour endowments significantly differ. In case no FPE steady state emerges, economy A will have higher wages than economy B and consequently households in economy A will be better off than household in economy B. To prevent this outcome, R&D subsidies can be used in

economy B to overcome the initial disadvantage in the production of blueprints, as Grossman/Helpman show. By the same line of arguments a temporary protection of economy B - infant tariffs, as List called it, - may be used to prevent trade hysteresis.

The models of Rivera-Batiz/Romer and Grossman/Helpman described so far derive a link between steady state growth and foreign trade by *market expansion* and *knowledge transfer* effects (Rivera/Batiz) and *specialization* effects (Grossman/Helpman). There are other types of New Growth Theory models, where foreign trade influences the steady state growth rate via *competition* effects. Competition effects are generated by in changes the market structure of the R&D sector induced by foreign trade. As Baldwin (1992) shows, foreign trade may change the market structure in a way that the steady state growth rate may increase or decrease. In many New Growth Theory models these four effects (market expansion, knowledge transfer, specialization and competition effect) work simultaneously and interact with each other.

To sum up, though the basic theories on the relation between foreign trade and economic growth reach back to authors like Adam Smith and Friedrich List, the New Growth Theory has delivered an analytical framework that is able to demonstrate, how different channels might link trade and growth and how those channels may influence each other. Thereby it was shown, that the competing hypotheses of Smith and List can be consistently derived from certain sets of assumptions, which are much alike to those, Smith and List used. This rises the question, if it is possible to empirically discriminate between both hypotheses.

1.3. Historical development and modern profile of restrictions on foreign trade

In a world, where all countries had the same level of restrictions on foreign trade for all times, it would not be possible to empirically discriminate between different hypotheses on trade and growth. Some variation - cross country or temporal - is necessary. As data on trade restrictions and information on institutional arrangements on foreign trade show, there is a lot of variation.

In a historical perspective phases of shifts to free trade regimes and phases of shifts to restrictive trade regimes followed each other. Since the beginning of industrialization roughly four such phases can be distinguished (World Bank 1987).

1820-1870: With the start of the industrial revolution at the beginning of the 19th century a period of endured trade liberalization followed that lasted until the late 1870s. After the

Napoleonic wars France started reducing tolls and tariffs on domestic trade. In Germany the "Zollverein" was created in 1834. United Kingdom started liberalizing its foreign trade by removing legal barriers against emigration of skilled workers in 1825 and against exports of machinery in 1842. Soon later the Navigation Act abolished restrictions on international shipping and by 1847 grain imports were liberalized by the Corn Laws. The United States started a series of tariff reductions in 1840. France reduced several import restrictions around 1852. The Cobden-Chevalier free trade treaty with the United Kingdom established a free trade zone between both countries. The German Zollverein reduced its foreign trade tariffs in the 1860s.

1870 - 1913: The impetus on foreign trade liberalization lost momentum. The American Civil War led to several increases in the need for government revenue in the late 1870 that were prolonged for protective purposes. In Germany, where tariffs on most imports had been abolished by 1877 agricultural producers were successful in achieving protection against cheap wheat from America. Subsequently, France and other countries followed the German example.

1913 - 1950: In course of the two world wars, the world trading system broke down. German industry cartelized. The same happened - constrained by anti-trust policy - in the United States. Around the Great Depression many countries embarked on restrictive foreign trade policies. Tariff races and quantitative restrictions became common features in commercial policy. Depressed by the dwindling demand for their products many developing countries such as Brazil and Argentina started to pursue an import-substitution trade strategy. The United States passed the Smoot-Hawley Tariff Act that created high tariffs. France and the United Kingdom withdrew from multilateral trade, by focusing on trade with their colonies. Germany constructed a complex system of bilateral payments and exchange controls.

1950 - 1994: With the General Agreement on Tariffs and Trade (GATT) the stage was set for a revival of foreign trade liberalization. In several GATT-Rounds starting with 23 countries in 1947 tariffs of more and more commodity groups were reduced. The Tokyo-Round (1973-1979), in which 99 countries participated, concentrated for the first time on non-tariff measures. The GATT process led to significant reductions in average tariffs and non-tariff measures. However, a complex set of exceptions and side agreements emerged in the course of the process. Since the 1960s a tendency to form regional trading blocs on the basis of bilateral agreements broke path. No less than 12 regional trading blocs

emerged. However, - indeed - only the European Community succeeded in significantly increasing their intraunion share of world exports since 1960. In the late 1960s and in the 1970s several developing countries made attempts to switch from an import substitution trade regime to on outward oriented export promotion regime. However, only few succeeded in sustaining this policy change. With the emergence of the successful outward oriented Asian newly industrialzed countries (NICs) and the collapse of the COMECON-countries in course of the 1980s a new wave of trade regime liberalization attempts arose. In the same time many industrialized countries and trading blocs like the European Community oppressed by national lobby groups started a policy of selective non-tariff protection.

The ups and downs of trade liberalization episodes are roughly reflected in the development of nominal merchandise import tariff rates of some early industrializing countries from 1820 to 1987 (table 1).

Table 1 - Tariff rates for industry imports (a) 1820-1987

Country	1820	1875	1913	1925	1931	1950	1987
Industries							
Austria	..	15-20	18	16	24	18	9
Belgium	7	9-10	9	15	14	11	7
Denmark	30	15-20	14	10	..	3	..
France	..	12-15	20	21	30	18	7
Germany	10	4-6	13	20	21	26	7
Italy	..	8-10	18	22	46	25	7
Netherlands	7	3-5	4	6	..	11	7
Spain	..	15-20	41	41	63	..	..
Sweden	..	3-5	20	16	21	9	5
Switzerland	10	4-6	9	14	19	..	3
United Kingdom	50	0	..	5	..	23	7
United States	40	40-50	25	37	48	14	7
Average	22	11-14	17	19	32	16	7

(a) Unweighted average percentages.

Source: World Bank (1991).

However, although the average tariff rates in the major industrialized countries has converged, there is widespread divergence of tariffs and non-tariff measures by regions, per capita income and country size in most developing countries. As shown in table 2 for a set of 50 developing countries (appendix table A1), countries with lower per capita GDP have higher average tariff rates.

Table 2 - Average tariffs and para-tariffs by income groups (a), 1985, in per cent

	GDP per capita					
	Less than US-$ 500	US-$ 500-1000	US-$ 1001-1500	US-$ 1501-5000	More than US-$ 5000	All income groups
TARIFFS						
unweighted (b)	46	25	29	24	5	26
import-weighted (c)	61	32	32	28	2	24
TARIFFS PLUS PARA-TARIFFS						
unweighted (b)	50	32	49	29	5	34
import-weighted (c)	66	41	54	34	3	30

(a) Based on UNCTAD computer files based on published official national sources. - (b) Simple average across products and countries. - (c) Simple average across products; across countries average weighted by total imports.

Source: Erzan/Kuwahara/Marchese/Vossenaar (1988)

This hints to the presumption that tariffs in most development countries are mainly used as a source for government income and not as a trade policy instrument, because in most poor countries fiscal administration is rather deficient and tariffs are easily collected compared with an implementation of new taxes such as a system of value added taxes. Indeed, a study of Farhadian-Lorie/Katz (1989) shows that tariffs constitute an average of 15 % of government revenue in most developing countries and more than 20 % in African developing countries. However, as a regression of the average tariff rate (incl. para-tariffs) on GDP, population size and a set of regional dummies indicates, regional factors may also play an important role (table 3). South America, Central America and Africa have the highest import tariffs, while Asian developing countries have the lowest import tariffs (see also appendix table A2). This may be caused by the existence of different regional trading blocs as well as by different regional tastes regarding trade policy.

Table 3 - Regression of import tariffs on GDP, population and regional dummies (a), 1985

	Explanatory Variables									
				Dummies for Geographical Regions						
$\overline{R^2}$	Inter-cept	GDP	Popu-lation	Carib-bean	Centr. Amer.	South Amer.	North Africa	Other Africa	West Asia	Other Asia
Dependent variable = import tariffs										
0.63	18.9	(-)X	X							
	(10.26)	(4.58)	(8.88)							
0.72		(-)X	X	16.4	21.6	28.4	22.4	21.7	11.0	13.2
		(5.07)	(8.14)	(4.38)	(4.08)	(7.97)	(4.69)	(7.60)	(3.24)	(3.09)
Dependent variable = import tariffs plus para-tariffs										
0.38	25.4	(-)X	X							
	(7.98)	(2.46)	(5.35)							
0.65		(-)X	X	17.6	63.3	38.5	28.4	24.0	13.4	16.3
		(3.57)	(6.06)	(3.15)	(8.00)	(7.24)	(4.00)	(5.39)	(2.65)	(2.55)
(a) t-values in parentheses all significant at the one per cent level.										

Source: Erzan/Kuwahara/Marchese/Vossenaar (1988)

Beneath tariffs and para-tariffs, non-tariff measures (NTMs) such as quantitative restrictions (import licenses, quotas, prohibitions) and certain institutional restrictions (advanced import deposit, central bank authorization, price level control, single distribution channel for imports) play an important role.[16] Table 4 displays the ratio of all custom listed commodities affected by NTMs with respect to regions and by per capita GDP.

[16] See appendix table 3 for a definition.

Table 4 - Ratio of all custom listed commodities affected by NTMs with respects to regions and per capita GDP (a) in per cent

	Quantitative restrictions (b)				Institutional restrictions (b)						
	All	Licence	Quota	Prohibition	Advanced import deposit	Central Bank authorization	Price Level controls	Single channel for imports	Stack total (c)	Non-stack total (c)	Non-Stack excl. gen. measures (d)
GEOGRAPHICAL REGIONS:											
Caribbean	18	17	0	1	7	5	0	2	32	23	14
Central America	48	7	42	0	42	58	0	0	148	100	22
South America	33	17	1	16	35	0	7	5	80	60	43
North Africa	29	28	1	1	46	13	0	18	107	85	46
Other Africa	64	58	0	7	64	50	0	4	183	86	53
West Asia	6	4	0	2	7	0	0	1	13	11	6
Other Asia	18	15	0	3	6	0	0	0	25	21	19
All regions	24	18	1	6	21	6	2	4	56	40	27
INCOME GROUPS:											
Less than US-$ 500	49	32	2	16	20	0	0	6	76	70	48
US-$ 500-1000	43	40	0	4	62	29	0	2	134	77	42
US-$ 1001-1500	57	43	8	7	48	9	2	1	118	83	49
US-$ 1501-5000	17	9	0	8	14	0	4	8	43	36	28
More than US-$ 5000	6	6	0	1	0	0	0	0	7	6	6
All income groups	24	18	1	6	21	6	2	4	56	40	27

(a) Based on UNCTAD computer files based on published official national sources. - (b) For definition see appendix table 3. - (c) In calculating the stack total, different NTMs affecting the same product are counted cumulatively; in non-stack total, even if more than one NTM affects a product, it is counted only once. - (d) Excluding NTMs which are applied across the board.

Source: Erzan/Kuwahara/Marchese/Vossenaar (1988)

Interestingly, roughly the same structure concerning region and per capita GDP evolves for NTMs as for average tariff rates: Countries with lower per capita GDP are more often affected by NTMs than countries with higher per capita GDP and again South America, Central America and Africa have the highest NTMs coverage ratios, while Asian developing countries have the lowest NTMs coverage ratios. Indeed, as revealed by table 5, tariffs are typically higher when at least one NTM is applied. This indicates that import tariffs and NTMs are usually not used as substitutes but as complements.

Table 5 - Interaction between NTMs and average tariff rates by income groups (a)

GDP per capita	Tariff when no NTMs applied (per cent)	Tariff when at least one NTM applied (per cent)	Ratio of column 2 by column 3
Less than US-$ 500	54	65	1.20
US-$ 500-1000	25	42	1.68
US-$ 1001-1500	23	34	1.48
US-$ 1501-5000	24	37	1.54
More than US-$ 5000	2	2	1.00
All income groups	20	29	1.45

(a) Based on UNCTAD computer files based on published official national sources. Countries in each group import weighted.

Source: Erzan/Kuwahara/Marchese/Vossenaar (1988)

This finding means that in most cases import tariffs underestimate the effective degree of the import restriction generated by the trade regime of a country, because effective protection is generally strengthened by an additional NTM. Nevertheless, as both import tariffs and NTMs are similarly distributed over per capita income levels and regions, the qualitative conclusion drawn from the tables above remain - at least approximately - valid.

A problem arises, if one wants to reveal the sectoral profile of the foreign trade regime for a given country. The reason for this is that the nominal import tariff, which is displayed in the above tables, refers to the value of total output of a certain sector but not to its value added. Yet, it is the effect of the foreign trade regime on the value added in a sector that has to be compared in order to draw conclusions on the sectoral profile of the foreign trade regime. To tackle this problem, the effect of the foreign trade regime on the value added of the

inputs used in a sector has to be eliminated. According to the concept of effective rate of protection (ERP) this can be done using the following formula:[17]

$$(1) \quad ERP_j = \left(v_j - v_j^*\right) / v_j^*,$$

where the ERP of sector j equals the percentage difference between the actual price of one unit value added (v) and the free trade price of value added (v^*). As displayed by equation (2) the ERP equals the nominal tariff per unit value added:

$$(2) \quad v_j = v_j^* \left(1 + ERP_j\right),$$

i.e. the effective rate of protection equals the percentage rate, by which the price of actual value added exceeds the price of free trade value added. Given the small country assumption the price of free trade value added can be measured by the world market price of value added. A positive ERP can be caused by import protection as well as by export promotion: If for example a country has a comparative disadvantage in sector j, such that it imports the goods of sector j, import restrictions will lead to a higher domestic price of value added and therefore yield a positive ERP. If however a country has a comparative advantage in the production of sector j, such that it exports the goods of sector j, export subsidies will lead to a higher domestic price of value added and therefore yield a positive ERP, because exporters sell these goods at the domestic market only if they receive a price at least as high as the world market price plus subsidy. The ERP can even be negative, if, for example, a country has a comparative advantage in the production of sector j, such that it exports the goods of sector j, and exports are taxed. In this case it is possible that the

[17] The concept of the effective rate of protection was developed by Corden (1966), Balassa (1965) and Johnson (1965). Several problems may arise, if it is applied on the value added of highly aggregated sectors (for a discussion see Corden (1971)). Furthermore, Dixit (1985) shows that it lacks certain general equilibrium properties and may in some circumstances lead to false conclusions regarding the effect of a change of the trade policy on resource reallocation.

domestic price of value added falls below the world market price, such that by equation (1) the ERP is negative.[18]

In a total equilibrium framework the concept of the ERP applies only if a set of assumptions concerning market structure and income and substitution elasticities is fulfilled. These assumptions have been intensively discussed in the literature (see e.g. Corden (1971) and Dixit (1985)). If one assumes that all these assumptions hold and that the production function can be approximated by a linear relation between inputs and outputs the ERP of sector j can be derived with the help of the input-output coefficients (a_{ij}) and the nominal import tariff rates (t_j):

$$(3) \quad ERP_j = \left(t_j - \sum_i a_{ij} t_i \right) \Big/ \left(1 - \sum_i a_{ij} \right)$$

Based on this formula Balassa (1971) derived the ERPs for six developing countries (table 6). As import tariffs generally lead to an artificial shortage in the domestic demand for foreign exchange, they may give rise to an overestimation of the domestic currency such that the ERP value is overestimated. Therefore, the values in table 6 are corrected for overestimation of the domestic currency (see Balassa (1971), p. 326 -330, for the procedure).

Table 6 reveals that the ERP of Brazil, Chile, Mexico and Pakistan was significantly higher for manufacturing sectors than for primary sectors. The trade regime of Malaysia and the Philippines also exhibit higher ERPs for manufacturing sectors than for primary sectors, but to a lesser degree. Hence, the trade regimes of these countries favour manufacturing production at the expense of primary production. As these countries typically have a comparative disadvantage in the production of manufacturing goods, these kind of trade regimes are called import substitution trade regimes (see section 2.2.1. for a further discussion).

---

[18] There are of course scenarios possible, where exports are subsidized while at the same time imports are restricted. The concept of the ERP can be applied to these cases too. For example, it is possible that a country has a comparative disadvantage in sector j and subsidizes exports of sector j while imports are restricted at the same time. In this case several outcomes are possible. If domestic producers yield an export price that is higher than the world market price and higher than the import price, all domestic production is exported while all domestic consumption is imported. In this case the effective rate of protection of *domestic producers* is given by the percentage rate by which the domestic export prices exceeds world market prices.

Table 6 - Effective rates of protection in selected developing countries (a)

Industry group	Brazil (1966)	Chile (1961)	Mexico (1960)	Malaysia (1965)	Pakistan (1963-64)	Philippines (1965)
Agriculture, forestry, and fishing	15	-6	-3	17	-46	16
Mining and energy	-34	2	-20	-12	-14	-21
Primary production, total	-7	-2	-11	4	-43	0
Processed food	52	111	10	3	219	65
Construction materials	41	51	-13	5	45	36
Intermediate products I	70	22	15	5	65	12
Intermediate products II	127	76	43	20	82	42
Non durable consumer goods	151	138	33	15	71	28
Consumer durables	204	33	70	-9	307	58
Machinery	52	17	27	2	40	8
Transport equipment	-42	-79	19	..	..	-15
Manufacturing, total	79	54	21	7	92	34

(a) Effective rates of protection have been estimated by using the Corden formula and have been adjusted for overvaluation as compared to the hypothetical free trade situation. Estimates based on free trade input-output coefficients.

Source: Balassa (1971), p. 56

To sum up, the analysis of the data on trade restrictions and information on institutional arrangements on foreign trade displayed, that restrictions on foreign trade differ threefold over time, over countries and over sectors. Hence, in principle it should be possible to discriminate between the different hypothesis on the relation between the foreign trade regime and economic growth.

2. Empirical Studies on International Trade and Economic Growth

2.1. Methodological considerations

2.1.1. Methodological rationale behind Case Studies and Statistical Tests

As controlled experiments for testing the Free Trade and Trade Hysteresis Hypothesis are rarely possible, a test has to be built on data that are influenced by a lot of factors that may disturb the true relation between foreign trade and economic growth. Hence, it is necessary to control for these disturbing factors by purging the available data of them. There are several ways, how this can be done. Two approaches represent in a sense two different extremes. *One* is to try to randomize the disturbing factors in a way that one has reason to believe that they net out each other as one increases the size of the data sample. If this is possible, one can argue that the larger the size of the sample, the greater is the probability to find the true relation that one is interested in. Another is to restrict the sample on one observation only and to try to obtain information on all disturbing factors that have influenced the relation one is interested in and then "purge" the data with the help of this information. The first approach is a statistical test; the second approach is a case study. Both approaches have their virtues and weaknesses.

A virtue of the first approach is that, if one can be sure that the disturbing factors net out each other as the sample size is enlarged, one need not spend too much time and money in the collection of information on all possible disturbing variables. A weakness of this approach is, that one can never be sure, if the disturbing factors actually net out each other as the sample size is enlarged.

A virtue of the second approach is that the concentration on one observation makes it cheaper to detect and control for all possible disturbing factors. A weakness of the second approach is, that in a stochastic world one can never control for the possibility that the *one* observation one studies is simply a stochastic phenomenon. However, though stochastic phenomena may play an important role in the microsphere of the world, it is questionable, whether they play an important role in the macrosphere too. For example, if one observes the foundation of *one* firm after a transition to free trade, this may be a mere stochastic phenomenon. However, if one observes the foundation of hundreds of new firms after a transition to free trade, it is most probably not a mere stochastic phenomenon.

Consequently, dealing with macro events it may not be necessary to worry too much about pure stochastic phenomena.[19]

Hence, from a methodological point of view, case studies may be not as bad as their reputation sometimes appears to be, and econometric tests may be not the only methodologically justifiable way to test economic hypothesis. One often presented criticism against the case study approach is that a case study is not "representative" enough or as Helleiner calls it: "Case-studies are sometimes derided as too partial and too "anecdotal" to contribute to the development of general knowledge" (Helleiner 1992, p 12). However, to falsificate, for example, the hypothesis that swans are always of white colour, it is enough present the observation of *one* black swan. The falsification of the white-colour-hypothesis is not made stronger or more reliable, if *one hundred* black swans are presented. The only problem is to make sure that it is really a black swan that has been observed and not just, say, a very fat raven with an abnormal long neck caused by some strange mutation. As the above discussion shows, this problem can be attacked in several ways. One is indeed, to draw a large sample of say one hundred black-swan-like birds and argue that very fat ravens with the abnormal long necks are seldom and hence the probability of finding only fat ravens with abnormal long necks approaches zero as the sample size is increased. This is the statistical test approach. The other is, to intensively investigate the one black swan, with the most sophisticated methods modern zoology offers, to make sure, that it is really a swan and not just a very fat raven. This is the case study approach.

To sum up, case studies as well as statistical tests are methodologically justified. There is no a priori argument to be made against one of both approaches. What kind of approach is to be preferred, is a question of the nature of the hypothesis and the time and money available for the test. Therefore, the following survey of empirical studies on foreign trade and economic growth pays attention to statistical tests as well as to case studies.

---

[19] Presumably, most stochastics (as e.g. measured by the variance of the error term) that show up in macro events are caused by ignorance, i.e. by the practical (not theoretical) impossibility to control for all factors of influence.

2.1.2. Trade regime measurement

One problem both methodological approaches - case studies or statistical test - have in common, is the measurement of the trade regime. In empirical studies many concepts are applied, that are more or less related to one another. This section tries to classify and compare these concepts.

Trade policy instruments influence the domestic market price of a commodity as well as the quantity sold at the domestic market. As for example an import quota does not always lead to a domestic market price that deviates from the world market price by a margin that is equivalent to a tariff that leads to the quantity sold at the domestic market under the import quota, it is in principle not possible to describe a trade regime by its influence on the domestic market prices only. Its influence on the quantities sold at the domestic market have to be recognized too.[20]

Hence, to describe a trade regime by its market effects, prices as well as quantities have to be taken into consideration. Therefore, in the following a trade regime is defined by a n-dimensional vector, where n equals the number of all tradable commodities. Each element of this vector is a 2x1 vector by itself that contains the deviations of the domestic market price and the domestic quantity sold from their corresponding free trade values. Hence, in case of free trade, the trade regime vector equals zero.

From this definition follows that it is not always possible to ordinarily rank two different trade regimes according to their degree of restrictivness. The only situation, where a clear-cut ordinarily ranking is possible, is given, when one trade regime vector compared to another is more restrictive in zero or more elements and equal in all others. However, clear-cut ranking is not possible, when one trade regime vector compared to another is more restrictive in one element but less restrictive in at least one other element.

