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Exchange Rate Fluctuations and the Patterns of International Trade: A Study of the Flow of Trade from Newly Industrialized Countries to the European Community at the Industry Level

FABIO SDOGATI *

* Assistant Professor of Economics, Marquette University, Milwaukee, Wisconsin 53233, and Research Fellow, European University Institute.
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Additional results obtained in this research will be made available through two EUI Working Papers. One of the papers, co-authored with Dr. Renzo Daviddi, focuses on the relevance of NIC's export and exchange rate policies for centrally planned economies; the second paper focuses on issues of estimation of the effects of exchange rate policy at the country and industry level.

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NONTECHNICAL SUMMARY

The long period of Dollar appreciation between 1981 and 1985 spurred a new wave of protectionist sentiment in the United States. While much of the public attention was focused on Japan, however, the economic profession was also paying attention to the large trade balance surpluses accumulated by other countries as well, the Asian Newly Industrializing Countries (NICs) especially. Pressure has been put in the last two-to-three years on these countries to adopt both trade-liberalization measures and exchange rate policies relying less heavily on undervalued domestic currencies.

Three facts are of special importance. First, there are signs that NICs are gradually opening domestic markets to foreign competition. Second, the U.S. Dollar has not nearly depreciated as much vis-a-vis NICs currencies as it has relative to EEC currencies and the Yen. Third, NICs are growing at a rate above that of the rest of the world. These three facts imply that these countries will keep relying heavily on growing shares of foreign markets, especially OECD countries other than the U.S.. Thus, it is argued that the mixture of new U.S. trade legislation and recent exchange rate changes may affect the patterns of international trade by increasing the volume of trade between NICs and EEC relatively more than that between NICs and the rest of the world.

An increase in the volume of trade is not likely to affect any two industries in the same way. It was believed until recently that NICs exports are generally labor-intensive due to their relative factor endowments. If this were true, one would expect the most labor intensive products (and thus the geographical areas specializing in

those products) to be hit hardest by competition. There are signs, however, that thinking of NICs exports as necessarily labor intensive is no longer adequate. South Korea, for instance, already in 1973 adopted a policy of incentives to capital intensive industries. While right now policymakers there appear to be questioning aspects of that choice (Kim, 1988), it is clear that at least the most dynamic among the NICs have already in place a policy of gradual shift of their resources away from labor intensive productions. If this process appeared to be generalized among NICs, capital intensive and/or high-tech European industries ought to be aware that new competitors are coming into the market.

The general aim of this project is to supply policy-relevant evidence on the effects of economic growth and exchange rate fluctuations on the patterns of exports from the NICs to the EEC. Attention is paid to 1. the possible re-direction of exports from the U.S. to Europe following the 1985 depreciation of the Dollar; and 2. the differential effects at the industry level.

I first document the time and commodity patterns of trade between EEC and NICs over the last twenty years. These are the years of flexible exchange rates a well as those of most rapid growth of the NICs GNP and trade volume. An effort is made to identify the pattern of trade for at least broad categories of goods, rather than rely solely on extremely aggregated variables such as the trade balance or the ratio of exports to GNP. This type of research has been carried out in the United States for a while now, due to the growing share of U.S. trade with the NICs, but it has not been pursued extensively in Europe yet.

I then move on to an attempt to identify the role of the exchange

rate in determining the patterns of trade for the NICs over the last twenty years. Since 1973 the value of all major currencies has fluctuated vastly. In the years of strong Dollar appreciation against most currencies, most Asian NICs were careful to keep their currencies undervalued, so as to make their goods very competitive on the U.S. market. This is a sign of how heavily exchange rate considerations weigh in the trade policy mix of many NICs, and suggests relatively high dollar-price elasticities for NICs exports. With the U.S. Dollar depreciating more than one third relative to EEC currencies and the Yen in the last three years, and their own currencies virtually unchanged relative to the U.S. Dollar, NICs can benefit from the same kind of price-competitiveness edge the U.S. are benefiting from relative to the EEC. Furthermore, it is unlikely that NICs will engage in further rounds of devaluations relative to the Dollar, for the U.S. trade deficit is so large that a competitive devaluation strategy would unleash protectionist pressures even stronger than those already existing in the U.S. Congress. These considerations lead to the tentative conclusion that as the period of strong Dollar appreciation led to penetration of NICs exports into the U.S. market, the present period of Dollar weakness will lead to accelerated penetration of those exports into Europe.

The results from this research are presented in greater detail in the concluding section. Here I summarize them very briefly.

1. Results from this research tend to support the hypothesis that the long run effect of exchange rate policy are relatively small. Estimates of long-run elasticities of NICs exports show that in general income growth in the importing country is a more crucial factor than changes in

relative prices. In the long run, when changes in domestic prices adjust following exchange rate shocks, competitiveness is driven more by productivity differentials than by changes in exchange rates.