Two principal approaches to tackle this problem can be chosen. *One* is to actually restrict the analysis on certain historical exceptional cases, where a more or less clear-cut ranking of trade regime vectors is possible. As it is very difficult to evaluate, whether such a

---

[20] Bhagwati (1969) discusses the conditions where an equivalence between tariffs and quotas does not hold. One such condition is a monopolistic market structure. For example, when foreign supply is monopolistic, the implicit tariff rate under an import quota may be higher or lower than a tariff necessary to generate the quota quantity.

situation is given for the trade regime across different economies, this approach is typically applied to temporal changes in the trade regime of a single country. For example, since the late 1960s many developing countries tried to shift their trade regime from a highly restrictive one to less restrictive one. If it is possible to show that in the course of these trade liberalization attempts only measures to liberalize the trade regime were undertaken, there is good reason to assume that the n-dimensional trade regime vector is less restrictive after the liberalization attempt.

The other approach to tackle the trade regime measurement problem is to measure only certain one-dimensional characteristics of different trade regimes vectors and rank them ordinarily or cardinarily. Such one-dimensional characteristics are, for example, the effective rate of protection for a certain type of commodity group or the protection bias against a certain type of commodity group or the variance of the differences between foreign and domestic prices caused by the trade regime.[21] These measures of one-dimensional characteristics can then be used to analyse their influence on the rate of economic growth. As such characteristics are (assumed to be) comparable across countries, this approach is typically used in cross-country analysis.

Both approaches to tackle the trade regime measurement problem are chosen in the empirical literature. While statistical tests typically chose the second approach, case studies use both approaches.

2.2. Case Studies on foreign trade and economic growth

In this paper a set of eight case studies is explicitly surveyed.[22] This set comprises the often called "classical" studies by Little/Scitovsky/Scott (1970), Balassa (1971), Bhagwati (1978), Krueger (1978), Balassa (1982) as well as the Word Bank project of Michaely/Papageorgiou/Choksi (1991) the WIDER-study[23] of Helleiner (1994) and

---

[21] The basical problem behind this approach is the aggregation problem. In forming one-dimensional characteristics of a multi-dimensional trade regime vector the critical question is whether these characteristics are suitable for some kind of averaging over different elements of the trade regime vector. In how far the characteristics chosen by empirical studies are suitable for this averaging will be discussed in the following for each single case.

[22] The basic results of these and six further studies are drafted in appendix table A4.

[23] WIDER = World Institute for Development Economics and Research at the United Nations University Helsinki.

Donges/Müller-Ohlsen (1978). Appendix table A4 briefly sketches the sample countries, sample periods, main results and policy recommendations of these studies.

Most of the studies do not have the intention to test clear-cut formulated hypotheses based on an explicit theory. None of the studies presents a closed theory of the relation between foreign trade and economic growth and derives from it explicit hypotheses. Instead, they proclaim intentions like

- "explore the effects of protection on resource allocation, exports and economic growth" (Balassa (1982), p. xiii),

- "comprehend and analyse the experience gained by these countries in industrialization." (Little/Scitovsky/Scott (1970), p. xiii),

- answer questions like "How are domestic resource allocation and growth affected when trade and payments regimes are liberalized...?" (Krueger (1978), p.xvii),

- and "Could we learn something about the forces that governed the likelihood of success in moving from a restrictive exchange control regime to a liberalized regime?" (Bhagwati (1978), p.3).

As these formulations suggest, and as is affirmed by the carrying out of these studies, they basically follow an inductive methodology. Their methodology is more or less based on the assumption that the more countries make the same experiences with a certain type of foreign trade regime, the greater is the probability that behind these experiences is a kind of general law. This is most obviously stated in the World Bank study of Michaely/Papageorgiou/Choksi (1991), p. xix: "There are fundamental principles, however, underlying the diversities and it is our thesis that a survey and analysis of a sufficiently broad spectrum of countries over sufficiently long development periods may serve to uncover them. With this object in view, we set out to study as many liberalization experiences as possible and aimed at including all liberalizations in developing countries in the post-world war period." However, if such a kind of probabilistic inductivism is

logically possible, has been intensively discussed among science theorists.[24] There are good reasons to believe that it is not. Some theorists even claim to have formally proved that it is not.[25]

Nevertheless, it is possible to interpret the empirical observations of these studies in a way that makes them suitable for testing hypotheses. For example, Little/Scitovsky/Scott (1970), Balassa (1971), Bhagwati (1978), Krueger (1978), Balassa (1982), Donges/Müller-Ohlsen (1978), state to have made several observations that in developing countries an import substitution trade regime is unfavourable for economic growth. If these observations are correct, this would imply a refutation of the Trade Hysteresis Hypothesis. However, several questions emerge in the following concerning the correctness of these observations.

To evaluate the quality of the observations made in the case studies, it is useful to classify the studies according to the way, they try to solve the problem of trade regime measurement. As discussed in section 2.1., there are two principle approaches towards this measurement problem. *One* is to restrict the analysis on historical cases where a more or less clear-cut ranking of the whole trade regime vector is possible. This is called in the following the "trade liberalization episode approach". *The other* is to measure certain one-dimensional characteristics of different trade regimes and compare their effects across countries. This is called in the following the "cross country trade regime characteristics" approach. However, some studies also measure the development of certain one-dimensional characteristics of trade regimes across time. These studies will be referred to as the "cross time trade regime characteristics approach".

---

[24] Carnap (1950) develops a theory of probabilistic inductivism that stated the possibility of making a theory more probable by repeated empirical evidence in favour of their hypotheses. Popper (1934) denied this possibility. According to him theories can only be falsificated but not verified or "probabilified". It is important to note that a refutation of the theory probabilistic inductivism does not imply that inductive research is worthless. Inductive research may be an valuable source for the creating of new theories. However, theories cannot be proved or made "more probable" by inductive research. Their hypotheses have to be tested - with data others than those that inspired their formulation.

[25] Popper (1934) together with Miller pp. 445-448.

2.2.1. The cross country trade regime characteristics approach

Studies that use one-dimensional trade regime measures, usually measure the bias in the degree of protection in favour of manufacturing against primary production. As the countries typically chosen in these case studies are developing countries, that have a comparative advantage in the production of primary products, this bias is called anti-export-bias. The trade regime of countries with a high anti-export-bias is called import substitution regime, because its incentive structure is intended to stimulate the domestic production of manufacturing goods, which else had to be imported. The trade regime of countries with no anti-export-bias is usually called export promotion system.

The anti-export-bias can be estimated either using the concept of the effective rate of protection (ERP), as defined in section 1.3. (equation (1)), or using the concept of the effective exchange rate.[26] Using the concept of the ERP an anti-export-bias is stated, if the ERP for primary goods is lower than the effective rate of protection for manufacturing goods:

$$(4) \quad \frac{ERP_{manufacturing}}{ERP_{primary}} > 1$$

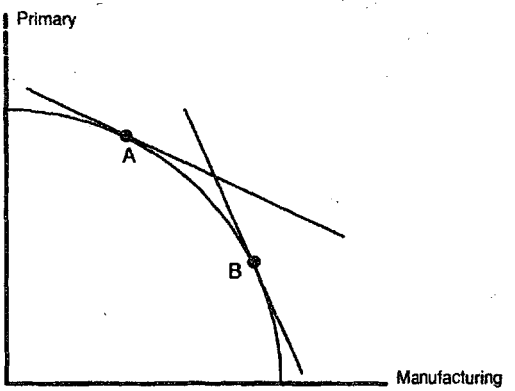
Equation (4) implies that a producer of manufacturing goods gets a higher additional percentage mark-up over world market prices than a producer of primary goods. The relative price for one unit of value added in manufacturing is higher than under free trade conditions. This incentive structure leads to the production of more value added in manufacturing than under free trade, given the standard set of assumptions concerning production technologies. Figure 1 presents the standard graphic exposition of the anti-export-bias:[27] A higher protection of manufacturing value added compared to primary value added leads to a higher relative price for one unit of manufacturing value added (i.e. a steeper price tangent), such that domestic production shifts from point A to B.

---

[26] For a description of the latter see appendix 1.

[27] Bhagwati (1978), p. 208.

Figure 1 - Effect of anti-export-bias on domestic production



Case studies that use the ERP concept are those of Little/Scitovsky/Scott (1970), Balassa (1971) and Balassa (1982). The OECD financed study of Little/Scitovsky/Scott (1970) report effective exchange rate values only for a single year per country (table 7).[28] A systematic analysis of subsectors is presented only for industry. The effective rate of protection values for primary products are incomplete and taken from other studies. It is not always clear, in how far they are comparable to the effective rates of protection for industry, estimated by Little/Scitovsky/Scott. The numbers show that protection in industry is typically high, whilst primary goods protection is significantly lower. From this overall picture Little/Scitovsky/Scott draw the conclusion that in all study countries a large bias against primary exports, i.e. an import substitution trade system, existed in the sample period 1950 - 1966. However, though the degree of the anti-export-bias differs across

[28] For some countries and some subsectors of manufacturing they report additional values for other years. However these reports a incomplete and do not cover large time spans.

countries, they do not compare the economic development in countries with a different anti-export-bias.[29]

Their main results concerning the dynamic effects of the import substitution trade regime is that in general after a period of about 15 years a country "runs out of import substitution", i.e. the expansion of the industry sector comes to a standstill, because domestic markets for import substitution goods are saturated and exports of import substitution goods are not possible, because the import substitution industries has lost their competitiveness on world markets. Consequently, the authors conclude, an import substitution trade regime not only leads to depression of the primary goods sector in favour of the industry goods sector, but also to a medium term lock-in of the industry sector.

Table 7- Estimates of the effective rate of protection in Little/Scitovsky/Scott (1970)

Sector	Argentina (1958)	Brazil (1966)	Mexico (1960)	India (1961)	Pakistan (1963/4)	Philippines (1965)	Taiwan (1965)
Manu-facturing	162	118	27	313 (b)	271	49	33
Primary products	-	32	1 (a)	-	< 0 (c)	-1	-

(a) 1960; (b)One sixth of total industry only; (c)1963/1964 agriculture only.

Source: Little/Scitovsky/Scott (1970), p. 174 and pp.434-443

Two points of criticism question the results of Little/Scitovsky/Scott (1970): *First*, the empirical basis of this result, the estimated anti-export bias against primary products, is not strong, because the estimates of the effective exchange rate for primary products are incomplete and refer to a single year only. No unequivocal empirical evidence is presented

[29] In so far their study does not belong to the "cross country trade regime characteristics" approach, but to the "cross time trade regime characteristics" approach. However, they do not analyse the temporal effects of trade regime changes either. Hence, strictly speaking, their study is not based on a suitable methodology.

that the strong anti-export bias has dominated the whole sample period. *Second,* even if one takes for granted that there has been an anti-export bias throughout the whole sample period, there is no evidence that the "running out of import substitution"- phenomenon was not due to other causes. Especially, they do not show that countries with a trade regime, that had no anti-export bias, performed better in the sample period. Hence, the methodological concept, the Little/Scitovsky/Scott study is based on, is weak. They do neither compare the effects of a change of the export-bias for a country across time nor do they compare the economic development of countries with different trade regime biases.

The World Bank study of Balassa (1971) presents an analysis of effective rates of protection for primary and for manufacturing industries on a disaggregated level for single years (table 8). The results for the aggregated sectors are presented in table 8. They show a high anti-export bias against primary products in Brazil, Chile, Pakistan, the Philippines and, to a lesser degree, Mexico. Compared to these countries Malaysia has a moderate anti-export bias against primary products and Norway displays a slight bias in favour of primary products.

Table 8 - Estimates of the effective rates of protection (a) in Balassa (1971)

Sector	Brazil (1966)	Chile (1961)	Mexico (1960)	Malaysia (1965)	Pakistan (1963-64)	Philippines (1965)	Norway (1954)
Manu-facturing	79	54	21	7	92	34	9
Primary products	-7	-2	-11	4	-43	0	16

(a) estimated by using the Corden formula, adjusted for overvaluation.

Source: Balassa (1971), p. 56

Balassa compares the dynamic effects of the anti-export bias against primary products across the different countries. He comes to the conclusion that countries with a high degree of anti-export bias against primary products experienced a "slowdown in the production and exports of primary commodities and have hindered the expansion of exports of industry goods." At the same time "import substitution in nondurable consumer goods and

their inputs has permitted rapid economic growth in countries at the first stage of import substitution", after this stage, however, growth slowed down, as countries moved towards the production of more sophisticated import substitution commodities. For countries with a relatively low or none anti-export bias against primary products (Mexico, Malaysia, Norway), Balassa finds that agricultural production has grown rapidly and export performance has improved in both primary *and* industry products. He also finds evidence that the success in exporting has contributed to economic growth.

The Balassa (1971) study is based on a detailed analysis of the effective rates of protection, inclusive a sensitivity analysis of different assumptions necessary for estimation. The methodological concept - the comparison of the dynamic effects of the anti-export bias among countries with different degrees of anti-export bias - is able to provide conclusive results. However, what reduces the strength of the results, is the fact that estimates of the effective rates of protection - just as in Little/Scitovsky/Scott (1970) - are presented for one year only, whilst the evaluation of the dynamic effects of the trade regime span over the period 1950-1965. Consequently, the conclusions of the study are only reliable, if the trade regime of the countries did not change much over this period. However, no sufficient support for this conjecture is offered by the study. Furthermore, even if one assumes that the trade regimes did not change over the sample period, it is not possible to exclude the hypothesis, that the success of the countries with a low anti-export bias, was due to an import substitution trade regime before they reduced their anti-export bias.

The Balassa (1982) study is also World Bank financed. It basically uses the same methodological concept as the Balassa (1971) study. Table 9 presents the effective rates of protection for the six sample countries.[30] Again, Balassa finds that the countries with the lowest anti-export bias (Korea, Singapore, Taiwan) had the highest growth performance over the period 1950-1973. This result is subject to the same criticism as the Balassa (1971) study: The conclusions concerning economic growth are only reliable, if the trade

[30] Balassa (1982) reports in addition to Balassa (1971) effective rate of subsidies, which are effective rates of protection corrected for credit and tax preferences paid by governments. On the aggregate level (primary and manufacturing) however, these estimates do not differ much from the estimates of the effective rates of protection.

regime of the countries did not change much over the 1950-1973. No evidence in form of effective rates of protection is offered, to support this assumption.[31]

Table 9 - Estimates of the effective rates of protection (a) in Balassa (1982)

Sector	Argentina (1969)	Colombia (1969)	Israel (1968)	Korea (1968)	Singapore (1967)	Taiwan (1969)
Manu-facturing	98	27	71	-1	6	19
Primary products	0	-10	48	9	9	0

Source: Balassa (1982), p. 28-29

2.2.2. The cross time trade regime characteristics approach

Donges/Müller-Ohlsen (1978), Bhagwati (1978), Krueger (1978), and Helleiner (1994) base their studies on the development of one-dimensional trade regime characteristics through time.

Donges/Müller-Ohlsen (1978)[32] determine the point in time when a country moves from an import substitution system to an export expansion trade regime in the period 1950-1975. Thereby import substitution system is defined in the same way as in the Little/Scitovsky/Scott (1970) and Balassa (1971) studies, namely as a bias against exports

---

[31] Balassa (1982) broadens the analysis by including five additional countries (appendix table A4), for which, however, he does not provide measures of the effective rate of protection. Based on this larger country sample Balassa classifies the countries in four categories according to their trade regime: Outward oriented trade policy: Korea, Singapore, Taiwan. Export promotion trade policy after a period of continued import substitution: Argentina, Brazil, Colombia, Mexico. Non sustained start of export promotion trade policy: Israel, Yugoslavia. Pursued import substitution trade policy: Chile, India. A comparison of the growth performance of these countries shows that the first group had a substantial better growth performance than the last group. However, as the classification of the countries is based on subjective judgements the results are probably biased by these judgements.

[32] Donges/Müller-Ohlsen (1978) is financed by the Deutsche Forschungsgemeinschaft, a state sponsored research fund.

in favour of domestic industry. However, unlike those studies, Donges/Müller-Ohlsen (1978) do not estimate effective rates of protection to determine the change in this bias.[33] Instead, they base the determination of the point in time, the trade regime changes, on information about legislative modifications that affect the trade regime (Donges/Müller-Ohlsen (1978), p.52 table 12). This way, they come to the conclusion that in the whole period from 1950-1975 only one such change took place in each country. Table 10 reports the year of change for the sample countries.

Table 10 - Year of change from import substitution to export promotion in Donges/Müller-Ohlsen (1978)

Sample country	Year of change	Sample country	Year of change
Brazil	1966	Mexico	1965
Egypt	1965 (a)	Pakistan	1959
India	1967 (a)	Spain	1959
Israel	1962	South Korea	1961
Yugoslavia	1966	Taiwan	1961
Colombia	1967	Turkey	1968 (a)

(a) Durability of trade regime change unsure.

Source: Donges/Müller-Ohlsen (1978), p. 55.

Based on this dates, they conduct a test of a structural break of the growth trend of GDP and the aggregate of industrial production. They find that in seven out of 12 cases (eight out of 12 cases) the change from import substitution to export promotion was accompanied by a significantly higher rate of growth of GDP (industrial production). For India, Israel, Yugoslavia and Turkey this change had no significant effect. For Egypt the trade regime

[33] Donges/Müller-Ohlsen (1978) present a table of effective rates of protection, which they collected in other studies (p. 61). However these rates of protection are - to the greatest part - for single years only and do not form the basis for their determination of the point in time, when the trade regime changes.

change was accompanied by a lower GDP (but higher industrial production) growth rate (Donges/Müller-Ohlsen (1978), pp. 125-126).

Though the methodological framework of Donges/Müller-Ohlsen (1978) provides conclusive results, two points of criticism can be stated: *First,* their methodological approach is able to falsificate the hypothesis, that an ever lasting import substitution phase is better than eventual change to an export promotion phase. It is not able to test the hypothesis, that export promotion, which is *not* preceded by an import substitution phase, leads to better results than export promotion preceded by an import substitution phase. Yet, only a falsification of the latter hypothesis would falsificate the Trade Hysteresis Hypothesis. The reason for this is, the argument implied by the trade hysteresis theory, that an import substitution phase is necessary, to change the comparative advantage of an economy, in order to yield higher GDP growth rate after a transition to a free trade regime. Hence, the Trade Hysteresis Hypothesis can only be falsificated, if one can show, that free trade without a preceding import substitution phase, leads - at least - to the same GDP growth rate than free trade with a preceding import substitution phase. *Second,* what may give rise to doubts concerning the results of Donges/Müller-Ohlsen, is the fact that they determine the point in time of the trade regime change, by subjective judgements. Although they give reasons for these judgements in form of information on legislative measures that determined the trade regime change, the possibility of a subjective bias in the observations can not be excluded. They present for example a table of the growth rates of the import quota in GDP, which they interpret as an import substitution indicator, that stops for most countries around the year the change in the trade regime takes place (p. 130, table 24). It would have been interesting to see, if a trade regime change was reflected in this import substitution indicator too.

The Bhagwati (1978) and Krueger (1978) studies are the output of a National Bureau of Economic Research financed project and comprise two volumes. Both volumes are based on the same five phases classification of the trade regime of their sample countries. Over the sample period (1950-1972), they classify the trade regime for each country to one of these phases on a yearly base. According to Krueger (1978, p. 23) "the basic principle of classification underlying the five phases is the extent to which a country relies on quantitative - as opposed to price - measures as a means of regulating its trade and payments". Hence, according to Krueger not the anti-export bias is used as a one-dimensional characteristic, used to rank the trade regime, but the kind of trade policy instruments that are applied. However, according to Bhagwati (1978, p. 207-209), this is

not the case. Bhagwati states that "Phase 2 which represents the restrictive foreign trade regime, is essentially one characterized by $EER_M/EER_X>1$ and therefore by an import substitution strategy whereas the liberalized trade regimes of Phases 4 and 5 evidently bring this ratio significantly closer to unity and hence are characterized by the export promotion strategy".[34] Consequently, there is some ambiguity concerning the underlying definition of their trade regime classification.[35] However, from the exact definition of the five phases that are published in the Krueger as well as in the Bhagwati volume, one may conclude that Krueger's interpretation of the trade regime classification describes better, what kind of classification criteria had actually been used. Both studies define the five phases in the following way:[36]

- Phase 1: Imposition or sharp intensification of quantitative trade controls that is mainly intended to control an unsustainable payments deficit.

- Phase 2: Quantitative restrictions continue to be dominant, but various price measures are taken to offset some of the undesired results of the system.

- Phase 3: Removal of some of the import surcharges and reduced reliance upon quantitative restrictions.

- Phase 4: Continued trade regime liberalization by gradual relaxation of quantitative restrictions and similar measures.

- Phase 5: Fully liberalized trade regime; no quantitative restrictions are employed any more as a means of regulating the ex ante balance of payments.

Based on these definitions the trade regime of the ten sample studies is classified for the period 1950-1972 (figure 1). Following this classification six of the countries (Brazil, Colombia, Israel, South Korea, the Philippines, and Turkey) had moved from highly protectionist policies to a liberalized trade regime. Three countries changed between Phases 2 and 4 (Egypt, Ghana and India), while Chile was more or less bound to Phase 2.

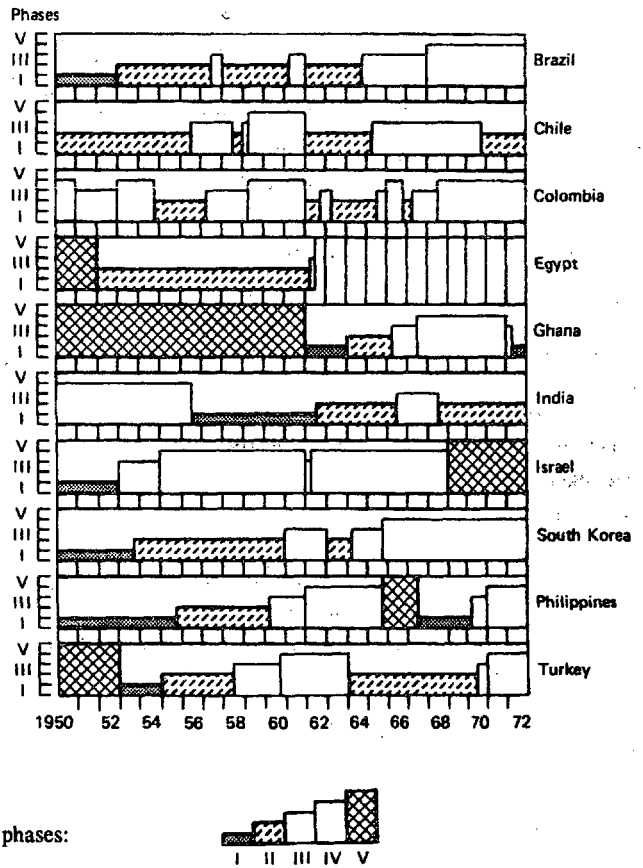
---

[34] EER_M = effective exchange rate for imports; EER_X = effective exchange rate for exports. The effective exchange rate has nearly the same interpretation as the effective rate of protection. For exact definition and comparison with the effective rate of protection see appendix 1.

[35] Balassa (1982), pp. 38-39, hints to these problems.

[36] Bhagwati (1978), p. 220-221, Krueger (1978), p. 302-303.

Figure 1- Phases of exchange control systems in Krueger resp. Bhagwati (1978)



Source: Krueger (1978), p. 38

Relying on this classification Krueger tests for a negative correlation between restrictions on the trade regime and the growth rate of GNP. To do so, she runs a regression over the pooled sample. The dependent variable is the level of GNP. The independent variables are a time trend, the deviation of exports from their sample average and two dummies that

take a value of one in case the trade regime is in Phases 1 or 2 resp. 3 or 4. The regression shows that GNP is positively related to time and the export variable, but negatively related to restrictions on the trade regime. However the influence of the trade regime, as captured by the dummies, is not significant. Krueger concludes that "This suggests that factors associated with better export performance explain whatever systematic differences there are in growth rates under different phases of the regime; the fact that the regime itself is liberalized (or restricted) does not seem to have any additional independent influence" (Krueger 1978, p. 274). The Bhagwati volume nearly draws the same conclusions: "There is little doubt that the project countries that have managed to shift during phases 4 to 5 to sustained, improved export performance (i.e. Brazil, Israel, and South Korea) by reducing bias against exports have also managed to register acceleration in their growth rates whereas countries (such as India) with sustained phase 2 regimes, and corresponding bias against exports, have generally continued their poor growth performance."

Contrary to the Donges/Müller-Ohlsen (1978) study, Krueger (1978) and Bhagwati (1978) base their analysis not only on a time series comparison of growth performance before and after a trade regime change but on a pooled, time series and cross country comparison. Hence, they combines the approaches chosen by Donges/Müller-Ohlsen (1978) and Balassa (1971). Unfortunately they do not present results of single country time series regressions too. Therefore an evaluation, how pooling influences the regression results, is not possible. Additionally, a sensitivity test of the robustness of the estimates by adding more explanatory variables to control for cross country differences not caused by different trade regimes, is not been provided.[37]

However, what gives rise to more important criticism, is the definition of the trade regime phases. If one takes the Krueger interpretation of the definitions as the truly applied definitions, one is left with the question, whether the imposition or reduction of quantitative restriction actually captures an economically important characteristic of the trade regime. The character of a trade regime or its bias against exports is not determined by quantitative restrictions alone but by other trade policy instruments as well. It is for example possible that a trade regime has a high anti-export bias but no quantitative restrictions are applied. If one takes the Bhagwati interpretation of the definitions as the truly applied definitions, the same problem as with the Donges/Müller-Ohlsen study arises:

---

[37] For a discussion of problems related to cross country regressions see section 2.3..

Their approach is not able to test the hypothesis, that export promotion, which is *not* preceded by an import substitution phase, leads to better results than export promotion preceded by an import substitution phase. Hence, their approach is not suited to falsificate the Trade Hysteresis Hypothesis. Another problem the Krueger and Bhagwati studies have in common with the Donges/Müller-Ohlsen study is the fact, that the classification according to the five trade regime phases is based on subjective judgements. Therefore, the possibility of a subjective bias of their observations can not be excluded.

The Helleiner (1994) study is financed by the World Institute for Development Economics, Helsinki. It comprises a sample of 14 country studies, which are carried out by different authors. Like Donges/Müller-Ohlsen (1978) it is based on a comparison of the temporal effects of a change from an import substitution to an export promotion trade regime in single countries. The determination of the point in time, where a change of the trade regime takes place, is in some of the 14 studies based on a comparison of the temporal development of the effective or nominal rates of protection of the production sectors, in other studies on the development of import quotas or on information about changes of trade legislation and governmental programs.

In the executive summary of the country studies Helleiner comes to the overall conclusion that compared to macroeconomic stabilization policy "trade policies do not appear to have played a dominant role these countries' industrialization and development experiences in the 1970s and 1980s."[38] However, though all country studies stress the importance of a stable macroeconomic policy, most of them assign a lot of the economic structural change found in the different countries to the changes in trade policy. For example, the studies of countries with a sustained change from an import substitution to an export promotion trade regime (South Korea, Malaysia, Sri Lanka, Thailand) show, that following this change the share of imports and exports in GDP as well as the share of industry in GDP increased, while the share of the primary sector in GDP decreased. At the same time these countries had the best long run growth performance. On the contrary most of the countries that had not sustained their change from import substitution to export promotion (Brazil, Chile, Peru, Bangladesh, India, Tanzania) had low performing industry sectors and at best a modest long run growth performance. Another interesting observation is that the good performance of the industry sector in countries with a sustained change from an import

---

[38] Helleiner (1994), p. 10.

substitution to an export promotion trade regime was not due to the *old* import substitution industries, which were protected in the past by infant tariffs, but to *new* labour intensive industries. Indeed, in nearly all countries with a sustained change from import substitution to export promotion, import protection for the old import substitution industries had to be maintained in order to help those industries to survive. Therefore, the change from import substitution to export promotion was regularly not achieved by a reduction in import protection but by introduction and increase of export subsidies, which had to compensate the new export industries for the import protection of the old import substitution industries. For example the study of Malaysia reports observations that the transition from import substitution to export promotion via export subsidies that compensated for the (maintained) protection of the old import substitution industries has led to an industry sector with a significant dualistic structure "made up of a relatively inefficient import-competing sector and a more efficient export-oriented sector with little linkage between them." Thereby the old import substitution industries comprise to the greatest part resource-based industries, such as food production, wood products, and rubber products industries, while the new export oriented industries, comprise to the greatest part labour-intensive industries such as electrical machinery and textiles.

Another example for the bad performance of old import substitution industries after a transition to an export promotion trade regime is Chile. After a period of three decades (1940-1973) of an import substitution trade regime, Chile accomplished a sharp transition to an unbiased export promotion trade regime. However, contrary to countries like South Korea, Malaysia, Sri Lanka and Thailand, this transition was not achieved through the implementation of export subsidies high enough to compensate for the (maintained) import protection of the old import substitution industries, but through a radical reduction of import protection (the highly volatile nominal import tariff rate was reduced from an average rate of 105 percent to a nearly uniform rate of 10 percent and - most important - all non-tariff barriers were practically eliminated by 1976). In response to this sharp decline of import protection the output of many of the industries, which had high import protection in the past (textiles and clothing, metal products and machinery) decreased and the share of industry in GDP declined from 25 percent in 1974 to nearly 20 percent during the 1980s.

The Chilean experience with its old import substitution industries as well as the experience in South Korea, Malaysia, Sri Lanka, Thailand with their transition to an export promotion trade regime, undermine the Trade Hysteresis Hypothesis. However, it should once again

be stressed, that this interpretation of the observations provided by the country studies of Helleiner (1994) is not in accordance with the interpretation Helleiner gives in his executive summary.

2.2.3. The trade liberalization episode approach

Michaely/Papageorgiou/Choksi (1991) is the only study, which is based on the trade liberalization episode approach. They define "trade liberalization" to imply "any change, which leads a country's trade system towards neutrality in the sense of bringing its economy closer to the situation, which would prevail, if there were no governmental interference in the trade system." Hence, expressed in the terminology of section 2.1.2., Michaely/Papageorgiou/Choksi define "trade liberalization" as every unequivocal shift of the n-dimensional trade regime vector to the zero vector. Following Michaely/Papageorgiou/Choksi a transition from an import substitution system to an export promotion system, which is solely achieved by a compensation of the anti-export bias via export subsidies, is no trade liberalization episode, because export subsidies may drive the domestic prices of the subsidized goods away from their free trade level. Yet, a transition from an import substitution system to an export promotion system that is solely achieved by a reduction of import tariffs and quantitative import restrictions is a trade liberalization episode, according to the definition of Michaely/Papageorgiou/Choksi. Based on this definition they are able to detect 31 trade liberalization episodes in developing countries in the post-world war period.[39] For each episode they analyze the behaviour of macroeconomic variables, that refer to employment, production, GDP growth, income distribution, balance of payments and exports, before and after the year of liberalization. Table 11 gives the real annual GDP growth rates in the years before and after a trade liberalization attempt. Out of 31 trade liberalization episodes only eight were followed by a three years GDP growth rate (AVG-T), that was lower than the growth rate before the episode (PtL). Consequently, the short term impact of trade liberalization episodes has been overwhelmingly positive in the post-war period. Beside that, industry had on average a higher growth rate after the liberalization than agriculture (last two rows of table 11), but compared to the pre-liberalization three years average agriculture had a higher percentage point increase of the growth rate (1.3) than industry (0.52).

---

[39] Trade liberalization episodes in countries with an insufficient data base are excluded from the sample.

The study of Michaely/Papageorgiou/Choksi (1991) is based on a similar methodological framework as for example Donges/Müller-Ohlsen (1978): Instead of comparing the growth performance of countries with different trade regimes at one point in time (as Balassa (1971) and (1982) did), they compare the growth performance before and after a trade regime change. However, contrary to Donges/Müller-Ohlsen (1978), they do not account for trade regime changes from import substitution to export promotion, but for trade regime changes, which bring a country's trade system closer to a laissez faire free trade regime. Nevertheless, the study gives rise to nearly the same points of criticism:

First, though the methodological approach of Michaely/Papageorgiou/Choksi (1991) is able to falsificate the hypothesis, that a change to a more liberalized trade regime has negative growth effects, it is not able to test the hypothesis, that a trade liberalization episode, which is *not* preceded by an import substitution phase, leads to at least as good results than a trade liberalization episode preceded by an import substitution phase. Yet, only a falsification of the latter hypothesis would - as discussed above - falsificate the Trade Hysteresis Hypothesis.

Second, trade liberalization attempts are often coupled with other kind of economic reform measures, such as monetary and fiscal austerity programs. Indeed, as it is documented in Michaely/Papageorgiou/Choksi (1991), many of the 31 trade liberalization episodes have been accompanied by this kind of macroeconomic stabilization programmes. Consequently, a part of the after-liberalization growth performance, shown in table 11, may not be due to trade liberalization alone.

Third, the point in time, where the trade regime change takes place is determined by subjective judgements. Although Michaely/Papageorgiou/Choksi substantiate their judgements in form of information on legislative measures that determined the trade regime change[40], some observations give rise to doubts concerning their judgements. According to their definition, a transition from an import substitution system to an export promotion system achieved by a compensation of the anti-export bias via export subsidies is - as discussed above - not a trade liberalization episode. However, there are examples, that trade regime changes, which Michaely/Papageorgiou/Choksi classify as trade liberalization episodes, were in fact characterized by significant usage of export subsidies. The most apparent case is Korea. In the description of Korean trade policy from 1960-

---

[40] Michaely/Papageorgiou/Choksi (1991), pp. 318-386.

1988 the country researcher for Korea of the Michaely/Papageorgiou/Choksi (1991) study, Kwang Suk Kim, does not mention the usage of direct or indirect export subsidies in Korean trade policy.[41] However, the same author, reports in Helleiner (1994), pp. 322-323, in a detailed way of broad set of different export subsidy instruments used in Korean trade reform 1965-1967.[42] Hence, as some of the "trade liberalization episodes" of Michaely/Papageorgiou/Choksi (1991) were possibly accompanied by an export subsidization policy, part of the good after-liberalization growth performance may be due to export subsidization.

---

[41] Michaely/Papageorgiou/Choksi (1991), pp.346-349.

[42] "The export incentive measure listed in the plan were: (i) a preferential export credits; (ii) tariff exemptions on imports of raw materials for export production (drawback system); (iii) indirect domestic tax exemptions on intermediate inputs used for export production and on export sales; (iv) direct reductions on income earned from exports (abolished in 1973); (v) wastage allowances for raw materials imported for export production; (vi) a system of linking import business to export performance; (vii) tariff and indirect tax exemptions for domestic suppliers of intermediate goods used in export production; and (viii) accelerated depreciation allowances for fixed assets of major export industries." Helleiner (1994), pp. 322-323.

Table 11 - Performance of gross domestic product (real annual rate of growth)

Episode		PtL	T	T + 1	T + 2	T + 3	AVG-T	AVG
Argentina	(1976-80)	6.70	2.60	4.40	8.50	5.40	6.10	5.23
Brazil	(1965-73)	2.90	-0.60	6.50	-3.10	6.90	3.43	2.43
Chile 1	(1956-61)	3.23	2.70	5.10	4.80	9.30	6.40	5.48
Chile 2	(1974-81)	2.30	1.20	7.90	2.80	0.53	3.74	3.11
Colombia 2	(1968-82)	-1.50	8.50	-12.90	3.50	9.86	0.15	2.24
Greece 1	(1953-5)	3.87	2.67	4.93	6.59	6.50	6.01	5.17
Greece 2	(1962-82)	4.90	13.06	3.10	6.81	8.70	6.20	7.92
Indonesia	(1966-72)	6.13	0.58	10.07	7.54	9.25	8.95	6.86
Israel 2	(1962-8)	0.80	2.72	1.41	10.89	6.83	6.38	5.46
Israel 3	(1969-77)	9.80	10.10	11.40	9.80	9.10	10.10	10.10
Korea 1	(1965-7)	5.77	12.60	7.90	11.00	12.30	10.40	10.95
Korea 2	(1978-9)	6.97	5.80	12.70	6.60	11.30	10.20	9.10
New Zealand 2	(1962-81)	13.80	3.31	6.36	-6.20	6.36	2.17	2.46
New Zealand 3	(1982-4)	4.02	5.84	6.57	5.54	-2.16	3.32	3.95
Pakistan 1	(1959-65)	4.32	4.66	0.48	2.78	3.29	2.18	2.80
Pakistan 2	(1972-8)	2.15	1.47	4.34	5.23	5.92	5.16	4.24
Peru	(1979-80)	5.48	1.61	7.53	7.71	4.11	6.45	5.24
Philippines 1	(1960-5)	0.30	3.78	3.07	3.14	0.74	2.32	2.68
Philippines 2	(1970-4)	5.37	0.90	4.90	4.50	6.30	5.23	4.15
Portugal 1	(1970-4)	5.32	4.84	5.72	5.23	8.48	6.48	6.07
Portugal 2	(1977-80)	5.88	7.55	6.39	9.49	11.48	9.12	8.73
Singapore	(1968-73)	1.60	5.30	3.20	4.50	4.90	4.20	4.48
Spain 2	(1970-4)	10.10	14.27	13.50	13.65	12.61	13.25	13.51
Spain 3	(1977-80)	6.67	4.89	5.54	8.59	8.06	7.40	6.77
Sri Lanka 1	(1968-70)	3.30	3.72	2.50	0.16	1.48	1.38	1.97
Sri Lanka 2	(1977-9)	3.57	7.57	4.25	3.50	-0.52	2.41	3.70
Turkey 1	(1970-3)	2.80	4.87	8.69	6.28	5.47	6.81	6.33
Turkey 2	(1980-4)	5.69	5.28	9.00	6.00	4.10	6.37	6.10
Uruguay	(1974-82)	2.90	-1.07	4.10	4.64	3.25	4.00	2.73
Yugoslavia	(1965-7)	-4.96	3.37	5.28	1.62	2.75	3.22	3.26
		7.90	1.40	5.00	0.90	3.50	3.13	2.70
Average GDP		4.45	4.69	5.45	5.26	6.00	5.57	5.35
Average industry		6.75	5.31	6.93	6.92	7.97	7.27	6.78
Average agriculture		2.79	2.91	5.48	2.83	3.95	4.09	3.80

PtL, average of three years up to liberalization; T, year of liberalization; T+1, one year after liberalization; T+2, two years after liberalization; T+3, three years after liberalization; AVG-T, average of three years after T; AVG, average of T plus three years after liberalization.

Source: Michaely/Papageorgiou/Choksi (1991)

2.2.4. Lessons from case studies

The case studies presented in this section allow no unambiguous conclusion concerning the two competing hypotheses of Smith and List. Although, with the exception of Helleiner (1994), all studies claim to provide evidence that export oriented or unrestricted trade regimes are superior to import substitution trade regimes, there is one argument that questions their results: Even if it is possible to show that a change from an import substitution to an export promotion or unrestricted trade regime spurs economic growth and gives rise to an expansion of the industry sector this does not falsificate the Trade Hysteresis Hypothesis. This is due to the fact that the Trade Hysteresis Hypothesis does not imply that an import substitution trade regime is always the most favourable trade regime, but - as has been stated by List (1842) and formally shown by Grossman/Helpman (1991) - an import substitution *phase* may be necessary to overcome the problems generated by an underdeveloped industry sector. The Trade Hysteresis Hypothesis states, that *after* such an import substitution phase has helped to develop a competitive industry sector, a transition to free trade is the most favourable policy. Hence, a supporter of the Trade Hysteresis Theory will argue, that the positive growth effects of a transition from import substitution to export orientation or unrestricted trade, is due to a successfully finished import substitution phase. None of the case studies presented so far in this section, tries to disprove this argument.

However, - as has been said above - some of the country studies presented by Helleiner (1994), provide observations that after a transition from an import substitution to an export promotion trade regime many of the old import substitution industries were not internationally competitive and had to be protected in order to prevent their withdrawal, whilst most of the expansion of the industry sector after a transition to export orientation were due to new industries that had not been favoured by import protection in the past.

Indeed, other empirical studies, which are not surveyed in this paper but briefly drafted in appendix table 4, provide similar observations.[43]

For example, Lardy (1992) reports in a study of the Chinese foreign trade reform, which started 1978, that the economic success of this trade reform was not due to the old large import substitution industries, but to the birth of thousands of small and medium sized enterprises in the light industries. This is most evident in the province of Guangdong. Guangdong had - compared to the old heavy (import substitution) industry regions, Shanghai and Liaoning, - the highest growth rate of exports. Guangdong exports grew from 1978 to 1990 from a base of 1,4 to 10 billion US-dollar, whilst Shanghai exports grew only from 2,5 to 5,3 billion US-dollar. This export success of Guangdong took place, *although* the pre-reform structure of Guangdong was mainly agricultural. By 1988 the share of agriculture in Guangdong's exports had fallen to under one fourth.[44]

In another study on the development of Chinese exports Hong Wang (1993) reports that a great part of the Chinese export success in textile industries (from 1978-1988 Chinese total textile exports tripled) was due to new "rural enterprises" outside of the old industrial regions. These new enterprises increased their share on Chinese textile exports from zero in the pre-reform era to 27 percent in 1988. Hong Wang reports similar observations about the development of the Chinese microcomputer industry, which established itself - without an import substitution phase - in the post-reform period, and is by now internationally competitive in terms of export performance. A key factor of the Chinese export success in

---

[43] In a case study on the Turkish industry, Krueger/Tuncer (1982) present statistical data on the protection and productivity growth of all manufacturing industries, from which they draw the conclusion that protected industries did not exhibit higher productivity growth than unprotected industries. They interpret this result as evidence against the infant industry protection hypothesis. However, Harrision (1994) questions this evidence by revealing a negative statistical correlation between protection measures and productivity growth in the raw data of Krueger/Tuncer (1982). Yet, as the maximum sample size of the raw data of Krueger/Tuncer (1982) includes only 15 observation points, it is somehow doubtful, if reliable statistical conclusions can be drawn from this data base.

[44] Of course the success of Guangdong was also favoured by its proximity to Hong Kong. However, as Lardy (1992) states, this does not fully explain the post-reform success of Guangdong. Unfortunately, he provides no statistics on the regional trade relations between Hong Kong and Chinese provinces.

many new industries seems to have been the influx of foreign capital and - hand in hand with it - technological know how.[45]

Of course, the successful development of Chinese industry enterprises since the start of the trade reform in 1978 can also be attributed to the domestic transition from a centrally planned economy towards a market economy. Nevertheless, it shows that new industries can be established in a developing country without an import substitution phase. Similar observations are delivered by other countries. For example Helleiner (1992) provides a study of the Korean semiconductor industry by Yoon Chang-Hoo, who shows that from 1984-1990 "Without direct subsidy or trade-restricting policies to protect them from foreign competition Korean firms successfully entered the high-density memory commodity market."[46] Beneath empirical facts, Yoon Chang-Hoo gives a formal proof, that even entrance in global oligopolistic high-technology markets is - under a given set of assumptions - possible for small firms by making use of a "niche strategy".

The discussion of case studies on foreign trade and economic growth in this section points out that a promising research strategy on this field may be characterized by two main features:

---

[45] Hong Wang (1993), Chapter 6, reports in a special study of China's electronic exports: "During 1980-1986 China imported 319 large- and medium-sized projects for producing colour television tubes, linear integrated circuits, computers and electronic parts and components. Among these were such important projects as the Color Kinescopes Factory in Shaanxi, the Linear Integrated Circuits Project in Wuxi, the Shanghei-Bell Telephone Equipment Manufacturing Corporation and the Guangdong Elecronic Tube Factory in Nanjing. It was reported that one-third of China's electronic enterprises were revamped by importing advanced foreign equipment. During this period a large amount of direct investment from multinational corporations and from overseas Chinese was also made in China's electronics industry. In those joint ventures or foreign owned plants, not only was a large amount of machinery transferred, but also Chinese workers and managers were intensively trained, which reportedly brought forward the development of China's electronic industry by 10 to 20 years and raised the quality of electronic parts by one grade."

[46] Helleiner (1992), p. 274. By now the three largest Korean semiconductor producers (Samsung Electronics Co., Hyundai Electronics and Goldstar Electron) hold a share of 30 percent in the 16 megabit-memory-chip world market. There are forecasts that by 1996 Korean firms will catch up with Japan's world market share. Korean firms even hold a strong position in the market for 64 megabit-DRAM-chips. It is expected that, based on large investments, they are going to successfully overtake Japanese shares in this market too.

- *First*, it may be useful to concentrate the empirical analysis on attempts to falsificate the central competing hypotheses, instead - as has been done by most case studies - trying to find "fundamental laws" by inductive data exploration.

- *Second,* instead of conducting studies on highly aggregated levels, it may me a fertile approach to try to test the competing hypotheses on the basis of disaggregated industry-level studies.

New attempts in this direction have been discussed in this section. Of course, there are still open questions concerning the interpretation of the observations made in China, Korea and elsewhere. Further empirical research is necessary - especially to establish, that there have not been indirect and hidden protection granted to the new industries in these countries. However, the first impression is, that internationally competitive industries can be established in developing countries without an import substitution phase. Hence, so far, the Trade Hysteresis Hypothesis may not to be in accordance with the facts.

2.3. Statistical Tests on foreign trade and economic growth

In the last two decades there have been numerous attempts to empirically explore the relation between foreign trade and economic growth with the help of statistical tests. The principle procedure of these tests is to construct an indicator, that measures a certain characteristic of the trade regime. Together with a set of additional variables (such as the growth rate of the labour and capital stock, further macroeconomic variables and variables, that measure policy performance etc.), which are believed to have a systematic influence on the GDP growth rate, the trade regime indicator is then used as an explanatory variable of the GDP growth rate. Based on these variables, time series, cross country or pooled regressions are run. Most of such tests implicitly assume, that the explanatory variables used beside the trade regime indicator, capture all the factors of systematic influence on the GDP growth rate that are not to be attributed to the trade regime, such that other factors of influence net out each other as the sample size is enlarged.