2. But in the **short run** exchange rate changes do appear to have a substantial impact, though such is not always the case: France and Italy do not show any sizable reaction to the change even in the shorter time frame; but the relationship is there, and rather strong, for Germany and the U.S.. There exists a correlation between the bilateral exchange rate and the value of imports of these countries, as it is confirmed by the fact that U.S. imports from the NICs increased most during the years of maximum Dollar strength, and that EEC imports increased most after 1985, the years of Dollar weakness.

3. The commodity composition of European imports from NICs has changed. European countries are converging toward a pattern of import composition that more and more resembles that of the U.S., where mechanical and electrical manufactures are the most important import category, and the "traditional" NICs exports are less important. Econometric analysis at the industry level yielded a list of industries whose export performance appears to have been positively affected by exchange rate changes. The list appears at the end of section IV.

4. The increase in domestic European GDP expected as a consequence of the completion of the internal market is large enough that a large influx of NICs goods can be expected over the next few years. If what was said under point 1. above is correct, this income effect is likely to be at least of the same order of magnitude as any relative price effect in favor of European goods, and possibly larger.

INTRODUCTION

The general aim of this project is to supply policy-relevant evidence on the effects of economic growth and exchange rate fluctuations on the patterns of exports from the NICs to the EEC, with attention being paid to the possible re-direction of exports from the U.S. to Europe following the 1985 depreciation of the Dollar.

There exist at least two independent reasons why such question is most relevant at this time. First, there are the large fluctuations in the value of the U.S. Dollar relative to the European currencies experienced now for almost twenty years. Such fluctuations change the price of U.S. goods when expressed in domestic currency in a way that is not necessarily consistent with the macro- and micro-economic targets of the policy maker, nor with the movements in productivities across countries. At the same time fluctuations of the Dollar do not necessarily affect only the domestic currency price of U.S. goods being sold in Europe. A number of developing countries peg the value of their domestic currency to that of the Dollar, or to a basket of currencies in which the Dollar has a predominant weight. When the Dollar depreciates against European currencies, a host of other currencies depreciate with it to some extent. Thus, not only U.S. goods become more price-competitive in Europe, but so do those of a number of other countries as well.

The second important reason to study the pattern of trade and exchange rate policy of developing countries toward Europe is the acceleration of the process of European economic integration through the implementation of the 1985 Single European Act and the process of

completion of the internal market by 1992. Research promoted by the Commission has been focused so far on the effects of the completion of the internal market on (1) the European economy as a whole --the Cecchini Report on the Cost of non-Europe, and (2) effects on industries and regions within the Community. By their nature studies of this type assume away external effects and possible feedbacks on the domestic market. Among the important aspects of external effects of completion of the internal market are precisely the effects on the relative prices of import and export goods, and the patterns of trade that are likely to result from the process of integration.

There are basically two questions we want to address. The first question is long-run, structure oriented, and asks whether there is a long-run scope for exchange rate policy by developing countries. This is a difficult question to answer for at least two reasons. First of all, small developing countries seldom resort to an independent exchange rate policy. More often they peg their currency to one of the major currencies or to a basket of them. When exchange rates among major currencies are realigned, or simply due to daily rate fluctuations, the pegging country is subject to undesired changes in its currency's parity. This has (undesired) effects on the degree of competitiveness relative to each of the major currency areas, and may force resource reallocations and redirection of trade flows. (See, for instance, Bautista and Riedel, 1982).

We address this long-run, structural-type analysis by resorting to traditional regression analysis for a period of twenty-one years, from 1967 to 1986. Data are annual, and disaggregated at the level of seventy-one industrial sectors.

The second question we want to address is that of the short and medium run effects of the Dollar depreciation on trade flows from NICs to EEC since 1985. There are at least two reasons why this question is of crucial importance at this stage: the first is that most NICs peg their currency to the Dollar, the second that so far the U.S. has been the most sizable market for the NICs. There are two implications for policy here. On the one hand a depreciation of the U.S. Dollar vis-a-vis the European currencies determines a growing price competitiveness not only for U.S. goods priced in Dollars, but also for any good priced in any currency pegged to the Dollar. This is equivalent to saying that the Dollar depreciation may have enhanced the price competitiveness of U.S. goods in Europe, but it has done so for goods exported by NICs as well. On the other hand, the hitherto large share of NICs exports into the U.S. market is a warning that, even if the price effects were to be relatively small, the overall effect of trade creation-plus-diversion toward the Community may not be negligible at all.

Our purpose is to identify those sectors that are most sensitive to exchange rate changes. There is some evidence of very sizable effects of exchange rate changes on specific industries. Branson and Love (1987, 1988) provide such evidence for the U.S. at the national, regional, and state level for a large number of manufacturing industries. Richardson (1988) shows that the U.S. auto industry has been greatly protected by Dollar movements over the last twelve years or so. To identify sectors that are most affected by exchange rate changes I estimate demand functions for NICs exports by the U.S. and the four large Community members. This is also a way of shedding light on whether the penetration onto each European markets follows similar patterns.

The report is structured in six Sections. The analysis is focused on different countries and different industries in different parts, according to data availability, policy relevance, and analytical difficulty. In the first Section I discuss some of the relevant literature on "successful development" and illustrate some descriptive statistics showing in what sense the expression "successful development" is to be understood for the purposes of this report. This allows the discussion of development and trade policies to be conducted later to be confined within clearly defined limits.