The empirical studies surveyed in this section are classified according to the trade regime indicator they use. As the bulk of studies use the real export growth rate as trade regime indicator these studies are presented first in the next section; section 2.3.2 discusses studies that use other trade regime indicators.

2.3.1. The export growth approach

Studies based on the growth rate of real exports interpret this variable not directly as an indicator of certain trade regime characteristic. Instead, they intend to reveal the negative influence of anti-export bias trade regimes by showing that export growth is positively related to GDP growth. The probably first regression between real export and GDP growth was presented by Emery (1967). However, the greatest part of the studies were published in the course of the 1980s. Appendix table A5 gives an overview of the estimated equations and results of 22 studies. The standard model used in these studies takes the following form:

$$(5)\quad \hat{Y}_j = \beta Z_j + \beta_{n+1} \hat{X}_j$$

where $\hat{Y}$ equals the real GDP growth rate, $\hat{X}$ equals the real export growth rate and Z is a vector of additional explanatory variables. In most models the growth rate of the labour force and the share of investments in GDP (as a proxy for the growth rate of the capital stock) are used as additional explanatory variables.

Out of 12 studies of table A5, which use this model specification for cross-country regressions (Emery (1967), Balassa (1978), Tyler (1981), Kavoussi (1984), Ram (1985), Balassa (1985), Ram (1987), Moschas (1983), Perraton (1990), Sheehey (1990), Park (1992), Kwasi Fosu (1992)), 11 find a positive and significant coefficient for the export growth rate; only one study, Park (1992), finds a positive but insignificant coefficient. From the two studies that use this model for time series analysis, Greenaway/Sapsford (1994) find only positive but insignificant coefficients, while Ram (1987) finds positive and significant coefficients in less than a half of 88 countries.

In a reaction to the perception, that a model specification like (5) is rather "ad hoc" and lacks a "theoretical base", Feder (1982) presented a model specification that is based on a two sector model:

$$(6)\quad N = F(K_n, L_n, X_n),$$

$$(7)\quad Y = G(K_X, L_X),$$

where equation (6) gives the production function of a sector, which produces with the help of capital (K_n) and labor (L_n) non-export goods, and equation (7) gives the production function of a sector, which produces with the help of capital (K_X) and labor (L_X) export

goods. Feder postulates, that positive externalities run from the export sector to the non-export sector. Therefore, he adds the output of the export sector (X) to the inputs of the non-export sector production function. Furthermore, he allows for different marginal productivities of labor and capital in both sectors. From these assumptions he derives, by forming partial derivations and some algebraic stipulations, the following model specification:

$$(8)\quad \hat{Y}_j = \beta_0 + \beta_1 \hat{L}_j + \beta_2 \hat{K}_j + \beta_3 \frac{X_j}{Y_j} \hat{X}_j$$

Out of the five studies of table A5, which use this model specification for cross-country regressions, three (Feder (1982), Balassa (1985), Helpman/Tratzenburg (1988)) find a positive and significant coefficient for the export growth rate; only one study, Kavoussi (1984), find a positive but insignificant coefficient. Ram (1987), who also uses this model for time series analysis, finds - again - positive and significant coefficients only in less than a half of 88 countries.

The weak correlations, found in the time series studies - especially those Ram (1987) finds with both specifications for a large set of 88 countries - questions somehow the strong correlation found in the cross country results. However, what gives rise to more profound doubts on the export indicator approach, presented so far, are the results of Sheehy (1990) and Greenway/Sapsford (1994). Sheehy (1990) shows, that the growth rates of other GDP components, such as consumption, investment, value added industry, value added agriculture, value added construction, value added services and so on, show positive and significant coefficients in cross country regressions for 36 LDCs for the period 1960-1970. Hence, the positive and significant correlation, found for the growth rate of exports, may be a pure algebraic accounting effect, that has nothing to do with the influence of an export oriented trade regime on economic growth. This impression is stressed by the results of Greenaway/Sapsford (1994), who find that after purging the GDP growth rate from the accounting effects of the exports, most of the 14 countries in their sample show a negative, though not significant, export growth coefficient.

The accounting problem of the export growth indicator approach can be more formally described. Define Z = C+G+I-M. If the export quota is constant, the covariance between output growth and export growth can than be written in the following way:

$$(9)\ \operatorname{cov}\left(\frac{\dot{Y}}{Y};\frac{\dot{X}}{X}\right)=\operatorname{cov}\left(\frac{\dot{Z}}{Y};\frac{\dot{X}}{X}\right)+\operatorname{var}\left(\frac{\dot{X}}{X}\right)\frac{X}{Y}$$

Hence, as the sign of a variance is positive by definition, every regression of output growth on export growth is biased towards a positive sign of the regression coefficient.

One way to overcome the accounting effect problem may be to test for "temporal causality" with the help of Granger tests. If the past realizations of exports can be used to improve the future realizations of GDP, this may indicate that the relation between exports and GDP is not a mere accounting effect. However, if both variables, exports and GDP, follow a common stochastic trend, i.e. if they are cointegrated, the growth accounting effect may even be the reason for Granger causality.

Table A6 presents the results of a couple of causality tests on GDP and exports. The results of these studies are ambiguous. No robust causation from exports to GDP nor the other way round is found. The three studies, that test for simple Granger causality, find for most countries no significant relationship (Jong/Marshall (1985), Hutchinson/Singh (1987), Dorado (1993)). In cases, where a significant causality is found, exports induce positive as well as negative causality on GDP growth. However, one reason for the large amount of countries, where no significant relationship is found, may be due to the fact, that exports and GDP are often cointegrated. As Granger (1988) shows, if two variables are cointegrated, an error correction term has to be included in the vector autoregression model used to test for Granger causality, or else in some occasions Granger causality is not detected, even if in fact there is Granger causality. However, the two studies that control for cointegration, Sung-Chen/Biswas/Tribedy (1990) and Marin (1992), though they find significant causality relationships in all study countries, present results that are far from being unambiguous. Sung-Chen/Biswas/Tribedy (1990) find, that, exports positively Granger-cause GDP in two countries, but show no influence in one country. Marin (1992) finds, that exports exhibit positive causality for one country and negative causality for the other three countries.[47]

---

[47] Marin (1992) bases her study not on the per capita GDP growth rate but on the manufacturing labor productivity growth rate.

2.3.2. The trade regime characteristics approach

To overcome the problems associated with the export growth approach several studies try to measure the restrictivness of the trade regime by alternative indicators. An early approach in this direction was presented by Heitger (1986). This study tries to measure the bias against exports by the deviation of the share of exports in GDP from the predicted value of this share. To predict the share of exports in GDP (export quota) Heitger (1986) uses a model, which is based on the well known empirical observation that small countries typically have a larger export quotas than large countries. Hence, if each country size has its characteristic "natural" export quota, deviations of the actual export quota from this natural export quota may be caused by the trade regime. To measure these deviations Heitger estimates the following regression equation cross country:

$$(10)\quad \ln\left(\frac{X_j}{Y_j}\right)=\alpha_0+\alpha_1 Y_j$$

where X_j equals the export of country j and Y_j equals the GDP of country j. The country residual of this regression measures the influence of the trade regime against exports. If the residual of a certain country is negative, this is interpreted as a bias of the trade regime against exports, if the residual is positive, this is interpreted as a bias in favour of exports. Adding three additional explanatory variables, the share of investments in GDP (investment quota), I_j/Y_j, the adult literacy rate, LIT_j, and the share base year per capita income of country j in the base year per capita income of the USA, y_j/y_j^*, Heitger runs the following regression for a pooled cross country sample:

$$(11)\quad \hat{y}_j=\beta_0+\beta_1\left(\frac{y_j}{y^*}\right)+\beta_2 LIT_j+\beta_3\left(\frac{I_j}{Y_j}\right)+\beta_4\tau_j,\ \text{where}\ \tau_j=\ln\left(\frac{X_j}{Y_j}\right)-\bar{\alpha}_0-\bar{\alpha}_1 Y_j$$

While the coefficients of the first three variables are significant and show the "expected" signs, the trade regime indicator exhibits a positive sign but is insignificant (appendix table A7). However, omitting the investment quota the trade regime indicator becomes significant, while maintaining its sign. As a regression of the investment quota on the trade regime indicator shows, the correlation between both variables is positive and highly significant. Consequently, the insignificant coefficient of the trade regime indicator in equation (11) is probably generated by multicollinearity. This observation, that is affirmed by the results of Levine/Renelt (1992) (see below), indicates that the influence of the trade

regime on economic growth may run over the influence of the trade regime on domestic investments - an implication that is matched by neoclassical growth models as well as by certain models of the New Growth Theory, where free trade may either spur an inflow of foreign investments or increases the return on investment.[48]

However, using the *average* ERP as an alternative trade regime indicator, the coefficient of the trade regime indicator as well as the coefficient of the investment quota is significant. The negative sign indicates that countries with a higher average ERP display a lower rate of per capita growth. It is however questionable, what the *average* ERP measures at all, because a bias against exports may go hand in hand with an equal average ERP than a bias in favour of exports (for definition see equation (4)). Assume the average ERP is measured by the following formula:

$$(12)\quad \overline{ERP} = ERP_M\,\omega_M + ERP_P\,\omega_P \quad \text{with} \quad \omega_M + \omega_P = 1,$$

where ω_j is a weight of the ERP of sector j. Hence a country, that grants protection to manufacturing only, displays an average ERP that equals ERP_M, while a country that neutralizes the protection granted to manufacturing by subsidizing primary exports (i.e. $ERP_M = ERP_P$) displays the same average ERP, if for example $\omega_j = 0.5$. Consequently, the *average* ERP may contain no information on the actual bias of the trade regime against exports. Perhaps, the average ERP is best interpreted as a kind of trade regime intervention indicator.

Edwards (1992) presented, i.a., two trade regime indicators that can to some extent be interpreted as a refinement of Heitger's (1986) "adjusted export quota" indicator. These trade regime indicators are taken from a study of Leamer (1988). Both measures are estimated on the basis of a Heckscher-Ohlin model, which uses nine production factors (capital, three types of labor, four types of land and oil) to estimate net trade flows for 183 commodities at the 3 digit SITC level for 65 countries.

---

[48] Actually all growth models where the steady state growth rate of the capital stock equals the steady state growth rate of output (such that K_t/Y_t is constant in steady state) imply a strong positive correlation between output growth and the investment quota, as can be seen by the following calculation: $\dot{Y}/Y = \dot{K}/K = (\dot{K}/Y)(Y/K)$ and $(Y/K) = \text{const.}$ $\Rightarrow \text{cov}(\dot{Y}/Y; \dot{K}/Y) = (K/Y)\,\text{var}(\dot{Y}/Y)$, such that the theoretical coefficient of a simple regression of output growth on the investment quota yields in steady state: (K/Y).

The formula of one indicator, which Leamer calls "openness"-indicator, is given by the following equation:[49]

$$(13)\quad \tau_j = \sum_{i=1}^{I=183} \left(\left| X_{ij} - M_{ij} \right| - \left| \overline{X}_{ij} - \overline{M}_{ij} \right| \right) \Big/ Y_j ,$$

where $\overline{X}_{ij} = \sum_{k}^{K=9} \overline{\alpha}_{ki}\, r_{ki}$, $\overline{M}_{ij} = \sum_{k}^{K=9} \overline{\alpha}_{ki}\, r_{ki}$, $X_{i,j}$ resp. $M_{i,j}$ are exports, rsp. imports, of commodity i of country j and Y_j equals GDP of country j.

Hence, the differences between the actual net trade intensity ratios and those "predicted" by this model are interpreted as generated by the trade regime. An interpretation of this indicator has to bear in mind that exports and imports in equation (13) refer to fairly disaggregated commodity data (I=183). If one assumes that they are deep enough disaggregated that within one commodity group no intra-industry trade takes place, than the net trade of each commodity equals either X_{ij} or M_{ij}. Consequently, the difference between actual and predicted trade for each commodity group is either given by $X_{ij} - \overline{X}_{ij}$ or $M_{ij} - \overline{M}_{ij}$. From this follows, that a trade regime, which restricts exports and/or imports leads to a lower level of this trade regime indicator. Hence, the larger the value of this indicator the less restrictive is the trade regime.[50]

The formula of the other indicator, which Leamer calls "intervention"-indicator, is given by the following equation:

$$(14)\quad \tau_j = \sum_{i=1}^{I=183} \left| X_{ij} - \overline{X}_{ij} - \left(M_{ij} - \overline{M}_{ij} \right) \right| \Big/ Y_j ,$$

Bearing in mind the assumption of no intra-industry trade within each commodity group, the difference between actual and predicted trade for each commodity group is either given by $X_{ij} - \overline{X}_{ij}$ or $M_{ij} - \overline{M}_{ij}$. As the *absolute* values of deviations from "free trade" are now added, it follows that a larger value of this indicator measures the overall interventions in

---

[49] Leamer (1988), pp.163-166.

[50] However, if a lot of intra-industry trade takes place in each commodity group, this index is best interpreted as a measure of overall intervention, because in this case a negative (positive) difference between actual and predicted net exports indicates that either exports are restricted (pushed) or imports are pushed (restricted) beyond their "free trade level" by the trade regime. A *higher* value of τ_j may then be caused by imports *lower* than their free trade level.

trade, whether they restrict or stimulate trade. Edwards (1992) runs a similar regression as Heitger (1986) for a cross country sample. Thereby, he uses the 1970-1982 average values for per capita GDP growth and investment quota and the Leamer estimates of the trade regime indicators for 1982.

(15) $\hat{y}_j = \beta_0 + \beta_1 (I_j / Y_j) + \beta_2 y_{j0} + \beta_4 \tau_j$, where y_0 equals per capita income of 1970.

Though Leamer (1988) presents the above trade regime indices for 65 countries, Edwards restricts his sample to 30 LDCs only, omitting 21 developed countries, 11 small island economies and three major oil exporters. Given this 30 country sample he finds for the openness indicator a positive and for the intervention index a negative coefficient. Both coefficients are significant at conventional levels. Edwards also reports estimations for a sample that includes the 21 developed countries for the intervention index and a variant of the openness index. These estimates display a negative but insignificant coefficient for the intervention index and a positive and significant coefficient for the openness index. Edwards does not present sensitivity estimates for sample periods including years after 1982.

However, as the Leamer trade regime indicators refer only to 1982 and, if one assumes (as Edwards does) a certain inertia of trade regimes, it is most probable that these indicators represent the actual trade regimes of the years shortly after 1982 better that the trade regime of the early 1970s. Nevertheless, it is surprising that the trade regime indicator actually changes sign, if one switches from the "openness" variant to the "interventions" variant in the "expected" way. This seems to suggests, that there is indeed some kind of "trade regime information" contained in the Leamer indicators. Yet, sensitivity tests performed by Levine/Renelt (1992) question these results. Levine/Renelt find for a similar regression approach as equation (15) that the coefficients of both Leamer indicators remain the "expected" sign, but become insignificant for the sample period 1974-1989 (appendix table A7). But a regression of the investment quota on the Leamer indicators yields again significant coefficients of the trade regime indicators and suggests that a less restrictive and distorted trade regime is positively correlated with the investment quota. Hence, the insignificant results of the Levine/Renelt regressions explaining per capita income growth may (as for Heitger (1986)) be caused by multicollinearity.

Dollar (1992) presented a study that is based on a trade regime indicator, which is supposed to measure the real exchange rate distortion caused by the trade regime. The formula of this indicator is given by the following equation:

$$(16)\quad \tau_j = 100\left(P_j / P^* e_j\right),$$

where P_j equals the consumption price index of country j, P* equals the consumption price index of the USA and e_j equals the nominal exchange rate of country's j currency against the US-Dollar. As Dollar (1992), p. 525, states "If all goods were tradable and there were no trade barriers, these measures would all be 100". Hence, Dollar suggests that the price arbitrage mechanism is well functioning, such that the "law of one price" is in force. Under this "law", the price for commodity i in country j deviates from the price of the same commodity in the USA only by transportation costs and the tariff equivalent of the import restrictions of country j.[51] As Dollar uses the Summers/Heston (1988) price indices, which are based on the *same* commodity basked for all countries, the "law of one price", would also work in this direction for these indices, if all commodities in this basket were tradable. From this follows that - ideally - the Dollar trade regime indicator measures something like an average import tariff equivalent of a country's import restrictions. Interpreted this way, it has the same dimension as the average effective exchange rate index (for definition see appendix 1).

Yet, a problem arises, as the commodity basket of Summers/Heston is intended to be representative for consumers, it comprises nontradables, i.e. services, too. As is well known, services in countries with high per capita income are more expansive than in countries with low per capita income (Bhagwati (1984)). To purge the price indices from this effect, Dollar estimates the following regression:

$$(17)\quad \left(P_j / P^* e_j\right) = \alpha_0 + \alpha_1 y_j + y_j^2,$$

---

[51] This result depends on a set of assumptions: As is shown by Bhagwati (1983), p. 196, under a monopolistic market structure an import quota does not always lead to a domestic market price that deviates from the world market price by a margin that is equivalent to a tariff that leads to the quantity sold at the domestic market under the import quota. Consequently, a price based measure of NTMs, such as the one used by Dollar (1992), may be biased for commodities traded on monopolistic markets. Another problem may emerge, if the USA had significant export restrictions, because these would be captured by this index as import restrictions of country j. However, as export restrictions are relatively rare in the USA, this may be no serious problem.

where y_j equals per capita income of country j. As Dollar assumes that each per capita income exists a typical consumer price index, P_j, he interprets actual deviations of P_j from this value as caused by the trade regime. Therefore, he can measure the overall restrictiveness of the trade regime with the following formula:

$$(18) \quad \tau_j = \frac{P_j / P^* e_j}{\overline{\alpha}_0 + \overline{\alpha}_1 y_j + \overline{\alpha}_2 y_j^2}$$

Based on this index Dollar (1992) runs similar cross country regressions as Heitger (1986) and Edwards (1992), but adds the coefficient of variance of his trade regime indicator, as a measure of the overall dispersion of trade interventions:

$$(19) \quad \hat{y}_j = \beta_0 + \beta_1 \left(I_j / Y_j \right) + \beta_2 \tau_j + \beta_3 \left(\text{var}(\tau_j) / E(\tau_j) \right)$$

To eliminate short run fluctuations Dollar uses for all variables the average value over the period 1976-1985. His country sample embraces 95 DCs. As the results show, his trade regime indicator as well as its coefficient of variance have significantly negative coefficients. Hence, Dollar obtains a similar result as Heitger (1986) based on the average rate of effective rate of protection. This may be due to the circumstance that Dollar's trade regime indicator has the same dimension as the effective exchange rate and the effective exchange rate index is closely related to the effective rate of protection (see appendix 1, equations (A4) and (A5)).

However, the same criticism as against the average rate of protection applies: it is questionable, what the average effective exchange rate, which ideally corresponds to the Dollar trade regime index, measures. For example, a bias against exports may go hand in hand with a lower *average* effective exchange rate than a bias in favour of exports.

To finish this survey of statistical tests based on the trade regime characteristics approach, it is useful to have a look at the sensitivity tests Levine/Renelt (1992) presented. As is shown in appendix table A7, Levine/Renelt performed Leamer's extreme-bounds analysis (EBA) for unspecified regression models (Leamer (1978)) for each of the trade regime indicators surveyed so far. The EBA is intended to test for the robustness of regression correlations in cases where the regression equations are not derived from an explicit theoretical model. To do so, Levine/Renelt use a regression approach of the following type:

$$(20)\quad \hat{y}_j = \beta_0 + \beta_1 \left(I_j / Y_j\right) + \beta_2 y_{0j} + \beta_3 \hat{P}_j + \beta_4 SEC_{0j} + \beta_5 \tau_j + \gamma Z_j,$$

where $\hat{P}_j$ is the population growth rate of country j, SEC_j is the secondary school enrolment rate, the other variables are as defined above, and Z_j is a vector of "policy" variables. Z_j is chosen in order to "identify the highest and lowest coefficient of the variable of interest", β_5. The pool of variables from which Z_j is chosen embraces, for example, the average rate of government consumption expenditures, the average inflation rate, the average growth rate of domestic credits, the standard deviation of domestic credit growth, and an index for the number of revolutions and coups. Based on this approach, Levine/Renelt are able to show, that none of the above trade regime indicators display a robust with the growth rate of per capita income, i.e. for each variable there exists a vector of Z, which yields either insignificant regression results or changes the sign of the regression coefficient. The best result obtains the Dollar (1992) trade regime indicator, for which only one Z-vector exists that is able to generate a - slightly - insignificant coefficient. It is, however important to note that, as has been stated above, the bad performance of the Heitger (1986) and Leamer (1992) indicators is most probably caused by multicollinearity with the investment quota. As an EBA test of the correlation between the investment quota and those trade regime indicators reveals, the Leamer openness and intervention index as well as the export quota displays a robust correlation with the investment quota. For the Dollar (1992) indicator, however, which displays a nearly robust correlation with the growth rate of per capita income, no Z-vector exists, which is able to generate a significant correlation with the investment quota.

2.3.3. Lessons from statistical tests

To sum up, the results of the statistical tests are far from being conclusive. The basic problem of the export growth indicator approach is that it is difficult to distinguish between a mere accounting effect relation between export growth and GDP growth and a relation that stems from an export oriented trade regime. Beside that, the weak time series results question the strong positive correlation between export growth and GDP growth found in cross country studies. Although the results from the trade regime characteristics approach are able to overcome problems caused by accounting effects, the results are not unambiguous either. However, the Levine/Renelt EBA-tests indicate that trade volume based trade regime characteristics indicators, such as the export quota or the Leamer openness and intervention indicators, exhibit a correlation with the growth rate of per capita income that runs over the investment quota. This is in accordance with those growth

models, which imply that open trade stimulates economic growth over its positive impact on investments. Price based trade regime measures, such as the Dollar (1992) index, seems to exhibit a more direct correlation with the growth rate of per capita income. However, as was stressed above, it is difficult to interpret them.

The detection of a rather complex correlation structure between per capita income growth, investment quota and trade volume based trade regime indicators, hints to the necessity, to base further statistical tests on foreign trade and economic growth on models, which allow for tests on specific economic "channels" between foreign trade and economic growth. New approaches, such as models offered by the New Growth Theory, may be a suitable framework. Compared to the rich microeconomic structure of these models, simple regressions of growth rates on trade regime indicators appear to be rather crude approaches.