Section II is devoted to a discussion of the relationship between exchange rate policy, export performance, and growth. In the first part I discuss the effects that exchange rate changes may have on the level of exports and real economic activity of the country. The focus is more on the importance of market structure and industrial organization characteristics than on the well known pass-through effect of exchange rate on relative prices in a world of perfect competition. The second part of the section reports some recent empirical estimates of the theoretical effects discussed in the first part.

Section III aims at describing the long-run development of trade flows from NICs to EEC and/or its major member countries. Data are available from 1967 to 1987 on an annual basis for a number of industrial sector, which is sufficient to study the relationship between exchange rates and flows of exports. In this Section I also bring the United States into the picture, and try to estimate the different characteristics of the flow of trade from NICs to U.S. as opposed to that from the NICs to the EEC.

Section IV abandons the descriptive character of the previous section and presents results from the econometric analysis of the relation between flows of exports and exchange rate policies. I still concentrate on the annual dataset to estimate the sectoral impact of exchange rate changes and import-demand on the flow of exports.

In Section V I exploit a monthly dataset made available by Eurostat through the CRONOS databank to study the directions of trade between 1983 and 1989. The results produced here are immediately relevant for short term policy design as well as to emphasize new pattern of trade that appear to have emerged since the great Dollar depreciation of 1985. To the best of my knowledge these are entirely novel results. Section VI summarizes the results and reports on the conclusions. The policy implications of the research reported here are probably best seen in this Section, where the technical aspect of the research is kept at a minimum and the striking results are emphasized.

I. INDICATORS FOR A TAXONOMY OF SUCCESSFUL DEVELOPING COUNTRIES

What is the criterion that should guide in the selection of the "representative" countries when it comes to export performance? "Success" ought to be a likely candidate. Unfortunately, it is unclear what the ingredients of a "strategy of successful development" ought to be --and it is especially unclear whether exchange rate policy is one such ingredient. The great debate of the 1950s and 1960s was centered on the dichotomy export promotion-import substitution. Contrary to what much of the contemporary literature appears to believe, the success of countries such as South Korea, Taiwan, Hong Kong, and Singapore is not necessarily a proof of the superiority of the former strategy over the latter, which was being adopted, for instance, by India. One cannot simply forget that countries belonging to the "Gang of Four" have some very crucial institutional and geographical characteristics that do not apply to many other countries: they are very small, very densely populated, enjoy (and/or have enjoyed for decades) special political and financial status, strong ties of military and economic nature with major countries, even a special political status. One cannot forget all this, and attribute to commercial policy merits (and demerits) the roots of which extend well beyond trade-related political choices. Additional, and possibly even alternative, hypotheses ought to be investigated.

A possible candidate is the traditional comparative-advantage approach. Some countries, later to be known as "Newly Industrializing," perhaps simply exploited some of the advantages they were endowed with: for instance, their relative labor abundance. But this explanation is no longer entirely convincing: why have other countries not benefited from their relative labor abundance, especially those where labor

abundance was coupled with relative abundance of skilled labor and/or natural resources? (1) Other factors must have played a role.

Recent theoretical literature suggests that scale economies may be one such factor. (2) The hypothesis is that comparative advantage is generated by falling marginal costs associated with productive units of larger and larger size, which are established just to exploit such economies of scale. Two are the strong points of this hypothesis: a large, and growing, share of international trade is intra-industry trade; and the international markets are imperfectly competitive. Alas, at least two are the drawbacks of this approach when one wants to investigate the determinants of trade flows originating from Less Developed Countries (LDCs). The first problem is that intra-industry trade is mostly a European and North-American phenomenon. LDCs have little intra-industry trade for the basic reason that they lack large industrial sectors required to exploit economies of scale, and specialize in commodity exports instead. The second reason why the imperfect competition model is not adequate in our case is that economies of scale in these countries can be exploited virtually by multinationals alone. Thus, it would be difficult to determine whether these economies ought to be attributed to the host or to the guest country.

1. RobertE. Baldwin (1971, 1979) has shed light on the relevance of these factors in the explanation of the direction of trade flows.

2. This is the stream of literature on international trade and imperfect competition developed in Helpman and Krugman (1985).
A third hypothesis worth investigating is that successful

development strategies result from interventionist policies. Clearly, this is not to say that any interventionist policy leads to success. Rather, the point is that "natural" endowments and comparative advantages may be exploited by amplifying their relevance and their impact through measures of economic policy.

Thus, "success" not being an entirely objective concept, its indicators must necessarily be arbitrary to some extent. For instance, the rate of growth of per-capita income may be an indicator to start out with, but then one has to realize that the distribution of income is also important. Which is the most successful country, that with higher per-capita income and more unequal distribution, or that with lower per-capita income and a more equal distribution? Let us suppose that this is not a problem, and think about the external situation of two countries with identical trade deficits. Are they really facing the same problem, or does the commodity composition of the imports make a difference as to the relative ability to pay off the debt in the future? And, as a final example, are there any meaningful ways in which a country whose export-led growth starts out in the troubled 1970s can be defined to be less successful than one whose higher rates of growth find their roots in the 1960s, the era of fast growth of world demand?