3. Conclusions, policy implications and some stylized facts

This survey of case studies and statistical tests on the relation of foreign trade and economic growth found no unequivocal empirical evidence against one of both competing hypothesis. Perhaps, most reliable are some observations of case studies, which question the validity of the Trade Hysteresis Hypothesis. As these observations exhibit, after a transition from an import substitution to an export promotion trade regime many of old import substitution industries were not internationally competitive and had to be protected in order to prevent their withdrawal, whilst observable expansions of industry sectors after a transition to an export-oriented trade regime, were due to new industries that had not been favoured by import protection in the past. Hence, a liberalization of the trade regime appears not necessarily to induce shrinking industry sectors and an import substitution trade regime seems not necessarily lead to a international competitive import substitution industry. However, as has been stressed in this survey, further empirical research on these kind of observations is necessary. Especially, it has to be established that the described observations were not due to indirect and hidden protection granted to new industries in trade liberalization countries.

An evaluation of the described statistical tests is even more difficult. Most reliable is the evidence that the export growth rate is not a suitable indicator to test for the relation between foreign trade and economic growth. The basic problem of the export growth indicator approach is that it is hard to distinguish between a mere accounting relation between export growth and GDP growth and a relation that stems from an export oriented

trade regime. Although the results from the trade regime characteristics approach overcome problems caused by accounting effects, these results are not unequivocal either. Nevertheless, the Levine/Renelt (1992) EBA-study seems to indicate that trade volume based trade regime indicators exhibit a correlation with the growth rate of per capita income that runs over the investment quota. This is in accordance with those growth models, which imply that open trade stimulates economic growth over its positive impact on investments. Therefore, it was argued in this survey that further statistical tests on foreign trade and economic growth should be based on theoretic framework, that is able to detect different economic "channels" between foreign trade and economic growth.

Although there is no clear-cut evidence found on the relation between foreign trade and the *growth rate* of per capita income, some rather robust stylized facts appear to indicate that there is a positive relation between the *level* of per capita income and the degree of international economic integration of a country, as measured by its share of imports and exports in GDP (trade quota). Chenery/Syrquin (1989) presented a large scaled descriptive study on the patterns of structural development. This study is based on the following regression equation:

$$(21)\quad \frac{Z}{Y}=\beta_0+\beta_1 \ln(y)+\beta_2\left(\ln(y)^2\right)+\beta_3 \ln(P)+\beta_4\left(\ln(P)^2\right)+\sum_j^4 D_j$$

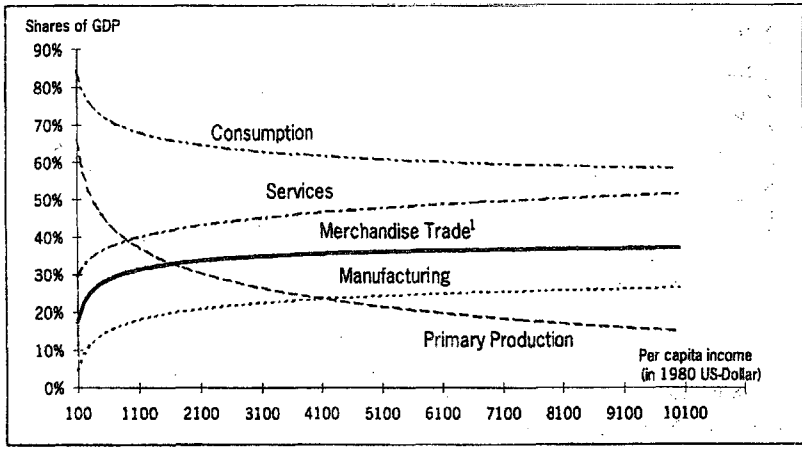
where Z/Y equals a certain component of GDP, y equals per capita GDP, P equals population and D_j equals a time dummy.[52] Chenery/Syrquin estimate this equation for a pooled cross country sample of about 100 countries over the period 1950-1983. They obtain i.a. significant coefficients of per capita GDP and population size for the share of consumption, government consumption, investment, merchandise exports, merchandise imports, primary production, industry and services in GDP. Figure 2 displays the average shares of these components in GDP dependent on per capita GDP, for a normalized population size of 20 million, corresponding to the regression results of Chenery/Syrquin. As figure 2 shows, in the course of per capita income growth the structure of GDP composition significantly changes, based on the demand side as well as based on the

---

[52] $D_1=1$ if $t \geq 1960$; $D_2=1$ if $t \geq 1967$; $D_3=1$ if $t \geq 1973$; $D_4=1$ if $t \geq 1979$. The semilogarithmic formulation of the regression equation has the comfortable algebraic property that the shares of the estimated GDP components add up to 1, if the shares of the actual GDP components add up to 1.

production side. The direction of these changes remains the same even, if the sample is divided into subperiods or country groups. The share of merchandise trade (= merchandise exports plus imports) in GDP grows as per capita income grows. This suggests, that - on average - a country has to open its economy to foreign trade in order to reach a higher per capita income level. Higher integration into the international division of labour seems to go hand in hand with a higher level of per capita income.

Figure 2 - Average GDP-composition dependent on per real capita GDP 1950-1983



[1] Share of merchandise exports plus imports in GDP

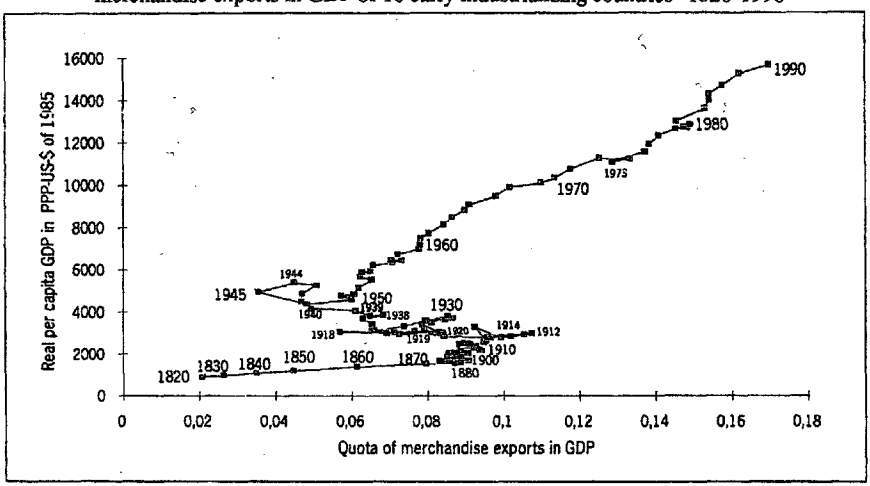
Source: Chenery/Syrquin (1989); own calculations

This simple but robust feature on international integration and the level of per capita income is also reflected in data of the historical development of the early industrializing countries. Figure 3 presents the historical development of the average real per capita GDP measured in US-purchasing-power-parity dollars of 1985 and the average share of merchandise exports in GDP for 14 early industrializing countries[53] from 1820 to 1990 based on the data of Maddision (1992). It is of cause rather problematic to deflate GDP of the 19th century on the basis of a commodity basket of a price index from 1985. However,

[53] Austria, Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Sweden, United Kingdom, United States.

the story of figure 3 remains the same if one starts with 1970. According to figure 3 the process of per capita income growth is significantly accompanied by a deepening of the international division of labour, as measured by the quota of merchandise exports.[54]

Figure 3 - Development of per capita GDP (in PPP US-$ of 1985) and quota of merchandise exports in GDP of 16 early industrializing countries[1] 1820-1990



[1] From 1820-1870: Austria, Belgium, Denmark, France, Germany, Italy, United Kingdom, United States; from 1870 to 1990 additionally: Australia, Canada, Finland, Netherlands, Norway, Sweden. The overall picture does not change, if the latter group is excluded.

Source: Maddison (1992), own calculations

There are indeed some hints that phases of accelerated deepening of international integration were also phases of accelerated growth of per capita income, as appendix figures A1 and A2 suggest.[55] Thereby the speed of international integration, as measured by the merchandise export quota, appears to be related to the historical shifts in trade policy that were described in section 1.3.. The first trade liberalization phase, 1820-1870,

---

[54] Unfortunately, Maddision (1992) offers no data on merchandise imports, total exports and total imports.

[55] Though highly speculative, appendix figure A3 suggests that such a relation was present in the growth process of a large sample of countries in the last two decades too.

policy that were described in section 1.3.. The first trade liberalization phase, 1820-1870, was accompanied by a significant growth of the merchandise export quota. The retardation of trade liberalization, 1870-1913, slowed down the export quota growth, while the break down of the world trading system in the course of the first and second world war, 1913-1945, showed a tremendous decline of the export quota. The revival of trade liberalization efforts after the second world war went hand in hand with a nearly monotone growth of the export quota that was only temporarily interrupted by both oil price shocks. Hence, the historical process of trade liberalization appears to have actually influenced the degree of international integration of these early industrializing countries.

The stylized facts of Chenery/Syrquin (1989) and the historical development of per capita income and merchandise export quota of the early industrializing countries do not support the hypothesis that a high level of per capita income can be reached by autarky. A sufficiently deep integration into the world economy by international trade, seems to be necessary to reach a high level of per capita income. As the appendix figures A4 and A5 show, all of the ten best per capita GDP growth performers from 1960-1990 had significantly increased their export and import shares in GDP, whilst most of the ten worst growth performing countries displayed diminishing or stagnating export and import GDP shares. A similar picture delivers appendix figure A3 that shows a significant correlation between the growth rate of per capita GDP and the growth rate of the trade quota for a sample of 104 countries for the period of 1970-1990.

Taken together, these observations can rather be matched with the Smithsonian Theory, discussed in section 1.1., that a higher degree of division of labour increases productivity. However, these observations do, so far, not unambiguously imply that a higher degree of division of labour necessarily leads to higher long-run rates of per capita GDP growth. Nevertheless, they are compatible with the hypothesis that, in order to enhance the level of per capita income, developing countries may - at least in the long run - have to allow for a deeper international integration of their economies. The question whether such an increased integration has to be preceded by an import substitution trade regime can not be answered on the basis of the above described stylized facts. Yet, as was mentioned above, some case study observations suggest that import substitution trade regimes have not always been successful in stimulating the development of industries *and* there are observations of some cases were trade liberalization has given rise to the establishment of new industries in developing countries *without* a preceding import substitution phase. Of course, as has been argued above, further empirical research is necessary in order to prove

the correctness of these observations. Nevertheless, although there are still a lot of open questions, the empirical observations presented in this survey do not imply a stalemate between the two competing hypothesis discussed in the beginning. The overall impression is that there is more empirical evidence against the Trade Hysteresis Hypothesis à la List than against the Smithsonian Market Expansion Hypothesis.

APPENDICES

Appendix 1 - A measure of the anti-export bias based on concept of the effective exchange rate

The concept of the effective exchange rate (EER) was developed by the studies of Krueger (1978) and Bhagwati (1978). Following this concept commodities are divided into those that are exported and those that are imported. For each of both groups the effective exchange rate is computed. Bhagwati (1978), p. 219, defines the effective exchange rate as:

> The number of units of local currency actually paid or received for a one-dollar international transaction. Surcharges, tariffs, the implicit interest foregone on guarantee deposits, and any other charges against purchases of goods and services abroad are included, as are rebates, the value of import replenishments rights, and other incentives to earn foreign exchange for sales of goods and services abroad.

Hence, for exports the effective exchange rate can be written as:[63]

$$(A1)\quad EER_{exports} = e_{exports}(1+s+r),$$

where $e_{exports}$ equals the official exchange rate for exports, s equals the percentage export subsidy and r equals other implicit subsidies expressed as a percentage rate. The higher the effective exchange rate for exports, the higher is the value of a unit foreign currency earned by exports in domestic currency units. Hence, a high effective exchange rate for exports is an incentive to export. The effective exchange rate for imports can be written as:

$$(A2)\quad EER_{imports} = e_{imports}(1+t+n+\pi)$$

where $e_{imports}$ equals the official exchange rate for imports, t equals the import tariff, n equals other import surcharges and π equals the premium associated with the existence of quantitative restrictions. A higher effective exchange rate for imports implies that the price of imports in domestic currency is higher. Hence, the domestic import goods producing branches get a higher protection against foreign competitors the higher the effective exchange rate is.

Using this concept an anti-export-bias is stated, if the effective exchange rate for export goods is lower than the effective exchange rate for import goods:

$$(A3)\quad \frac{EER_{imports}}{EER_{exports}} > 1$$

---

[63] Bhagwati (1988)

Equation (A3) implies that the anti-export-bias is the higher, the lower the incentives to export and the higher the disincentives to import. From the definition of the effective exchange rate and the effective rate of protection it follows that both concepts are closely interlinked. The only difference between both concepts is that the effective rate of protection is based on the price of value added of a commodity and the effective exchange rate is based on the price of the hole commodity. This can be seen by writing the equilibrium relation between the effective exchange and domestic and world market prices:

$$(A4) \quad EER_j = \frac{p_j}{p_j^*}$$

Equation (A4) follows from the condition that in an arbitrage equilibrium the domestic price (p^*) equals the world market price (p_j^*) times the effective exchange rate. Corresponding to equation (A4) equation (2) can be rewritten in the following way:

$$(A5) \quad 1 + ERP_j = \frac{v_j}{v_j^*}$$

Hence, for commodities with a low input of intermediates both measures tend to be equal. Significant differences appear only for commodities of industries with a low value added share. By the same argument, trade policy instruments tend to shift both measures in the same direction. For example an import tariff for commodity j increases c.p. both measures.

Both measures have their pros and cons. Since the anti-export-bias is intended to measure a bias against certain commodity groups, the measure biased on the effective rate of protection, i.e. the value added of certain commodity groups, may be more appropriate than the effective exchange rate. However, the concept of the effective exchange rate contrary to the concept of the effective rate of protection tries to account for the influence of quantitative restrictions on the trade regime by adding a premium (π) to the measure. This is important in those cases, where, because of monopolistic markets, where an import quota does not always lead to a domestic market price that deviates from the world market price by a margin that is equivalent to a tariff that leads to the quantity sold at the domestic market under the import quota. Yet, in the studies that are based on the concept of the effective exchange rate, it is left open, how this premium is estimated. The impression is that some kind of rule of thumb is applied to estimate π.

What both types of measures do not indicate, is the absolute restrictiveness of the trade regime. The trade regime characteristic that they measure is only the relative bias against certain commodity groups (i.e. export goods resp. primary goods) implied by a trade

regime. Consequently, a trade regime with very high import restrictions for industry may have the same anti-export-bias as a trade regime with actually no import restrictions, if the import restrictions are completely compensated by export incentives for primary products.[64]

[64] Such a kind of highly restrictive but at the same time unbiased trade regime is actually possible, if the subsidies paid for exports are financed via taxes on non-tradables or lumpsum taxes and the like.

Appendix 2 - Figures and Tables

Table A1 - Countries by region and per capita GDP as used by Erzan/Kuwahara/Marchese/Vossenaar (1988)

GEOGRAPHICAL REGIONS	GDP per capita					
	Less than US-$ 500	US-$ 500-1000	US-$ 1001-1500	US-$ 1501-5000	More than US-$ 5000	Number of Countries
North Africa	Sudan	Egypt Morocco	Tunisia	Algeria		5
Other Africa	Cen.Afr.Rep. Senegal Somalia Tanzania Zaire	C.d'Ivoire Ghana Nigeria Zimbabwe	Congo			10
Caribbean		Belize Guyana	Jamaica	Antigua & Barbuda Barbados	Trinidad & Tobago	6
Central America			Costa Rica Guatemala Nicaragua			3
South America			Bolivia Chile Colombia Ecuador Peru	Argentina Brazil Mexico Uruguay Venezuela		10
Other Asia	Bangladesh Pakistan Sri Lanka	Philippines Thailand		Korea,Rep. Malaysia	Singapore	8
West Asia				Cyprus Syria	Bahrain Kuwait Oman Qatar S.Arabia U.A.E.	8
Number of Countries	9	10	11	12	8	Total: 50

Source: Erzan/Kuwahara/Marchese/Vossenaar (1988)

Table A2 - Average tariffs and para-tariffs by geographical regions, 1985, (a) in per cent

	Carib-bean	Central America	South America	North Africa	Other Africa	West Asia	Other Asia	All Regions
TARIFFS								
unweighted (b)	16	23	34	29	32	7	36	26
import-weighted (c)	17	24	38	30	35	4	22	24
TARIFFS PLUS PARA-TARIFFS								
unweighted (b)	18	65	46	36	34	9	42	34
import-weighted (c)	17	66	51	39	36	5	25	30

(a) Based on UNCTAD computer files based on published official national sources. - (b) Simple average across products and countries. - (c) Simple average across products; across countries average weighted by total imports.

Source: Erzan/Kuwahara/Marchese/Vossenaar (1988)

Table A3 - Trade control measures covered by the study of Erzan/Kuwahara/Marchese/Vossenaar (1988) (a)

TARIFFS:
Customs Duties and Fiscal Duties (b)
General rates
MFN rates
Rates Reduced or Suspended
PARA-TARIFFS:
Additional Fiscal Charges
Customs Surcharge and Surtax (c)
Stamp Tax (c)
Additional Fiscal Charges n.e.s. (c)
Other taxes on imports
Tax on Foreign Exchange Transaction (c)
NON-TARIFF MEASURES (NTMs):
Restrictive Licensing
Discretionary Licence (c)
Special Import Authorization
Licence for Selected Purchasers
Quotas
Global Quota
Quota n.e.s. (c)
Prohibition
Total Prohibition
Temporary Prohibition
Suspension of Issuance of Import Licences
Prohibition n.e.s.
Money and Finance Measures
Advance Import Deposit (c)
Foreign Exchange Licences, Authorizations, Permits, Visas, Prohibitions, etc. (c)
Control of Price Level
Customs Valuation in form of Fixed Unit Values
Single Channel for Imports
State Trading Monopoly
Sole Importing Agency
(a) This is not an exhaustive list of trade control measures in the countries concerned. It is confined to measures on which consistent data were available and therefore were included in the analysis. - (b) When for a product more than one of the rates listed existed, only the lowest of the rates was considered in the analysis. - (c) Trade control measures which were applied across the board in some countries (in others on a product specific basis). The number of these countries were the following: Customs surcharge and surtax 6; stamp tax 3; additional fiscal charges n.e.s. 11; tax on foreign exchange transactions 5; discretionary licence 7; quotas 1; advance import deposit 12; foreign exchange licences, etc. 6.

Source: Erzan/Kuwahara/Marchese/Vossenaar (1988)

Table A4 - Case studies on foreign trade and economic growth.

Study/Financier	Sample Countries	Period	Main results	Policy Recommendation
Little, Scitovsky, Scott (1970): Industry and Trade in Some Developing Countries / OECD	Argentina Brazil Mexico India Pakistan Philippines Taiwan	1950-1966	Import tariffs and quotas have been used to encourage industrialization and have thereby discouraged exports and the agricultural sector. This has led to static inefficiencies. Furthermore, after a period of 10-15 years industrial growth stagnated, because of limited domestic markets.	Encouragement of industrialization can be carried out without trade restrictions by directly subsidizing labor in industry, providing sufficient educational infrastructure, improving financial institutions to channel private savings to industry and direct compensation of industry for external benefits.
Balassa and Associates (1971): The Structure of Protection in Developing Countries / World Bank and Inter-American Development Bank	Brazil Chile West Malaysia Pakistan Philippines Norway	1950-1967	There is considerable variation in the degree of protection between countries and sectors as measured by the effective rate of protection. Manufacturing is - with exception of Norway and Malaysia - protected against primary sectors (agriculture, mining and energy). Within manufacturing machinery, intermediate goods and consumer goods enjoy the highest protection. This has led to static inefficiencies and a slowdown in production and exports of primary commodities and - after a first phase of rapid import substitution - a slowdown in the production of manufacturing products too.	Reduction of the protection of manufacturing, reduction of the incentive bias against nontraditional primary products and - to a lesser degree - reduction of the incentive bias against traditional primary products. This protection scheme should be implemented by the use of a basic exchange rate for nontraditional primary products, export taxes on traditional primary exports, and a combination of tariffs and subsidies on manufactured goods.
Krueger (1978): Liberalization Attempts and Consequences / National Bureau of Economic Research	Brazil Chile Columbia Egypt Ghana India Israel South Korea Philippines Turkey	1950-1972	The transition from a trade regime that is characterized by significant import tariffs and intensive use of import quotas to a regime that is characterized by reduced tariffs and rare use of import quotas leads in general to more labor-intensive production, increased employment, increased productivity in formerly protected sectors and, higher export growth rates that are positively related to GNP growth rates.	Transition from an import substitution trade regime to an export promotion trade regime, reduction of quantitative restrictions and the variance of tariff incentives.
Bhagwati (1978): Anatomy and Consequences of Exchange Control Systems / National Bureau of Economic Research	The study is based on the same countries as Krueger (1978)		Restrictive trade regimes lead to illegal transactions, underutilization of capacity, excess holdings of inventories, overcapitalization of production, low export growth rates and low GNP growth rates.	Transition from an import substitution trade regime to an export promotion trade regime, reduction of quantitative restrictions and the variance of tariff incentives.

Donges, Müller-Ohlsen (1978): Außenwirtschaftsstrategien und Industriealisierung in Entwicklungsländern / Deutsche Forschungsgesellschaft, Sonderforschungsbereich 86	Egypt, Brazil Hong Kong India Israel Yugoslavia Columbia Malaysia Mexico Pakistan Singapore Spain South Korea Taiwan Turkey	1950-1975	All study countries switched from an import substitution phase to an export promotion phase in the course of the 1960s. In general, import substitution has led to an overshooting of manufacturing at the expense of agriculture, overdiversification of manufacturing, discrimination against exports, overcapitalization of manufacturing and capacity underutilization. In the beginning, import substitution accelerated industrial growth. After a period of 10-15 years industrial growth slackened. There is a structural break in the time series of GNP, industrial production and exports in most of the countries, that shows an increase of the growth rate after transition to an export promotion system.	Transition from an import substitution trade regime to an export promotion trade regime by an reduction of import restrictions, subsidization of exports, stabilization and devaluation of the real exchange rate.
Balassa and Associates (1982): Development Strategies in Semi-industrial Economies / World Bank	Argentina Brazil Chile Columbia India Israel Korea Mexico Taiwan Yugoslavia	1960-1973	Countries are classified according to their trade regime into four groups: 1. Outward oriented policy with no bias against exports: Korea, Singapore, Taiwan. 2. Start of an export promotion policy after an continued phase of import substitution policy: Argentina, Brazil, Columbia, Mexico. 3. Fading export promotion strategy: Israel, Yugoslavia. 4. Import substitution strategy: Chile, India. Export performance was best in the first group and worst in the last group. Export expansion had positive effects on GNP growth.	Reduction of the bias against primary activities and sales in foreign markets. Replacement of quantitative restrictions by import tariffs. Reduction in the level and dispersion of tariffs. Partially compensated devaluation. Imposition of optimal tariffs on commodities with price-inelastic foreign demand.
World Bank (1987): Barriers to growth and adjustment in the world economy - Foreign Trade and Industrialization / World Development Report 1987 / World Bank	41 developing countries (see World Bank (1987), figure 5.1)	1963-1985	Classification of the study countries by trade orientation (Strongly outward oriented, moderately outward oriented, moderately inward oriented, strongly inward oriented) based on subjective judgement shows that outward oriented countries had higher real GNP per capita growth rates, higher domestic savings quota in GDP, a lower incremental capital-output ratio, higher manufactured exports growth rates and a more equitable distribution of income. The effect on inflation rate was ambiguous. Furthermore outward oriented countries had significantly higher growth rates of real manufacturing value added, a higher share of manufacturing value added in GDP, a higher share of labour force in industry and a higher annual growth of employment in manufacturing.	Transition from inward to outward orientation by replacing quantitative restrictions with tariffs, reducing the average level and dispersion of tariffs, devaluation of the real currency exchange rate. To prevent appreciations of the real currency exchange rate a total liberalization of financial markets may be postponed. As long as import tariffs are not widely reduced, export promotion via direct export subsidies may be justified to compensate for import tariff induced anti-export bias - though this is a difficult alternative to cuts in import protection. The process of trade reform should be accompanied by stable macroeconomic policies, especially with regard to the real currency exchange rate.