Any exercise in taxonomy of "successful" is necessarily arbitrary to some extent. Dervis and Petri (1987) suggest choosing the seven best performers with respect to any given variable over some (arbitrarily chosen) period of time. Table I.1, from their paper, shows that per-capita growth rates of Gross Domestic product would lead to label as successful countries Taiwan, Brazil, South Korea, Thailand, Portugal,

Table I.1 Measures of Growth in GDP per Capita, 1965–1985
(Percent per Annum)

Country	*Real per capita GDP growth*				*1965–1985 International purchasing power growth*		
	1965–1985		1979–1985		Raw		Debt-adjusted
	rate	rank	rate	rank	rate	rank	rate
Taiwan, Province of China*	8.6	1	5.2	1	7.9	2	
Korea*	6.9	2	4.1	2	8.4	1	8.2
Brazil*	4.3	3	−0.1	10	3.2	4	3.0
Thailand*	4.3	4	3.5	3	3.5	3	3.4
Portugal*	4.0	5	1.9	4	2.8	5	2.4
Greece*	3.8	6	0.3	8	2.7	6	2.5
Yugoslavia*	3.5	7	0.2	9	1.6	8	1.4
Turkey	2.9	8	1.7	5	1.4	9	1.3
Colombia	2.4	9	0.7	6	0.7	10	0.6
Dominican Republican	1.9	10	−0.5	11	−1.4	17	−1.7
Philippines	1.5	11	−1.9	15	0.5	11	0.3
Morocco	1.4	12	0.4	7	−0.3	14	
Bolivia	1.4	13	−4.5	19	−2.7	19	−3.3
Guatemala	0.9	14	−3.2	17	2.0	7	1.9
South Africa	0.8	15	−0.7	12	0.0	13	
Zimbabwe	0.6	16			0.5	12	
Argentina	0.4	17	−3.1	16	−0.9	15	−1.1
Chile	0.4	18	−0.7	13	−1.9	18	−2.5
Zambia	0.3	19	−1.6	14	−3.2	20	−3.9
Ivory Coast	−0.1	20	−3.5	18	−1.2	16	−1.9
Panel Mean	2.5		−0.1		1.2		0.9
A-Group Mean	5.0		2.2		4.3		4.0

Note: International purchasing power is calculated as nominal GDP deflated by the average wholesale price index of five major industrial countries converted to domestic currency using official exchange rates. Debt-adjusted index subtracts from international purchasing power GDP interest obligations on foreign debt.

*A-group (seven most rapidly growing) countries.

Greece, Yugoslavia, Turkey, and Colombia. Official OECD publications include only the first three in the class of Newly Industrializing Countries, along with Hong Kong, Singapore, and Mexico.

A second indicator of success may be the growth rate of the share of world market of market economies by each country. Presence on the world market is an indicator of success in that it identifies anability to compete on the open market, that is, an ability to produce and distribute worldwide at competitive price. (3) Table I.2 reports OECD calculations of market shares for six developed and developing countries. It shows that growth rates of market shares have been consistently higher for OECD-defined NICs than for any of the major OECD countries since 1963.

A third indicator of development is the rate at which the manufacturing sector grows relative to the rest of the economy. On this ground Di Bartolomeo (1988) chooses to identify as "emerging" seven Asian countries --Hong Kong, Singapore, South Korea, Taiwan, Malaysia, Indonesia, Philippines-- and two South American countries --Argentina and Brasil— which "may represent an interesting way to evaluate the seven Asian countries in that they enjoy similar levels of industrial development." (Di Bartolomeo, p. 153). The taxonomy suggested by the author derives from her wish to classify countries on the basis of the level and composition of commodity trade with the rest of the world, her final goal being the identification of an implicit model of development that would appear to be common to all nine countries.

3. While it is conceivable that some market share can be conquered through heavy subsidization of the export sector, it is less so that such process could last for a long time on a large scale. Thus, the share of foreign market is a significant indicator of competitiveness.

Table I.2 Gross Domestic Product at Constant 1975 Prices and Exchange Rates: Share in World Market Economies and Growth Rates of GDP (per cent)

	SHARE IN WORLD MARKET ECONOMIES								GROWTH RATES	
	1964	1973	1978	1979	1980	1981	1982	1983	1964-73	1973-83
AUSTRALIA	1.8	1.9	1.8	1.7	1.8	1.8	1.8	1.7	5.3	1.8
CANADA	2.6	2.8	2.9	2.9	2.9	2.9	2.8	2.8	5.8	2.3
FRANCE	6.4	6.6	6.6	6.6	6.5	6.5	6.6	6.5	5.5	2.2
GERMANY	9.1	8.5	8.1	8.2	8.2	8.0	8.0	7.9	4.3	1.7
ITALY	4.0	3.9	3.7	3.7	3.8	3.8	3.8	3.6	4.7	1.8
JAPAN	7.0	9.9	10.1	10.2	10.5	10.8	11.2	11.3	9.2	3.7
SWEDEN	1.4	1.2	1.1	1.2	1.2	1.1	1.1	1.1	3.1	1.8
UNITED KINGDOM	5.0	4.2	3.9	3.8	3.6	3.4	3.5	3.6	3.1	0.7
UNITED STATES	34.8	31.5	30.9	30.5	29.8	30.2	29.6	30.2	3.9	2.0
TOTAL ABOVE COUNTRIES	72.1	70.6	69.1	68.8	68.2	68.5	68.3	68.7	4.8	2.1
DEVELOPED MARKET ECONOMIES (1)	84.0	82.5	80.4	80.0	79.7	79.9	79.8	80.0	4.8	2.1
BRAZIL	1.6	2.2	2.6	2.7	2.8	2.8	2.8	2.7	8.7	4.5
MEXICO	1.4	1.6	1.8	1.9	2.0	2.1	2.1	2.0	6.9	4.7
HONG KONG	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	9.9	8.6
KOREA	0.2	0.4	0.5	0.5	0.5	0.5	0.5	0.6	9.9	7.8
SINGAPORE	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	12.1	7.8
TAIWAN	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.5	10.8	7.2
NICS TOTAL	3.5	4.7	5.6	5.9	6.1	6.3	6.3	6.2	8.4	5.3
DEVELOPING MARKET ECONOMIES (2)	16.0	17.5	19.6	20.0	20.3	20.1	20.2	20.0	6.1	3.7
WORLD MARKET ECONOMIES	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	5.0	2.4

(1) OECD MEMBER COUNTRIES, PUERTO RICO AND SOUTH AFRICA.
(2) ALL MARKET ECONOMIES EXCEPT THOSE INDICATED IN FOOTNOTE 1.

SOURCE: OFFICE FOR DEVELOPMENT RESEARCH AND POLICY ANALYSIS, UNITED NATIONS, NEW YORK, OCTOBER 28TH 1986.

II. EXCHANGE RATE POLICY, EXPORT PERFORMANCE, AND GROWTH

"The simple fact is that Koreans work longer." (Dornbusch and Park, 1987). This is not to say that labor costs and productivity are identical across countries, of course, and that the comparative advantage of South Korean firms is simply given by a higher-than-average utilization rate of existing capacity. Hooper and Larin (1988) calculate that unit labor costs fluctuate with nominal exchange rates, and that by early 1988 unit labor costs in the United States were lower that those of most other industrialized countries, with the only exception of South Korea. Through what channels do nominal exchange rates affect relative unit labor costs, and thus competitiveness?

This Section is sub-divided in two parts. The first part reviews the theoretical reasons why exchange rate rate movements may be expected to have real effects —that is, effects on relative prices, resource allocation, and flows of trade. The second part of the section is devoted to existing empirical estimates of the size of parameters crucial to the effectiveness of exchange rate policy to activate those real effects that the theory identifies.

II.1 Effects of Exchange Rate Changes in Theory

The crucial point of interest for us is whether exchange rate policies can be used to enhance export performance. In principle, there is no reason why a devaluation ought to turn out to be a "good." Consider the following example of a small open economy facing a given world price for its export good. A devaluation (depreciation) of the small country's currency lowers the foreign currency price of the export

good, thus making it more attractive to foreign buyers. The usual assumption of "smallness" used here implies that the rest of the world is in principle able to absorb any possible amount that may be offered at the lower (in foreign currency) price. But is the volume of exports going to increase under all circumstances as a result of the devaluation? The answer is that there are several important conditions that must be satisfied before the volume of exports —and thus their value expressed in foreign currency-- may increase.

The first such condition is that the rest of the world (the "foreign country") be a free trader and not ready to start a chain of competitive devaluations. Also, it must be the case that quantitative restrictions, such as quotas, did not exist prior to the devaluation, for in such an instance there would be no change in the volume of imports by definition.

The second condition for a devaluation to be successful is that the price elasticity of the basket of exported goods in the importing country be significantly greater than one. At a price elasticity of one, what is gained in volume is lost in foreign currency earned per unit of exported good, and total receipts of foreign currency is unchanged. (4) The size of the price elasticity of exports from developing countries is a very controversial issue. In an attempt to see whether it would be realistic for developing countries to use

4. This type of consideration is obviously long-run in nature, and it may not be of great concern if the problem is to establish a beach-head in the foreign country's market.

currency devaluations as a means to increase receipts of hard currency with which to pay their debts, Marquez and McNeilly (1986) report that existing studies vary widely as to the price elasticity of import demand from industrial countries, with many reporting zero elasticity.

A third line of problems arises considering that a devaluation is bound to have different effects on different exported goods, which results in different relative prices for those goods in the importing country as a consequence of the existence of different elasticities of demand for different export goods. To see this point one can imagine that a 10% devaluation makes all exported goods 10% cheaper in foreign currency relative to the basket of foreign goods. This is equivalent to shifting the supply of the export goods to the right. But suppose that the two export goods --which for simplicity are assumed to show the same supply function-- face demand functions of different elasticities. Then it must be the case that the original equilibrium relative price is going to be altered, for the new equilibrium price for the good with the less elastic demand function is greater than the price of the other good, that facing the more elastic demand function.