Banuri et al. (1991): Economic Liberalization - No panacea / World Institute for Development Economics Research - United Nations University	*Asian countries:* China, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Sri Lanka, Taiwan *Latin American countries:* Argentina, Bolivia, Brazil, Chile, Columbia, Ecuador, Mexico, Peru, Venezuela	1970-1980	Neither trade, nor openness, nor outward orientation is unambiguously linked with higher growth. Yet, trade openness does increase flexibility to cope with financial market shocks, while financial openness reduces the ability to adjust to exogenous shocks. As the Asian NICs had more open trade regimes but more closed financial market regimes, they performed better than the Latin American countries.	No general policy recommendations are possible. Variability of inward or outward orientation of trade regimes depends on the social, institutional and economic context. Yet, given the global setting at the end of the 20th century (lack of access to external sources of capital, growing protectionism of the developed countries) an inward-oriented trade and development policy - including partial delinking of certain sectors of the economy - may be the most promising strategy.
Papageorgiou, Michaely, Choksi (1991), Liberizing Foreign Trade / World Bank	Argentina Brazil Chile Colombia Greece Indonesia Israel Korea New Zealand Pakistan Peru Philippines Portugal Singapore Spain Sri Lanka Turkey Uruguay Yugoslavia	max. 1947-1985	Trade liberalization episodes regulary lead to an acceleration of growth, especially in the tradable sector, no substantial increase in unemployment, no detoriation of the trade balance and have no clear effect on the equality of income distribution. Liberalization episodes are mainly characterized by a relaxation of quantitative restrictions, first for non-competing imports but later on even for final goods. Only fifteen of thirty-six analyzed trade reforms were fully sustained, nine were partially sustained and the rest collapsed. Small, resource-poor countries tend to sustain trade liberalization program much better than large, resource-rich countries. Real currency devaluation favoured the sustainability of liberalization episodes. Accompanying restrictive monetary and fiscal macroeconomic policies were important for the sustainability of liberalization episodes.	Trade liberalization by a quick, non-gradualist approach. Relaxation of quantitative restrictions and reduction of tariffs on exports and imports. Stabilization and devaluation of the real currency. Restrictive monetary and fiscal macroeconomic policies. Trade liberalization of the goods marked should precede liberalization of the capital markets to avoid real currency appreciations. Convergence of the tariff system to an uniform tariff. Export promotion will not be necessary, if imports restrictions are relaxed and a real currency devaluation is implemented.

Helleimer et al. (1992): Trade policy, Industrialization and Development / World Institute for Development Economics and Research - United Nations University	Industry level studies: Brazilian aircraft; Korean semiconductor industry; Argentinean, Mexican, Korean, Canadian automobile industries	industry specific	Historical experiences of industrialized countries suggest that government interventions in trade and other spheres may sometimes assist efficient industrialization and development processes. There are empirical hints that learning effects, scale economies, market structure, externalities and institutional influences may play an important role, as suggested by the New Trade Theory. However, the empirical evidence is ambiguous: While significant learning externalities are found in Brazilian civil aircraft industry, the market success of private Korean semiconductor industry, that has not been subsidized by government, shows that entry barriers may be not to high for nonsubsidized private firms - even on oligopolistic high-tech markets with significant learning effects. Import substitution policy for the automobile industries of Argentina, Mexico, Korea and Canada appears to have been successful only in Korea.	No recommendations, further research has to be undertaken.
Nicholas (1992): Foreign Trade and economic reform in China 1978-1990 / Joint Committee on Chinese Studies of the American Council of Learned Societies, Social Science Research Council, Henry M. Jackson School of International Studies, Institute of Economics of the Chinese Academy of Social Sciences	China	1978-1990	China's opening to the world economy had significantly contributed to its acceleration of economic growth. The foreign trade reform, that started 1976, after a long history of autarkic import substitution regimes and holds on up to the present, was characterized by a dezentralization of foreign trade authority, strong devaluation of the real exchange rate, relaxation of exchange control via the establishment of foreign exchange markets, shrinkage of the foreign trade plan and opening for foreign direct investment. The trade reform was accompanied by domestic economic reforms, namely a smooth but steady liberalization of prices, dezentralization of production decision to local authorities, establishing the right for private investments. The trade reform led to the birth of thousands of small and medium sized entrepreneurial firms and to a significant inflow of foreign direct investment that spurred technological knowledge transfers, whilst many of the state-owned former import substitution industries stagnated or shrinked. Some of them are no longer viable without government subsidies.	In a centrally planned economy as China, a foreign trade reform has to be accompanied by domestic reforms - especially by an implementation of viable domestic factor markets, dezentralization of economic decision making, establishment of the right for private investments. The adoption of the domestic price system to world marked prices should be gradually accomplished. To complete the Chinese foreign trade reform, viable financial and labour markets should be established, the subsidization of noncompetitive former import substitution industries should be stopped and the state-run programs of export promotion should be reduced.

World Bank (1993): The East Asian Miracle	Hong Kong Indonesia Japan Korea Malaysia Singapore Taiwan Thailand	1965-1990	The main reasons of the high growth performance of the East Asian countries have been high private investments and rapidly growing human capital, both of which have been made possible by an economic policy that set the right framework: Stable macroeconomic policies, increase of the efficiency of the banking system, establishment of a successful primary and secondary education system, openness to foreign ideas and technology, outward oriented trade policies. Governments systematically and through many channels intervened in markets. These interventions did in general not succeed in prompting specific industries. Yet, they may have worked in certain situations by mildly repressing financial markets in order to direct credits for investments.	Getting the fundamental economic framework right: Stable macroeconomic policies, outward oriented trade policies, improvement of the financial sector in order to spur savings and investments, implementation of a public education system to lay the foundation for human capital accumulation, acquisition of technology through openness to foreign direct investments and licensing. Interventions as industrial policy and financial repression will only work under very restrictive circumstances that may not be given in most developing countries.
Helleimer et al. (1994): Trade Policy and Liberalization in Turbulant Times / World Institute for Development Economics and Research - United Nations University	Bangladesh Brazil Colombia India Korea Mexico Thailand Turkey Chile Kenya Malaysia Peru Sri Lanka Tanzania	country specific	Compared to other policies (macroeconomic stabilization policy, industrial policy, technology policy) trade policy has not played a dominant role with respect to the growth performance of the study countries. Most of the countries switched from an import substitution regime to an export promotion regime in course of the 1970s. This policy change was mainly characterised by a reduction of quantitative restrictions and an implementation of export subsidies. However, neither import liberalization nor export expansion is significantly assoziated with total factor productivity growth. Instead, it appears that weak productivity performers had overvalued and unstable real currency exchange rates, increasing inflation rates and overall macroeconomic instability.	Policies that are appropriate for any particular time or place clearly depend upon initial conditions and constraints, and the capacity of governments to efficiently implement them. The strongest case for liberalized and neutral trade policies rests on the risk that discretionary economic policy may become a captive of economic interests. In general there are many routes to industrial expansion, productivity growth and successful manufacturing for export. Government policies that have worked include exchange rate policies, various kinds of direct and indirect export subsidies and various industrial policies, including selective interventions.

Table A5 - Statistical tests on export growth and per capita GDP growth

Study	Sample	Period	Argued Improvement	Estimated equation	Results	Other Tests
Emery (1967)	50 less, middle and high income countries	1953-63	—	$\hat{Y} = \beta_o + \beta_1 \hat{X}$	β_1 is positive and significant	—
Michaely (1977)	41 low and middle income countries with a threshold level of $(Y/P)_{1972} = 300\$$.	1950-73	Deels more critical with the export-led-growth hypothesis by using GDP export share growth instead of export growth as explanative variable.	Spearman rank correlation test of $(\hat{X}/Y)$ and $\hat{Y}$.	$cor\left((\hat{X}/Y),\hat{Y}\right) = 0{,}38$ and significant.	$cor\left((\hat{X}/Y),\hat{Y}\right) = 0{,}523$ and significant for 23 countries with $(Y/P)_{1972} > 300\$$, $cor\left((\hat{X}/Y),\hat{Y}\right) = -0{,}04$ and insignificant for 18 countries with $(Y/P)_{1972} < 300\$$, $cor\left((\hat{X}/Y),\hat{Y}\right) = -0{,}326$ and significant.
Balassa (1978)	10 LDCs	1860-66 1966-73	Adding more explanatory variables	$\hat{Y} = \beta_o + \beta_1 (I_D/Y) + \beta_2 (I_F/Y) + \beta_3 \hat{L} + \beta_4 \hat{X}$	β_4 is positive and significant	Spearman rank correlation tests between exports and output growth. All rank correlations are positive and significant.
Tyler (1981)	55 middle income LDCs. Eliminating those with income per capita $(Y/P) < 300\$$.	1960-77	1. Less restrictive sample of countries 2. No selection bias with respect to Balassa's studies.	$\hat{Y} = \beta_0 + \beta_1 (I/Y) + \beta_2 \hat{L} + \beta_3 \hat{X}$	β_3 is positive and significant for the whole sample. β_3 is also positive and significant when 6 OPEC countries are excluded.	Pearson and Spearman rank correlations between $\hat{Y}$ 1. manufacturing output 2. domestic investment 3. export growth rate 4. manufactured export growth rate. All rank correlations are positive and significant.
Feder (1982)	19 middle income countries and 31 middle income countries	1964-73	Distinguishes between factor productivity differential and externality effects of EP policies in a two-sector model.	1) $\dot{Y} = \beta_1 (I/Y) + \beta_2 \hat{L} + \beta_3 \hat{X} \cdot (X/Y)$ 2) $\dot{Y} = \gamma_1 (I/Y) + \gamma_2 \hat{L} + \gamma_3 \hat{X} \cdot (X/Y) + \gamma_4 \hat{X}$	1. β_3 is positive and significant. Introduction of exports as explanatory variable increases the $\bar{R}^2$. 2. γ_4* is positve and significant.	Extension of regression of (1) for 17 developed countries reveals that γ_3 is significant but not γ_4.

Kavoussi (1984)	73 low and middle income LDCs with a threshold level of $(Y/P)_{1960} = 360\$$.	1960-78	Examination whether the positive correlation $\hat{X}$ and $\hat{Y}$ also holds for low income countries.	1) $\hat{Y} = \beta_0 + \beta_1\hat{K} + \beta_2\hat{L} + \beta_3\hat{X}$ 2) $\hat{Y} = \alpha_0 + \alpha_1\hat{K} + \alpha_2\hat{L} + \alpha_3\hat{X} + \alpha_4(\hat{X_m/X})$	1. β_3 is positive and significant for the whole sample and for both subsamples. Twice as large for middle-income than for low-income countries. 2. α_4 is not significant for the sample as a whole. For the middle-income group: α_3 negative and not significant α_4 positive and significant. For low income groups: opposite results.	Spearman rank correlations between $\hat{X}$ and $\hat{Y}$ for 1. The whole sample (positive and significant) 2. The two subsamples (for the middle income stronger than for the low income group). 3. Excluding countries where $(X_m/X) > 44\%$ reduces the significance of the middle income group.
Ram (1985)	73 low and middle income LDCs with a threshold level of $(Y/P)_{1977} = 300\$$.	1960-70 1970-77	1. Avoid selection bias. 2. Test fo absence of simultaneity bias.	$\hat{Y} = \beta_0 + \beta_1(I/Y) + \beta_2\hat{L} + \beta_3\hat{X} + \beta_4 D$ D ≡ low income dummy.	β_3 is positive and significant in all cases. Larger in the second subperiod and lower for the low-income countries.	White's test is performed to check for homoskedasticity of disturbances and simultaneity bias.
Balassa (1985)	43 DCs including LDCs and NICs.	1973-79	Analysis of post oil crisis data.	1. $\hat{Y} = \beta_0 + \beta_1(S_d/Y) + \beta_2(S_p/Y) + \beta_3\hat{L} + \beta_4\hat{X} + \beta_5(Y/P) + \beta_6(X_m/X)$ 2. $\hat{Y} = \beta_0 + \beta_1\hat{L} + \beta_2(I/Y) + \beta_3(X/Y)\hat{X}$	1. β_6 is positive and significant in both specifications. 2. The Feder (1982) specification delivers a higher significance of β_4.	Addition of explanatory variables that capture trade orientation (deviation of actual from hypothetical per capita exports) and policy responses. The export growth coefficient stays positiv and significant.
Ram (1987)	54 middle income and 34 low income LDCs with a threshold level of $(Y/P)_{1960} = 200\$$.	1960-72 1973-82	1. Comparison of time series analysis results with cross country analysis results. 2. Comparison of the Ram (1985) - regressions with the Feder (1983) - regressions.	1. $\hat{Y} = \beta_0 + \beta_1\hat{L} + \beta_2(I/Y) + \beta_3\hat{X}$ 2. $\hat{Y} = \gamma_0 + \gamma_1\hat{L} + \gamma_2(I/Y) + \gamma_3(X/Y)\hat{X}$	1. Time series analysis: F-statistics are significant for about 70% of all countries. β_3 is positive in 80% and positive and significant in 40% of all countries. High variability of β_3 over different countries. 2. Cross country analysis: F-statistics are significant. β_3 positive and in most cases significant. 3. Both specifications of the regression equation provide similar results.	—
Helpman/ Tratzen-burg (1988)	76 countries	1965-84	Completion of the Feder (1982) model for additional variables: inflation rate, ratio of government expenditures to GDP and a dummy for oil exporting countries.	$\hat{Y} = \beta_0 + \beta_1 D + \beta_2(I/Y) + \beta_3(I/Y)D + \beta_4\hat{L} + \beta_5\hat{X}(X/Y) + \beta_6\hat{X}(X/Y)D + \beta_7\pi + \beta_8\pi D + \beta_9(G/Y) + \beta_{10}D_{OIL}$	β_5 is positive and significant. β_6 is positive and significant. The three additional variables do not alter the result but lead to higher β_5 values.	—

Kader (1988)	60 DCs	1970-81	Control for the simultaneous bias caused by the identification problem that GDP growth and export growth were jointly determined by the same variables.	Two-stage least square estimation. 1st stage: $\hat{X} = \alpha_0 + \alpha_1 Y + \alpha_2 P + \alpha_3 (X_m / X)$ 2nd stage: $\hat{Y} = \beta_0 + \beta_1 \overline{X} + \beta_2 \hat{L} + \beta_3 (I/Y)$, where $\overline{X}$ = 1st stage estimated value of $\hat{X}$.	β_1 is positive and significant, i.e. there is no severe simultaneous bias.	—
Moschas (1989)	71 developing countries	1970-80	Maximum likelihood estimation of a critical per capita income level that changes the growth regime of the countries.	$\hat{Y} = \beta_0 + \beta_1 \hat{X} + \beta_2 \hat{L} + \beta_3 (I/Y)$	1. No threshold level of per capita income is found, where the effect of export growth alone on GDP growth differs. 2. A threshold level of per capita income is found, where the effect of $\hat{X}$, $\hat{L}$ and $\hat{K}$ together in GDP growth differs. 3. β_1 positiv and significant in both income clusters, yet larger in the low income cluster.	—
Chen/ Tang (1990)	Taiwan two-digit industry level data	1968-82	Separating the economies-of-scale-effect of export growth from other effects of export growth.	$T\hat{F}P = \beta_0 + \beta_1 \hat{Y} + \beta_2 \hat{X} + \beta_3 Y$	In all but one industry β_2 is positive but not significant. In 10 out of 16 industries β_1 is positive and significant. In all but one industry β_3 is positive but not significant.	—
Perraton (1990)	21 lower income LDCs 52 upper income LDCS	1960-86	Testing for different causal links between income growth and export growth.	1) $\hat{Y} = \beta_0 + \beta_1 \hat{L} + \beta_2 (I/Y) + \beta_3 \hat{X}$ 2) $(\hat{Y - X}) = \alpha_0 + \alpha_1 \hat{X}$ 3) $\hat{Y} = \gamma_0 + \gamma_1 \hat{L} + \gamma_2 (I/Y) + \gamma_3 (\hat{X}/\hat{Y})$	β_3 is positive and significant for the whole sample but larger for the upper income group. α_1 is positive but insignificant at the ten per cent level for the whole sample. γ_3 is positive and significant for the whole sample.	Adding a dummy variable for the World Bank (1987) trade regime classification for equation (1) and (3) leads to an insignificant dummy coefficient.
Sheehey (1990)	36 LDCs	1960-70	Testing for the explanatory power of other components of GDP (final use and industrial origin).	1) $\hat{Y} = \beta_0 + \beta_1 (I/Y) + \beta_2 \hat{L} + \beta_3 \hat{Z}$ 2) $\hat{Y} = \beta_0 + \beta_1 (I/Y) + \beta_2 \hat{L} + \beta_3 (Z/Y) \hat{Z}$ Z= Exports, consumption, government consumption, private consumption, investment, value added agriculture, value added manufacturing, value added construction, value added electricity/gas/water, value added services	β_3 is positive and significant for all components of GDP.	Spearman rank correlation tests between $\hat{Z}$ and $\hat{Y}$. All correlation coefficients are positive and significant if $\hat{Y}$ is total GDP growth. If the rank correlation between $\hat{Z}$ and $(Y - Z)$ is determined all but three coefficients are not significant.

Park (1992)	18 Latin American LDCs 51 other LDCs, 28 African LDCs.	1970-86	Extension of previous studies.	1) $\hat{Y} = \beta_0 + \beta_1\hat{L} + \beta_2\hat{I} + \beta_3\hat{X}$ 2) $\hat{Y} = \beta_0 + \beta_1\hat{L} + \beta_2(I/Y) + \beta_3\hat{X}$	In all but one case (other LDCs, 1970-81) β_3 is not significant for both equations.	Division of the sample into 2 subsamples of good export performers ($\hat{X} > 5{,}9\%$) and bad export performers ($\hat{X} < 5{,}9\%$). In all but one case [bad export performers, 1960-70, equation (2) and bad export performers, 1970-81, equation (1) and (2)] β_3 is positive but not significant.
Kwasi Fosu (1992)	35 African LDCs, 30 other LDCs	1970-86	Controlling for export instability.	1) $\hat{Y} = \beta_0 + \beta_1(I/Y) + \beta_2\hat{L} + \beta_3\hat{X} + \beta_4 INST$ where $INST = \min\left(\sum_{t=1}^{T}(X_t - \overline{X}_{it})/T\right)^{0.5}$, $\overline{X}_{1t}$=linear trend, $\overline{X}_{2t}$=quadratic trend, $\overline{X}_{3t}$=exponential trend. 2) $\hat{Y} = \beta_0 + \beta_1\hat{K} + \beta_2\hat{L} + \beta_3\hat{X}$	β_3 is positive and significant. β_4 is always negative but significant only for Non-African LDCs.	—
Kugler (1992)	USA, Japan, Switzerland, West Germany, United Kingdom, France	1970-87	Johansen Test for integration.	$dZ_t = a + \sum_{i=1}^{k-1}\Gamma_i dZ_{t-i} + \Gamma_k Z_{t-k}$ $Z_t = (Y_t, C_t, I_t, X_t)$	Exports cannot be excluded without destroying the cointegrating relationships for all countries with the exception of West Germany and France.	—
Marin (1992)	USA, Japan, West Germany, United Kingdom	1960-87	Alternative test procedures for cointegration: (1) Durbin Watson test, (2) Dickey-Fuller Test: $du_t = u_{t-1} + \varepsilon_t$, (3) Augmented Dickey-Fuller Test: $du_t = u_{t-1} + \sum_{i=1}^{4}\beta_i du_{t-j} + \varepsilon_t, \varepsilon \sim N(0,\sigma)$, cointegration implies $u_t \sim I(0)$.	1) $u_t = X_t - \beta_1(y_m / e_m) - \beta_2 tot - \beta_3 q$ 2) $u_t = X_t - \beta_1(y_m / e_m) - \beta_2 tot$ 3) $u_t = X_t - \beta_1(y_m / e_m) - \beta_2 q$ 4) $u_t = X_t - \beta_1(y_m / e_m)$	$(X_t, y_m / e_m)$ not cointegrated $(X_t, y_m / e_m, tot)$ positively cointegrated $(X_t, y_m / e_m, tot, q)$ positively cointegrated. No matter what cointegration test procedure is chosen.	—

Sprout/ Weaver (1993)	72 LDCs	1970-84	Test of a simultaneous equations model explaining GDP-growth, the share of capital investment in GDP and export growth rsp. growth of the export share to GDP. Control for the different structure of export trade.	1) $\hat{Y} = \beta_0 + \beta_1 (I/Y) + \beta_2 \hat{L} + \beta_3 \left[\hat{X} \text{ or } (\hat{X} - \hat{Y}) \right]$ 2) $(I/Y) = \alpha_0 + \alpha_1 (\hat{Y} - \hat{P}) + \alpha_2 \hat{y} + \alpha_3 (X/Y) + \alpha_4 (C/Y)$ 3) $\left[\hat{X} \text{ or } (\hat{X} - \hat{Y}) \right] = \gamma_0 + \gamma_1 \hat{Y} + \gamma_2 PC + \gamma_3 TG + \gamma_4 TC + \gamma_5 TS$	β_3 is positive and significant no matter whether $\hat{X}$ or $(\hat{X} - \hat{Y})$ is choosen. α_3 is positive and significant.	—
Green-away/ Sapsford (1994)	14 DCs	1957-85 (max.)	1. Taking care of growth accounting effects. 2. Time series analysis instead of cross country.	1) $\hat{Y} = \alpha_0 + \alpha_1 \hat{X} + \alpha_2 (I/Y) + \alpha_3 \hat{L}$ 2) $\hat{N}^* = \beta_0 + \beta_1 \hat{X} + \beta_2 (I/Y) + \beta_3 \hat{L}$ 3) $\hat{N}^* = \gamma_0 + \gamma_1 (X/Y) \hat{X} + \gamma_2 (I/Y) + (L/Y) \hat{L}$ with $\hat{N}^* = (\hat{Y} - \hat{X}) \frac{X-Y}{Y}$	α_1 is positive for 10 countries out of a sample of 14 countries, but in no case significant. β_1 is positive for 3 countries out of a sample of 14 countries but significant only in a case with a negative sign. γ_1 is positive for 2 countries out of a sample of 14 countries but significant only in two cases with a negaive sign.	—

Notes: $\hat{y}$ = real growth rate of per capita GDP, $\hat{Y}$ = real growth rate of GDP, $\hat{X}$ = real growth rate of exports, $\hat{L}$ = growth rate of labour force, $\hat{K}$ = growth rate of capital stock, I/Y = ratio of investments to GDP, I_D = domestic investments, I_F = foreign investments, X/Y = ratio of exports to GDP, TFP = total factor productivity, $\hat{X}_m$ = real growth rate of manufactured exports, A = country area, Y = real GDP, C = real consumption, I = real investment, X = real exports, $(S_d/Y) = \sum_{t=1973}^{1978} (I_t + X_t - M_t)/Y_{1973}$, $(S_f/Y) = \sum_{t=1973}^{1978} (X_t - M_t)/Y_{1973}$, $T = time$, x = log of real exports, X_m = real manufactured exports, y_m = log of manufacturing output, e_m = log of manufacturing employees, tot = log of terms of trade, q = log of real OECD output, TOT = terms of trade, Y/P = per capita real GDP, $(M - X)/Y$ = ratio of net exports of goods and services to GDP, $PC_i = \hat{e}_i - \hat{P}_i + \sum_j^4 w_{ij} (\hat{P} - \hat{e})_j$ = indicator of price competitiveness, $\hat{e}$ = percentage change of the exchange rate, $\hat{P}$ = inflation rate measured by Consumer Price Index, j = 1,...,4 = the four leading trade partners of country i, $w_{ij} = X_{ij}/\sum_j^4 X_{ij}$, $TG_i = \sum_j^5 w_{ij} \hat{Y}_j$ = indicator of trade partner growth rates of country i, j=1,...,5, the five leading trade partners, $TC = \sum_j^3 X_{ij}/X_i$ = indicator of trade partner concentration, j=1..3 = the three leading partners, TS = ((primary sector exports)/X) + ((sum of the two leading export commodity exports))/X = indicator of trade structure composition, π = inflation rate measured by the overall GDP deflator. D = dummy for the period from 1973-84, D_{oil} = dummy for oil exporting countries, G = real government expenditures.

Table A6 - Causality tests on export growth and per capita GDP growth

Study	Sample	Period	Type of causality-test	Estimated equations	Number of countries with significant relationships (a)			Number of countries with no significant relationships
					Export induced causality	GDP induced causality	Bilateral export/GDP causality	
Jong/ Marshall (1985)	37 LDCs	1950-81	Granger causality test. Residual whitening lag-structure	1) $\hat{X}_t = \sum_{i=1}^{m} \beta_i \hat{X}_{t-1} + \sum_{j=1}^{n} \beta_j \hat{Y}_{t-j}$ 2) $\hat{Y}_t = \sum_{i=1}^{r} \beta_i \hat{Y}_{t-1} + \sum_{j=1}^{s} \beta_j \hat{X}_{t-j}$	Positive causality: 4 Negative causality: 4	Positive causality: 5 Negative causality: 1	Negative export and negative GDP causality: 1	23
Hutchinson/ Singh (1987)	34 LDCs	1950-85	Granger causality test.	1) $\hat{X}_t = \sum_{i=1}^{m} \beta_i (dI/Y)_{t-1} + \sum_{j=1}^{n} \beta_j (\hat{Y} - \hat{X})_{t-j} + \sum_{k=1}^{p} \beta_k \hat{X}_{t-k}$ 2) $\hat{Y}_t - \hat{X}_t = \sum_{i=1}^{r} \beta_i (dI/Y)_{t-1} + \sum_{j=1}^{s} \beta_j (\hat{Y} - \hat{X})_{t-j} + \sum_{k=1}^{u} \beta_k \hat{X}_{t-k}$	Positive causality: 10 Negative causality: 3	Positive causality: 3 Negative causality: 3	—	18
Chow (1987)	8 NICs	1960-80	Sim causality test. Arbitrarily determined lag structure.	1) $\hat{Y}_{m,t} = \sum_{i=1}^{6} \hat{X}_{t-3+1}$ 2) $\hat{Y}_{m,t} = \sum_{i=1}^{3} \hat{X}_{t-1}$ 3) $\hat{X}_t = \sum_{i=1}^{6} \hat{Y}_{m,t-3+i}$ 4) $\hat{X}_t = \sum_{i=1}^{3} \hat{Y}_{m,t-i}$	Positive causality: 1	—	Positive export and positive GDP causality: 1	6

Hsiao (1987)	South Korea Taiwan Hong Kong Singapore	1960-82 1960-82 1961-82 1966-82	Comparison of the results of Sims and Granger causality tests. Arbitrarily determined lag structure.	Granger test: 1) $X_t = \sum_{i=1}^{3} \beta_i Y_{t-i} + \sum_{i=1}^{3} \beta_i X_{t-i}$ 2) $Y_t = \sum_{i=1}^{3} \beta_i Y_{t-i} + \sum_{i=1}^{3} \beta_i X_{t-i}$	—	Negative causality: Hong Kong	—	3
				Sims test: 1) $Y_t = \sum_{i=0}^{6} \beta_{t+3-i} X_{t+3-i}$ 2) $X_t = \sum_{i=0}^{6} \beta_{t+3-i} Y_{t+3-i}$ (level variables!)	—	Negative causality: Hong Kong	Negative export and positive GDP causality: South Korea, Singapore. Positive export and positive GDP causality: Taiwan.	—
Kunst/ Marin (1989)	Austria	1965-85	Granger causality test. Akaike information criterion determined lag structure.	1) $dX_t = \sum_{i=1}^{m} \beta_i dX_{t-1} + \sum_{j=1}^{n} \beta_j dY_{t-j} + \sum_{k=1}^{p} \beta_k dQ_{t-k} + \sum_{\ell=1}^{q} \beta_\ell dTOT_{t-\ell}$ 2) $dY_t = \sum_{i=1}^{r} \beta_i dX_{t-1} + \sum_{j=1}^{s} \beta_j dY_{t-j} + \sum_{k=1}^{u} \beta_k dQ_{t-k} + \sum_{\ell=1}^{v} \beta_\ell dTOT_{t-\ell}$	—	1	—	—

Sung-Chen/ Biswas/ Tribedy (1990)	Japan Korea Taiwan	1957-87 1960-84 1961-84	Granger causality test. Controlling for cointegration by detrending. Akaike information criterion determined lag structure.	See Marin (1992).	—	Positive causality: 1	Positive export and negative GDP causality: 1 Positive export and positive GDP causality: 1	—
Marin (1992)	Germany United Kingdom United States Japan	1960-87	Granger causality test. Controlling for cointegration by detrending and inclusion of an error-correction term. Baysian information criterion determined lag structure.	1) $dx_t = \sum_{i=1}^{m} \beta_i dx_{t-1} + \sum_{j=0}^{s} \beta_j d(Y_m / L_m)_{t-j}$ 2) $dy_t = \sum_{i=0}^{r} \beta_i dx_{t-1} + \sum_{j=1}^{s} \beta_j d(Y_m / L_m)_{t-j}$	Positive causality: 1 Negative causality: 2	—	Negative export and positive (Y_m / L_m) causality: 1	—
Dodaro (1993)	87 LDCS	1967-86	Granger causality test.	See Jong/Marshall (1985)	Positive causality: 4 Negative causality: 4	Positive causality: 9 Negative causality: 3	Positive export and positive GDP causality: 2 Positive export and negative GDP causality: 1	72

Notes: $\dot{Y}$ = real growth rate of GDP, $\dot{X}$ = real growth rate of exports, dX = first difference of real GDP, dY dY dY = first difference of real exports, dQ = first difference of total OECD-GDP, $dTOT$ = first difference of terms of trade, P = population. Y_m = value added manufacturing, L_m = labor force manufacturing.
(a) At least at the 10 percent level.

Table A 7 - Statistical tests on trade regime characteristics indicators and per capita GDP growth

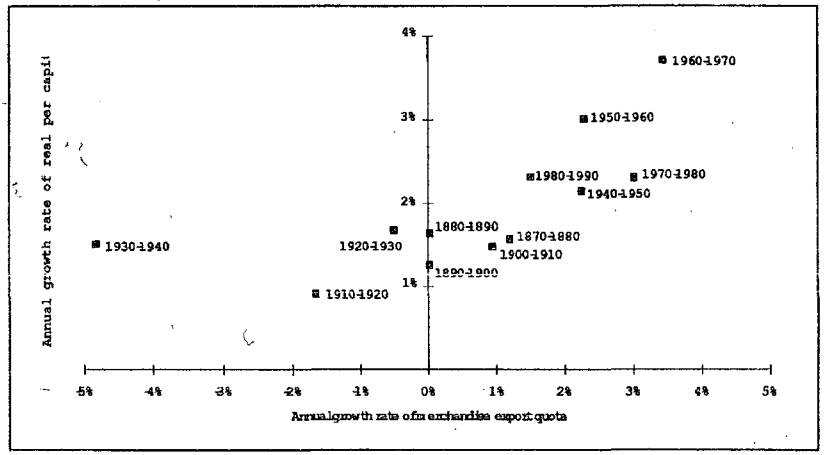
Study	Sample	Period	Trade regime indicator	Estimated equations	Results	Other Tests
Heitger (1986)	All available	1950-80 (max.)	$\tau_j = \ln(X/Y) - \overline{\alpha}_0 - \overline{\alpha}_1 \ln(Y)$	1) $\hat{y} = \beta_0 + \beta_1(y/y^*) + \beta_2 LIT + \beta_3(I/Y) + \beta_4\tau$ 2) $(I/Y) = \gamma_0 + \gamma_1\tau$	β_1 = -0,04 significant β_2 = 0,02 significant β_3 = 0,15 significant β_4 = -0,17 insignificant γ_1 = 7,42 significant	
			$\tau_j = ERP_j$	1) $\hat{y} = \beta_0 + \beta_1(y/y^*) + \beta_2 LIT + \beta_3(I/Y) + \beta_4\tau$ 2) $\hat{y} = \gamma_0 + \gamma_1(y/y^*) + \gamma_2 LIT + \gamma_3(I/Y) + \gamma_4\sigma(\tau)$	β_1 = -0,04 significant β_2 = 0,02 significant β_3 = 0,18 significant β_4 = -0,51 significant γ_1 = -0,04 significant γ_2 = 0,02 significant γ_3 = 0,18 significant γ_4 = -0,42 significant	
Edwards (1992)	30 DCs	1970-82	$\tau_j = \sum^{1-80}\left(\lvert X_{ij} - \overline{X}_{ij}\rvert - \lvert M_{ij} - \overline{M}_{ij}\rvert\right)/Y_j$ $\overline{X}_{ij} = \sum_k^{K=9} \overline{\alpha}_{kj} r_{ki}$ $\overline{M}_{ij} = \sum_k^{K=9} \overline{\alpha}_{kj} r_{ki}$ r_{ki} = resource endowment (capital, three types of labour, four types of land, oil) of country j	$\hat{y} = \beta_0 + \beta_1(I/Y) + \beta_2 Y_{1970} + \beta_3\tau$	β_1 = 0,282 significant β_2 = -0,12 significant β_3 = 2,004 significant	Regressions based on a set of alternative trade regime indicators: Average black market premium, coefficient of variation of the black market premium, index of relative price distortions, average import tariff, average non-tariff barriers coverage, index of effective rates of protection, World Bank (1987) outward orientation index. With exception of the effective exchange rate, all indicators have significant coefficients and imply that less restrictive trade regimes cause higher growth rates.
Dollar (1992)	95 LDCs	1976-85	$\tau_j = P_j / P^* e_j - \overline{\alpha}_0 - \overline{\alpha}_1 Y_j$	$\hat{y} = \beta_0 + \beta_1(I/Y) + \beta_2\tau + \beta_3(\text{var}(\tau)/E(\tau))$	β_1 = 0,14 significant β_2 = 0,17 significant β_3 = 0,08 significant	All possible combinations of the three regressors plus a dummy for African countries. The result for the coefficients of τ and var(τ) are robust.

Levine/ Renelt (1992)	119 countries (major oil exporters excluded)	1960-89	$\tau_j = X / Y$	$\hat{y} = \beta_0 + \beta_1 (I/Y) + \beta_2 y_{1960} + \beta_3 \hat{P} + \beta_4 SEC + \beta_5 \tau + \gamma Z$	β_5 = 0,99 insignificant for Z = (G/Y, π, $\sigma(\hat{c})$) β_5 = 0,88 insignificant for Z = (0, 0, 0) β_5 = 0,14 insignificant for Z = ($\hat{c}$, π, $\sigma(\hat{c})$)	Same procedure with (I / Y) as dependent variable shows that (X / Y) and LEAM1 are positive and significant no matter what Z-vector is chosen.
		1974-89	$\tau_j = \sum_{i=1}^{i=183} \left(\lvert X_{ij} - \overline{X}_{ij} \rvert - \lvert M_{ij} - \overline{M}_{ij} \rvert \right) / Y_j$ (see Edwards (1992))		β_5 = -0,08 significant for Z = (G/Y, π, REV) β_5 = 1,01 significant for Z = (0, 0, 0) β_5 = -2,03 significant for Z = (D/Y, π, REV)	
		1960-89	$\tau_j = M / Y$		β_5 = 1,27 insignificant for Z = (G/Y, π, $\sigma(\hat{c})$) β_5 = 0,56 insignificant for Z = (0, 0, 0) β_5 = -1,11 insignificant for Z = (D/Y, π, $\sigma(\hat{c})$)	

Notes: P^* = CPI-index of the USA, e_j = nominal exchange rate of country j currency to US-dollar, y^* = per capita GDP of the USA, LIT = adult literary rate, ERP_j = average effective rate of protection of country j (definition see equation (1) section 1.3.), var(X) = variance of X, $\sigma(X)$ = standard deviation of X, $E(X) = \left(\sum_{t}^{T} X_t \right) / T$, $\hat{P}$ = growth in population, SEC = secondary school enrollment rate, G = government expenditures, π = average inflation rate, $\hat{c}$ = domestic credit growth, REV = index for the number of revolutions and coups, D = central government deficit, all other variables see Table 4.

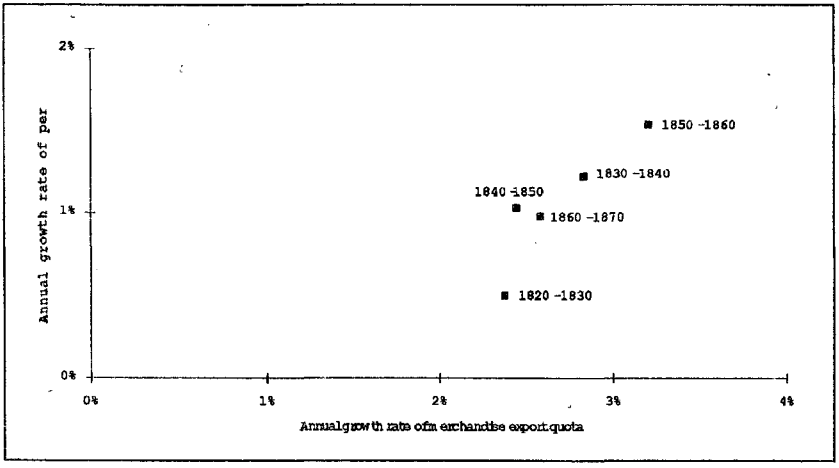
FIGURES

Figure A1 - Annual growth rate of per capita GDP (in PPP US-$ of 1985) and quota of merchandise exports in GDP of 16 early industrializing countries[1] 1870-1990



[1] Austria, Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Sweden, United, Kingdom, United States.

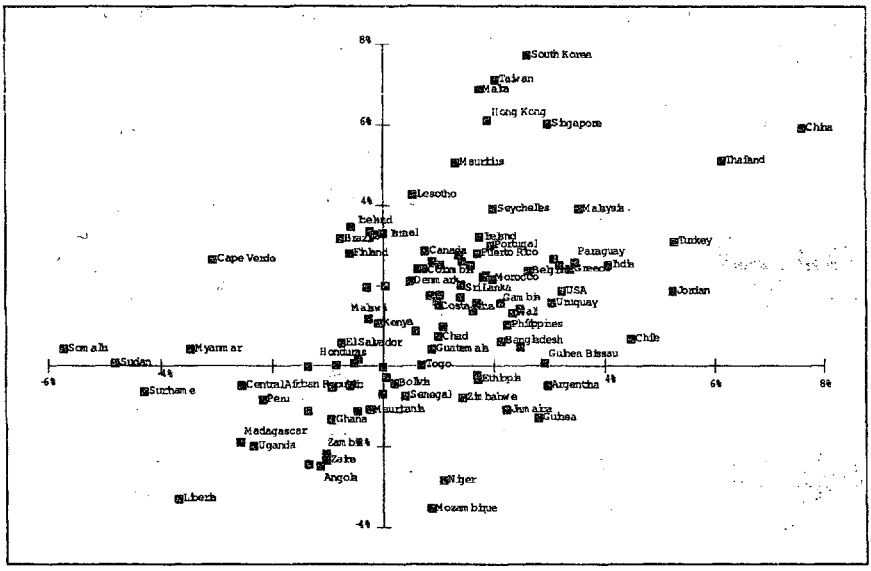
Figure A2 - Annual growth rate of per capita GDP (in PPP US-$ of 1985) and quota of merchandise exports in GDP of 16 early industrializing countries[1] 1820-1870



[1] Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, United Kingdom, United States.

Source: Maddison (1992)

Figure A3 - Average annual growth rate of real per capita GDP and trade quota[1] of 117 countries from 1970-1990

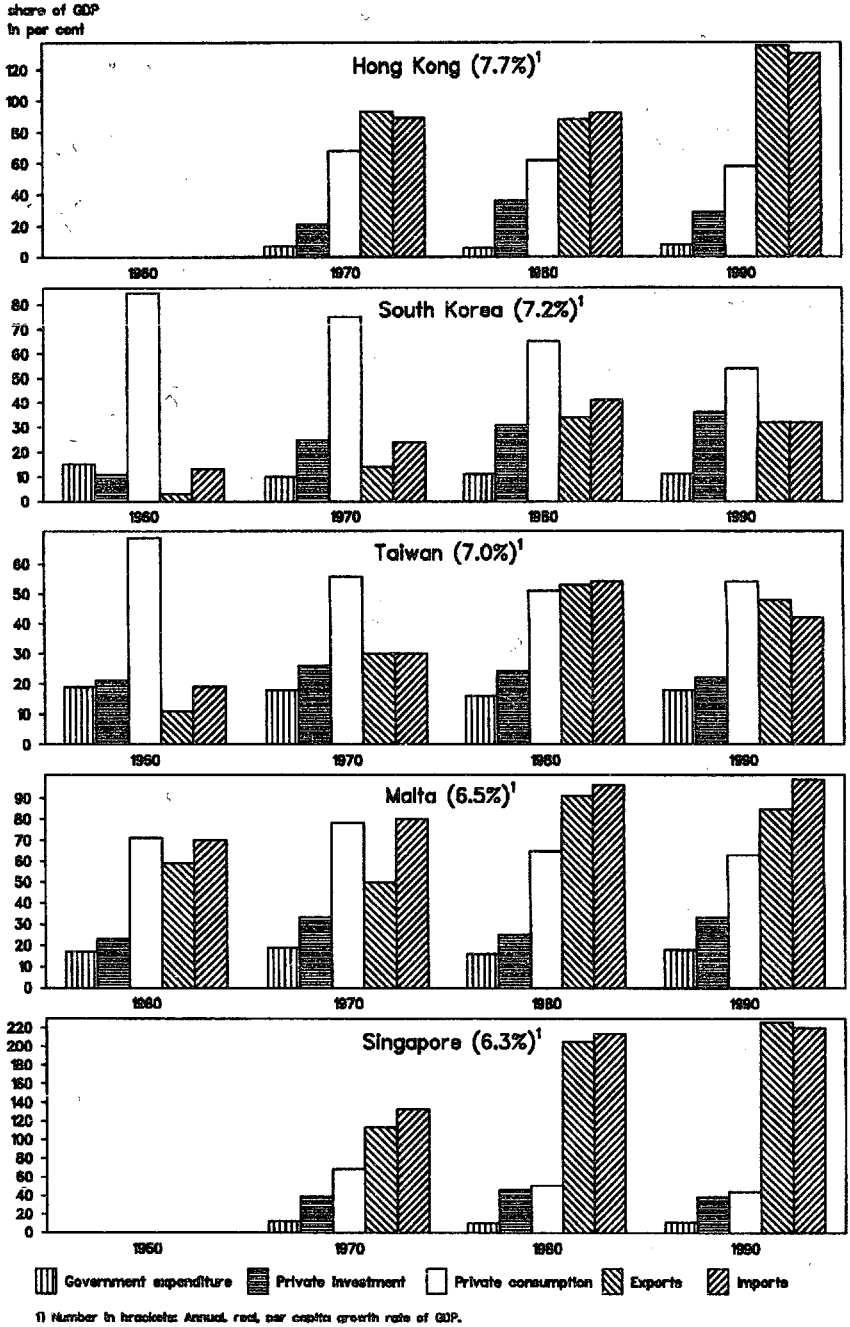


[1] Trade quota = share of total exports plus total imports in GDP

[2] Oil exporting countries as defined by UNCTAD (1992) are excluded (though they do not alter the graph and the strength of correlation).