Thus, even in this simple case it can be shown that a devaluation is not sector-neutral, which is to say that a devaluation activates a change in relative prices potentially large enough to generate a flow of resources away from one sector toward the other. It follows that exchange rate policy, while allowing for a change of relative prices between exported and imported goods, does not allow to control the extent to which each particular branch of the export sector is going to be affected relative to others.

This is by no means a secondary problem in the case of a developing country which aims at a "balanced" growth of its export sector relative to the rest of the economy. The devaluation might, and in general will, generate demand pressure on sectors that are not considered to be of strategic importance by the exporting country, thus forcing the fiscal authority to intervene to correct the imbalance.

Other limits of devaluations as strategic policy instruments have been emphasized in the literature. Schydlowsky (1982) points out that in the case of developing countries generalized devaluations are not sophisticated policy tools in that they are not adequate to unchain adequate supply-side responses. These are two two reasons for the inefficacy of devaluations in LDCs: low price elasticity of export supply and income elasticity of demand, coupled with the large size of the non-traded goods sector relative to the traded goods sector.

Schydlowsky's point rests on the observation that the aggregate supply curve for LDCs exportables is generally S-shaped: low elasticities of supply for mining and industrial agriculture coexist with relatively high elasticities of supply for the manufacturing sector. the problem is that the latter is heavily dependent on imported intermediate inputs and spare parts, so that the positive effect of the devaluation on the supply side is hindered by the increased costs of inputs expressed in local currency. The net overall effect is that the elasticity of net exports to exchange rate changes appears to be low. Schydlowsky concludes suggesting <u>differential devaluations</u>, that is, an exchange rate for each class of products at a level capable of raising the revenue from the export of industrial goods in local currency.

A second problem has to do with the macroeconomics of devaluations: are devaluations really expansionary in the aggregate? The question is not an academic one. Throughout the experience with fixed exchange rates, devaluations have been used mostly as a means to reverse --or at least slow down-- the accumulation of foreign debt resulting from current account imbalances, whereas fiscal and monetary policy were "assigned" to growth and stability of the domestic component of the economy. (5) Even if devaluations were not expansionary, it would still be the case that a change in the terms of trade could be brought about, and exports stimulated. But the problem is that this stimulus to the export sector would have to be strategically very important to overcome the welfare loss associated with the devaluation-induced recession.

What is the likelihood that a devaluation turns out to be contractionary? Edwards (1986) summarizes several theoretical reasons why such can be the case. First of all, the price increase associated with the devaluation generates a negative real balance effect, which in turn results in lower aggregate demand at existing levels of output. If this real-balance effect is sizable, the contractionary effect may even more-than-offset the expenditure-switching effect.

At least two more demand-side effects can be identified that may potentially lead to a recession. The first is that the devaluation may alter the distribution of income in favor of groups with a higher-than average marginal propensity to save, thus resulting in lower aggregate demand and falling output. Endless are the channels through which this type of redistribution may take place in the devaluing country: it will suffice to remember that devaluations are usually accompanied by wage

5. The seminal paper in this literature is Mundell (1962).

and public spending freezes even in nominal terms, while it is current practice for the wealthy in LDCs to hold bank accounts in foreign currency, or directly abroad.

The third demand-side effect has to do with the price elasticities of demand for imports and exports. If these are sufficiently low, a devaluation generates a trade balance deficit when evaluated in domestic currency, which worsens the net asset position of the country vis-a-vis the rest of the world.

And devaluations may be contractionary also because of supply-side characteristics of the devaluing country. One may think of a scenario in which a devaluation is (unexpectedly) announced to enhance the export capability of the domestic manufacturing sector through relative price changes. In the absence of any offsetting fiscal or credit measures, the price of imported intermediate inputs is bound to increase when expressed in domestic currency (6), thus affecting the cost function of the domestic manufacturing firm, the more so the more drastic the devaluation.

Empirical evidence supplied by Edwards (1986) supports the hypothesis that devaluations are indeed contractionary in the short run --a period of roughly one year-- and that such effect is reversed in the longer run. This result emphasizes the need to account for the macroeconomic effects of exchange rate policies, when attempting to evaluate their overall desirability: it may well be the case that less

6. A different result obtains if the exporting firm is allowed to keep the foreign exchange earned on the foreign market and purchase its inputs in hard currency. If the firm is not large enough to affect the world market, the price of those inputs does not change for such firm.

developed countries are ready to sacrifice short-run growth objectives on the altar of long-run strength in the export-led industrial sector.

II.2 Estimated Effects of Exchange Rate Changes

Recently, some strands of research on third-world debt have emphasized that debt is a real, as opposed to monetary, phenomenon, so that real have to be the ways out of it. Third world debtor countries cannot inflate their way out of the debt, which is for the most part denominated in U.S. Dollars. At the same time, lenders have shown some willingness to compromise on the terms of loan repayment, but to date forgiveness of the debt is still mostly a word, not a major, agreed-upon policy. Thus, debtor countries have to find the hard currency they need to pay back their debts through current account (balance of trade) surpluses. Is this a feasible way out? While we are not interested in the specific question in this research, addressing such a question is instrumental to our interest on the feasibility of exchange rate policy as a way of redirecting flows of trade.

There only exist two ways to generate a current account surplus: to import relatively less that the foreign country for each increase in income, and to render one's own goods relatively less expensive than comparable foreign goods on foreign markets, hoping that falling export revenues per unit of output may be more than compensated by the rising number of exported units. Two elasticities are crucial in this mechanism: the income elasticity of demand and price elasticity of demand. I do not deal with supply elasticities in this context.

Marquez and McNeilly (1986) report that existing studies vary

widely as to the estimates of the price elasticity of import demand from industrial countries, with many reporting zero elasticities. The authors also supply both an overview of historical estimates of such elasticities, and new estimates of their own for goods generally imported by the United States from non-OPEC developing countries. Table II.1 is from their paper.

Table II.1 Non-oil Exports of Developing Countries: Comparison of Selected Studies

Author	Country Exporter	Aggregation Importer	Data	Commodity	Elasticity Income	Price
Bond (1985)(a)	Non-Oil LDC	Industrial	Annual 1967-81	All Goods	2.4	-0.1 -0.8
Goldstein Khan (1982)(b)	Non-Oil LDC	Industrial	Annual 1963-80	Non-Oil	1.3	0.0
Cline (1984)(c)	World	Industrial	Annual 1961-81	Non-Oil	3.1	0.0
Dornbusch (c) (1985)	Non-Oil LDC	World	Annual 1960-83	Non-Oil	2.4 4.7	-1.2
Grossman (d) (1982)	Non-Oil LDC	U.S.	Quarterly 1968-78	7-digit SITC	0.2, 7.5	-4.5. -0.5
Riedel (c) (1984)	Non-Oil LDC	Industrial	Annual 1960-78	Non-Oil	0.9. 1.3	0

a. The estimation method is indirect least squares.
b. The estimation method uses the average of the percentage changes of the ratio between LDC exports to OECD countries and the OECD real GDP.
c. The estimation method is ordinary least squares.
d. The estimation method is two-stage least squares.

The last two columns in the Table report the estimates of income

and price elasticities by recent major studies. The most important result for our purposes is that the price elasticity estimated by most authors is negative —which is what theory predicts it ought to be— but the size of which is worrisome: three studies out out of six report price elasticities insignificantly different from zero, one (Bond, 1985) reports virtually the same result, Dornbusch (1985) reports one that is slightly above -|1|, and Grossman's (1982) is basically inconclusive.

Is there a reason for this result? It is conceivable that, given the time frame and the degree of aggregation chosen by the studies reported here, commodity exports dominate the scene relative to manufactures. Since the former do have a low elasticity of demand, the overall result hides the "true" elasticity of manufactures demand to their own price. This is something to keep in mind to develop this line of research.

What is the conclusion to be drawn from the result supplied in the literature on the price elasticity of demand for exports? Coeteris paribus a devaluation will not increase receipts of hard currency, and it would actually result in a loss for most of the estimated coefficients. Thus, this result would lead us to believe that competitive exchange rate policies ought not to be particularly appealing to developing countries, due to the relative unresponsiveness of quantity demanded to prices. Indeed, they would be better off letting their currency appreciate and their exports command a higher return in hard currency, given such unresponsiveness.

At the same time it ought to be kept in mind that the price of an export good need not represent its true marginal costs more than any

other good. A fall in the export price of a good may well be more than compensated by a host of other factors. For instance, in an attempt to come up with an "objective" measure of trade policy biases, Krueger (1978) and Bhagwati (1978) have suggested an indicator that is the ratio of the effective exchange rate available to exporters to the exchange rate paid by importers. But such an indicator is obviously extremely difficult to compute: one ought to factor in subsidies and all kinds of export-promoting measures on the one hand, and quotas, tariffs, and non-tariff barriers to trade on the other, in addition to the general monetary and fiscal stance of the government, the existence of selective credit controls, and so on. (7) The upshot is that is this difficult to find a clear-cut relationship between price variables and trade performance, when so many important variables cannot be controlled for.

The other crucial elasticity is that with respect to income in the importing country --generally a developed one. Krugman (1988) has recently pointed out an empirical regularity, and advanced a possible explanation for it. The empirical regularity is that countries that have grown at higher-than-average annual rates appear to have enjoyed both a high income elasticity of demand for their exports and a low income elasticity for their imports. This especially lucky combination of parameters could well be the reason why these countries do not appear to be forced to long-run competitive devaluations of their real exchange rates: as they grow, their net exports grow as well, and need not be stimulated through real depreciations. Thus, long-run purchasing power

7. This point is made very clearly by Bradford and Branson (1987) in their attempt to overcame the inward looking vs. outward looking dichotomy typical of the trade literature.

parity would appear to hold as a result of a lucky combination of income elasticities. Krugman goes on to explain why this type of explanation sounds unconvincing to him, and suggest an alternative one. For the present purposes we need not follow him. But there are two implications of this "stylized fact" that are of interest for our own work.