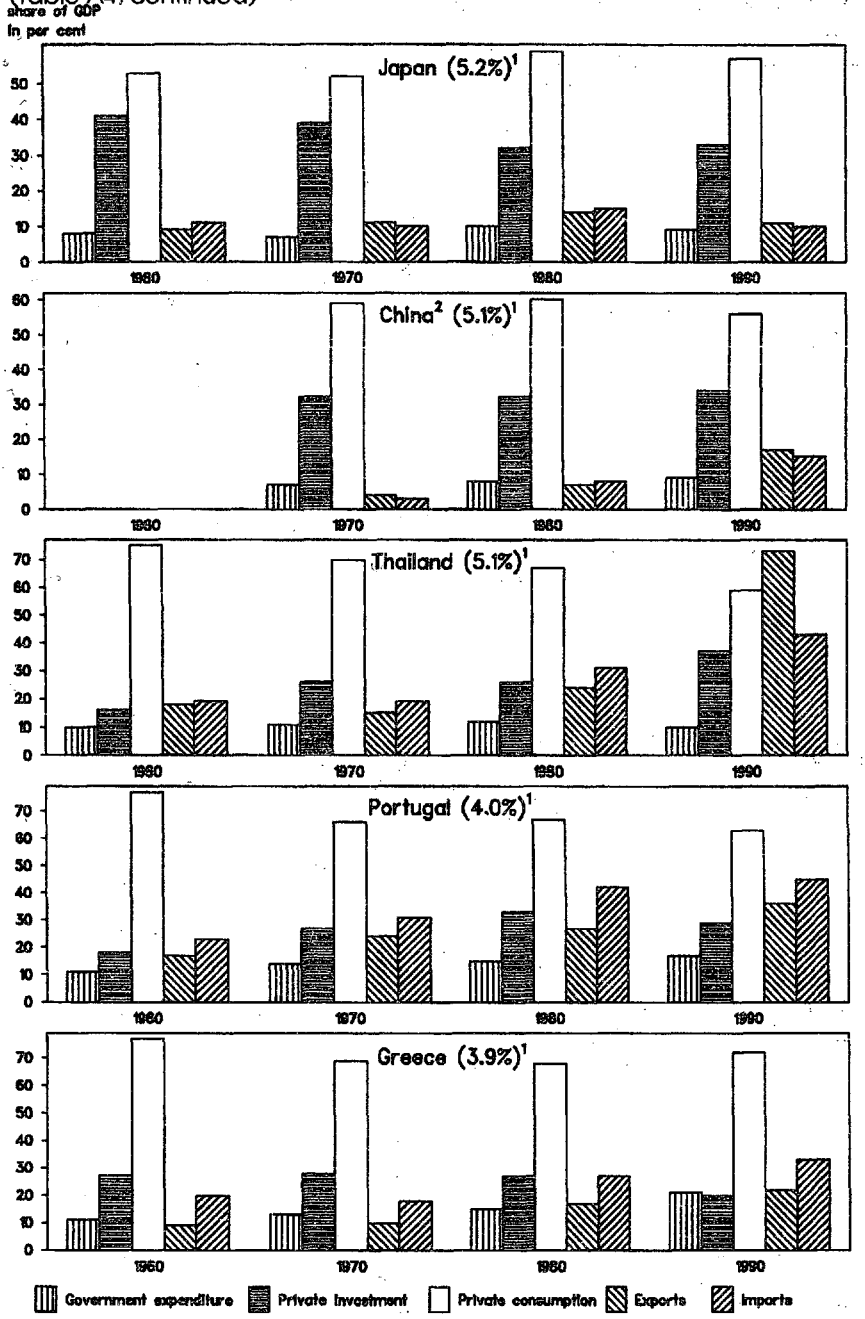
Source: UNCTAD (1992)

Figure A4 - Structural change of GDP of the ten best growth performing countries 1960-90



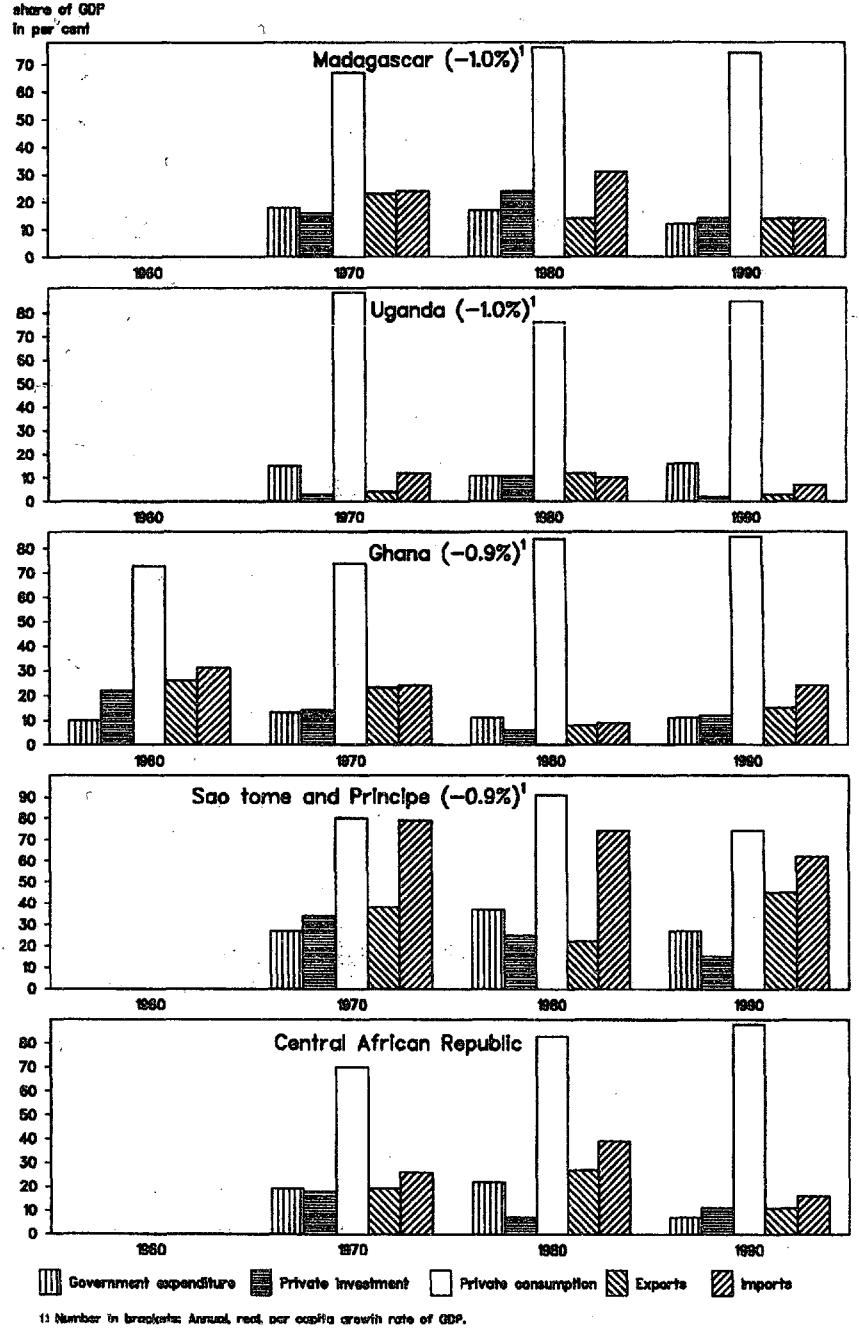
1) Number in brackets: Annual, real, per capita growth rate of GDP.

(Table A4, continued)

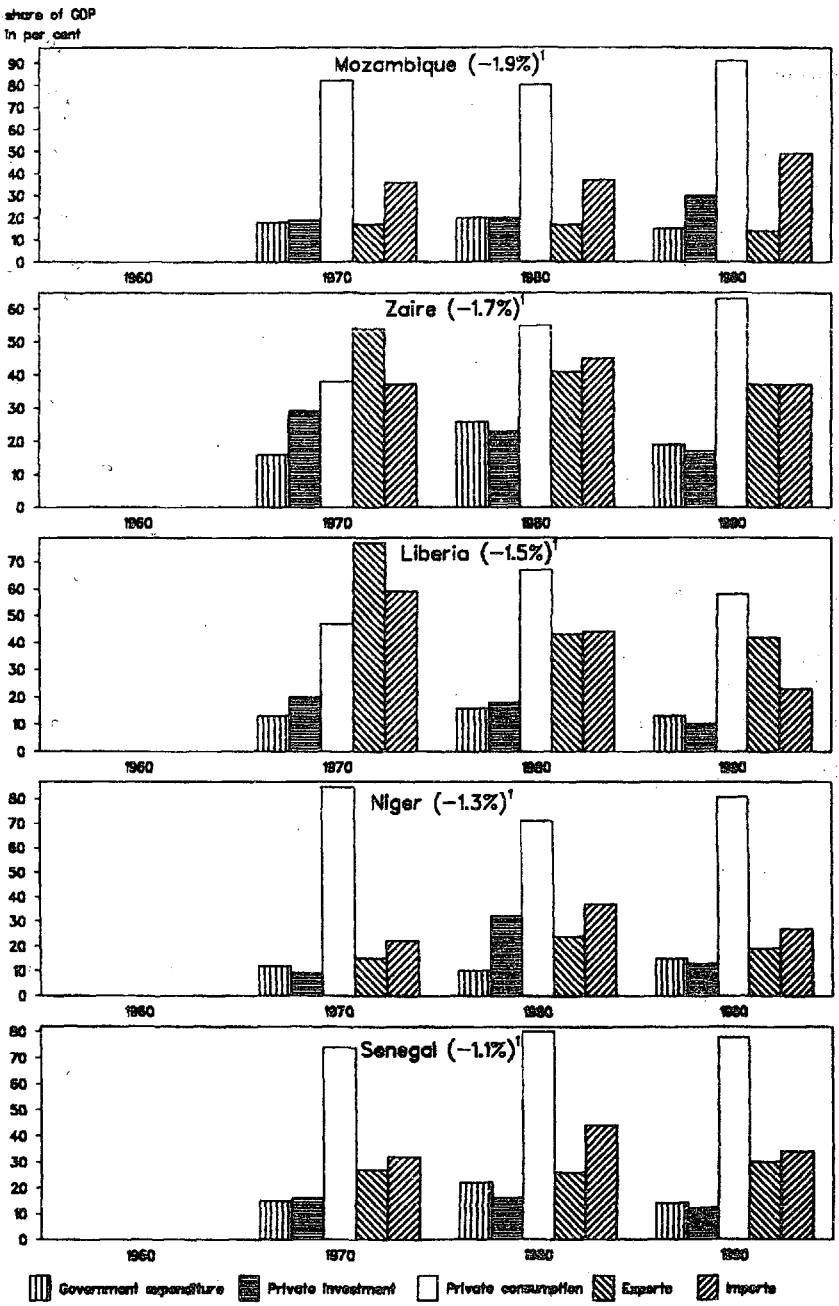


1) Number in brackets: Annual, real, per capita growth rate of GDP. 2) Based on net material product (NMP) instead of GDP.

Figure A5 - Structural change of GDP of the ten worst growth performing countries 1960-90



1) Number in brackets: Annual, real, per capita growth rate of GDP.



¹) Number in brackets: Annual real per capita growth rate of GDP.

References

BALASSA, Bela, 1965, Tariff protection in industrial countries: an evaluation, Journal of political economics, Vol. 73,6, 573-594.

BALASSA, Bela, 1971, The structure of protection in developing countries, Baltimore, John Hopkins University Press.

BALASSA, Bela, 1978, Exports and economic growth: Further evidence, Journal of Development Economics, Vol. 5, 181-189.

BALASSA, Bela, 1982, Development strategies in semi-industrial economies, New York and London, Oxford University Press.

BALASSA, Bela, 1985, Exports, policy choices, and economic growth in developing countries after the 1973 oil shock, Journal of Development Economics, Vol. 18, 23-35.

BALASSA, Bela, 1989, Outward orientation, in Handbook of Development Economics, Vol. 2, Editors: Hollis Chenery and T.N. Srinivasan, Amsterdam, North-Holland, 1645-1689.

BALDWIN, Richard, 1992, On the growth effects of import competition, NBER Working Paper, No. 4045.

BANURI, Tariq, 1991, Economic liberalization: No panacea, Oxford and New York, Oxford University Press, Clardon Press.

BARDHAN, P., 1970, Econmic growth, development and foreign trade, Wiley, New York.

BARDHAN, P., K. Kletzer, 1984, Dynamic effects of protection on productivity, Journal of International Economics.

BHAGWATI, Jagdish, 1969, Trade, tariffs and growth, Cambridge, MIT Press, chapter,9, 248-265.

BHAGWATI, Jagdish, 1978, Anatomy and consequences of exchange control regimes, Cambridge, Massachusetts, Ballinger Publications Cooperation for NBER.

BHAGWATI, Jagdish, 1988, Export-promoting trade strategy: Issues and evidence, World Bank Research Observer, January, Vol. 3(1), 27-57.

BHAGWATI, Jagdish, 1983, The Theory of commercial policy, Essays in international economic theory, Vol. 1, MIT Press, Cambridge, Massachusetts.

BHAGWATI, Jagdish, 1984, Why are services cheaper in poor countries?, Economic Journal, June, Vol. 94, pp. 279-286.

BONELLI, Regis, 1992, Growth and productivity in Brazilian industries: Impacts of trade orientation, Jouranal of Development Economics, Vol. 39, 85-109.

CARNAP, Rudolf, 1950, Logical foundations of probability, Chicago/London, edition 1971.

CHU, Wan-Wen, 1994, Import substitution and export-led growth: A Study of Taiwan's Petrochemical Industry, World Development, Vol. 22, No. 5, pp. 781-794.

CHEN, Tain-Jy, 1990, Export performance and productivity growth: The case of Taiwan, Economic Development and Cultural Change, Vol. 38, 577-585.

CHENERY, Hollis B., Moshe Syrquin, 1989, Patterns of development 1950 to 1983, World Bank Discussion Papers, No. 41.

CHOW, Peter C.Y., 1987, Causality between export growth and industrial development: Empirical evidence from the NICs, Journal of Development Economics Vol. 26, 55-63.

CORDEN, Werner, 1966, The structure of a tariff system and the effective protection rate, Journal of Political Economy, Vol. 74,3, 221-237.

CORDEN, Werner, 1971, The substitution problem in the theory of effective protection, Journal of International Economics, Vol. 1,1 , 37-57.

DOLLAR, David, 1992, Outward-oriented developing economies really do grow more rapidly: Evidence from 95 LDCs, 1976-1985, Economic Development and Cultural Change, Vol. 41, 523-544.

DONGES, Müller-Ohlson, 1978, Außenwirtschaftsstrategien und Industrialisierung in Entwicklungsländern, Kieler Studien Nr. 157, Tübingen, J.C.B. Mohr (Paul Siebeck) Tübingen.

DIXIT, Avinash, 1985, Tax policy in open economies, in Handbook of public economics, editors: Alan Auerbach, Martin Feldstein, New York and Oxford, North-Holland, 313-374.

EDWARDS, Sebastian, 1992, Trade orientation, distortions and growth in developing countries, Journal of Development Economics, Vol. 39, 31-57.

EMERY, Robert F., 1967, The relation of exports and economic growth, Kyklos, Vol., 20, 470-486.

ERZAN, Refik, Hiroaki Kuwahara, Serafino Marchese, Rene Vossenaar, 1988, The profile of protection in developing countries, United Nations Conference on Trade and Development, Discussion Papers, No. 21.

ESFAHANI, Hadi S., 1991, Exports, Imports, and economic growth in semi-industrialized countries, Journal of Development Economics, Vol. 35, 93-116.

FARHADIAN-LORIE, Ziba, Menachem Katz, 1989, Fiscal dimensions of trade policy, in Blejer, Mario, Ke-young Chu (Eds.), Fiscal policy, stabilization, and growth in developing countries, Washington, D.C., International Moetary Fund, 276-306.

FEDER, Gershon, 1982, On exports and economic growth, Journal of Development Economics, Vol. 12, 59-73.

FINDLAY, Ronald, 1974, Relative prices, growth and trade in a simple Ricardian system, Economica, Vol. 41, 1-13.

FINDLAY, Ronald, 1984, Growth and development in trade models, Handbook of International Economics, 185-236, Vol. I, ed. by R. Jones and P. Kenen, North-Holland, Amsterdam, New York, Oxford.

FOSU, Augustin K., 1992, Effect of export instability on ecnomic growth in Africa, Journal of Developing Areas, Vol. 26, 323-332.

GRANGER, C.W.J., 1988, Causality, cointegration and control, Journal of Economic Dynamics and Control, Vol. 12, 551-559.

GREENAWAY, David, David Sapsford, 1994,What does liberalisation do for exports and growth?, Weltwirtschaftliches Archiv, Vol. 130, 152-174.

HARRISION, Ann, 1994, An empirical test of the infant industry argument: Comment, American Economic Review, Vol. 84, No. 4, 1090-1096.

HEITGER, Bernard, 1987, Import protection and export performance: Their impact on economic growth, Weltwirtschaftliches Archiv, Vol. 123(2), pp. 249-261.

HELLEINER, Gerald K., 1994, Trade policy and industrialization in turbulent times, World Institute for Development Economics - United Nations University Helsinki, Routledge, London and New York.

HELLEINER, Gerald K., 1992, Trade policy, industrialization and development: New perspectives, World Institute for Development Economics - United Nations University Helsinki, Clarendon Press, Oxford.

HELPMAN, Elhanan, Manuel Trajtenberg, 1988, The hypothesis of export-led growth revisited, Tel-Aviv University , Tel-Aviv.

HSIAO, Mei-chu W., 1987, Tests of causality and exogeneity between exports and economic growth: The case of Asian NICs, Journal of Economic Development, Vol. 12, 143-159.

JUNG, Woo S., Peyton J. Marshall, 1985, Exports, growth and causality in developing counties, Journal of Development Economics, Vol. 18, 1-12.

KRUEGER, Anne O., 1978, Foreign trade regimes and economic development: Liberalization attempts and consequences, Cambridge, Massachusetts, Ballinger Publications Cooperation for NBER.

KRUEGER; Anne O., 1982, An empirical test of the infant industry argument, American economic review, Vol. 72, No. 5, 1142-1152.

KRUGMAN, Paul, 1981, Trade, accumulation and uneven development, Journal of Development Economics Vol 8, p. 149-161.

KUNST, Robert M., Dalia Marin, 1989, On exports and productivity: A causal analysis, Review of Economics and Statistics, Vol. 71, 699-703.

LARDY, Nicolas R., 1992, Foreign trade and economic reform in China 1978-1990, Cambridge University Press, Cambridge and New York.

LEAMER, Edward, 1978, Specification searches: Ad hoc inference from non-experimental data, New York, Wiley.

LEAMER, Edward, 1988, Measure of openness, in R. Baldwin, editor, Trade policy and empirical analysis, Universty of Chicago Press, Chicago.

LEAMER, Edward, 1992, Testing trade theory, NBER Working Paper, No. 3957, Los Angeles, CA.

LEVINE, Ross, David Renelt, 1992, A sensitivity analysis of cross-country growth regressions, American Economic Review, Vol. 82, 942-963.

LIST, Friedrich, 1841, Das nationale System der politischen Ökonomie, Stuttgart und Tübingen, J.G. Cotta'scher Verlag.

LITTLE, Ian; Scitovsky, Tibor; Scott, 1979, Maurice, industry and trade in some developing countries, London and New York, Oxford University press for OECD.

LUKAS, Robert, 1988, On the machanics of economic development, Journal of Monetary Economics, Vol. 22, 4-42.

MADDISION, Angus, 1992, Dynamic forces in capitalist development, Oxford University Press, Oxford, New York.

MARIN, Dalia, 1992, Is the export-led growth hypothesis valid for industrialized countries?, Review of Economics and Statistics, Vol. 74, 678-688.

MICHAELY, Michael, 1977, Exports and growth: An empirical investigation, Journal of Developmant Economics, Vol. 4, 49-53.

MICHAELY, Michael, 1991, Liberalizing foreign trade, Vol. 7, Lessons of experience in the developing word, Oxford and Cambridge, Massachusetts, Basil Blackwell.

MOSCHOS, Demetrios, 1989, Export expansion, growth and the level of economic development: An empirical analysis, Journal of Development Economics, Vol. 30, 93-102.

MULLIGAN, C., Sala-i-Martin, X., 1992, Transitional dynamics in two-sector models of endogenous growth, NBER Working Paper No. 3986, Cambridge, Massachustetts.

ONIKI, H., Uzawa, H., 1965, Patterns of trade and investment in a dynamic model of international trade, Review of Economic Studies, 31, 15-38.

PARK, Jong H., 1992, Exports and economic growth in developing countries: The case of Latin America, Rivista Internazionale di Scienze Economiche e Commerciali, Vol. 39, 239-258.

PASINETTI, L., 1960, A mathematical formulation of the Ricardian system, Review of Economic Studies, Vol. 27, 78-98.

PERRATON, Jonathan, 1990, Exports and growth in developing countries, 1966-1986: getting at the hypotheses, CREDIT Research Paper, No. 90/11, Centre for Research in Economic Development and International Trade, University of Nottingham, Nottingham.

POPPER, Karl R., 1934, Logik der Forschung, neunte verbesserte Auflage, Tübingen 1989.

RAM, Rati, 1987, Exports and economic growth in developing countries: Evidence grom time-series and cross-section data, Economic Development and Cultural Change, Vol. 35, 51-72.

RICARDO, D., 1951, The works and correspondence of David Ricardo, P. Sraffa. , editor, Cambridge University Press, Cambridge (first edition 1817).

RIVERA-BATIZ, L., Paul Romer, 1991a, International trade with endogenous technological change, European Economic Review 35.

RIVERA-BATIZ, L., Paul Romer, 1991b, Economic integration and endogenous growth, Quarterly Journal of Economics, Vol. 106, 531-550.

ROMER, Paul, 1986, Increasing returns and long-run growth, Journal of Political Economy, Vol. 94, 1002-1037.

ROMER, Paul, 1990, Endogenous technological change, Journal of Political Economy, Vol. 98, No.5, 71-102.

SAMUELSON, P.A. 1959, A modern treatment of the Ricardian economy, I and II, Quarterly Journal of Economics, Vol. 73, 1-35 and 217-231.

SHEEHEY, Edmund J., 1990, Exports and growth: A flawed framework, Journal of Development Sudies, Vol. 15, 111-116.

SMITH, Adam, 1994, An inquiry into the nature and causes of the wealth of nations, Modern Library, New York (first edition: 1776).

SOLOW, R., 1956, A contribution to the theory of economic growth, Quarterly Journal of Economics, Vol. 70, 65-94.

SPROUT, Ronald V.A., James H. Weaver, 1993, Exports and economic growth in a simultaneous equations model, Journal of Developing Areas, Vol. 27, 289-306.

UNCTAD, 1992, Handbook of international trade and development statistics.

WANG, Hong, 1993, Chinas exports since 1979, The Macmillan Press Ltd, London.

WILBUR, William L., Mohamed Z. Haque, 1992, An investigation of the export expansion hypothesis, Journal of Development Studies, Vol. 28, 297-313.

WORLD BANK, 1987, World Development Report - Barriers to adjustment and growth in the world economy, Oxford University Press, New York.

WORLD BANK, 1991, World Development Report - The challenge of development, Oxford University Press, New York.

WORLD BANK, 1993, The east Asian miracle - Economic growth and public policy, Oxford University Press, New York.

YOUNG, Alwyn, 1991, Learning by doing and the dynamic effects of international trade, Quarterly Journal of Economics, 369-405.