The first important implication of Krugman's "stylized fact" is that the exchange rate becomes just a short-run policy instrument. As the process of growth and development goes on, the supply side effects of growth make the developing country more and more like its developed partner, and the role of the exchange rate as a determinant of the pattern of trade falters. The second implication has to do with how dynamic comparative advantages are generated. If, as I have suggested earlier, it is unlikely that countries in the early stages of their development may be able to exploit economies of scale of their domestic industries, it is still possible for them to do so as a result of an activist exchange rate policy aimed at building a domestic export sector large enough to exploit such economies. Once established, this sector would no longer require protectionist devaluations to be profitable.

Is there any empirical support for this hypothesis? Since it is not the purpose of this report to review the methodologies employed and the quantitative results obtained by the empirical literature on the relationship between trade regime, export growth, and growth of aggregate real activity, I limit the discussion to a brief summary of the state of existing research. Edwards (1989) offers a good overview of such research.

Studies focusing directly on the relationship between export and

output growth are mostly associated with the names of Balassa (1978) and Michaely (1977). One of the directions taken by this literature is to test the hypothesis of a positive influence of exports on real aggregate activity by adding the volume of exports to a standard production function including labor and capital. In general, large and significant values of the coefficient on export growth has been found in these studies, and this finding has been interpreted as evidence supporting the hypothesis of a causal link running from export to output growth.

More recently this interpretation has been challenged on several grounds. On the one hand, Bhagwati (1986) criticizes the lack of tests of policy effectiveness for the policy instruments that the empirical results are supposed to indicate, and comes to the conclusion that existing evidence obtained through estimation of export-augmented production functions ought to be interpreted as no more than (mild) indirect evidence in favor of export-promoting policies. On the other hand, Jung and Marshall (1985) challenge the interpretation of existing empirical evidence on the basis that traditional regression analysis is not capable of indicating the direction of causality between dependent and independent variables. Accordingly, they suggest testing for the presence of Granger causality to determine whether evidence exists that the growth of exports is actually leading output growth.

In conclusion, neither the theoretical nor the empirical research appear to supply a satisfactory set of guidelines to the policy maker.

On the theoretical ground, I have discussed several reasons why a policy of devaluations, or undervaluation, may not generate the expected flow of exports, reasons that have to do with the sectoral distribution

of the gains from the de/undervaluation, and reasons that have to do with the response of domestic income and absorption. Yet, strong reasons exist for a devaluation policy to be effective.

On the empirical side, I have reported discouragingly low own-price elasticities of exports recently presented in the literature. On the basis of such estimates the policy maker ought to avoid counting on the effects of relative price changes to enhance export activities, but one does see that competitive undervaluation is an often used tool.

The next three sections are entirely devoted to quantitative evidence on the strength of the relationship between exchange rate and exports.

III. LONG RUN TRENDS OF EXPORTS FROM THE NICs TO THE U.S. AND EUROPE: DESCRIPTIVE ANALYSIS

Goal of this section is to identify qualitatively signs of major shifts in the patterns of trade that may be associated with exchange rate movements. More rigorous quantitative techniques are employed in the next section. I concentrate on OECD imports from NICs, and totally disregard the opposite flow of trade for the purpose of this project. The approach is to evaluate preliminary evidence on the relationship between export volumes and their geographic direction on the one hand, and exchange rate movements on the other over the period 1967-87. Post-1987 annual data on trade flows are not available at the time this report is being written. We deal with post 1985 evidence in Section V, where we exploit a monthly data set on bilateral trade flows covering the period 1984-1988.

III.1 Overview of NICs performance in the Aggregate

I start out by reviewing the most recent evidence on the economic relationship between six Nics and the OECD area. The six countries are South Korea, Taiwan, Singapore, Hong Kong, Mexico, and Brazil. The OECD area is that defined in the OECD charter, plus those countries that became members subsequently. (8)

8. The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, the Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. The following countries became Members subsequently through accession at the dates in parentheses: Japan (28 April 1964), Finland (28 January 1969), Australia (7 June 1971), and New Zealand (29 May 1973). The Socialist Federal Republic of Yugoslavia takes part in some of the work of the OECD (agreement of 28 October 1961).

Data available beginning in 1964 show that NICs exports to OECD countries have increased manifolds, and that this happened mostly at the expense of other OECD countries' exports. Evidence from Table III.1 supports the view that EEC and North America have lost sizable shares of exports markets in favor of NICs and Japan in roughly the same proportions. Table III.2 confirms that the Asian NICs have performed much better than the Latin Americans, both individually and in the aggregate.

Table III.1 Imports of Manufactured Products by OECD from Selected Countries (Total=SITC 5, 6-68,7,8). Market Shares, in Percentages.

YEAR	NICS	FRANCE	GERMANY	ITALY	U.K.	EEC	USA	USA + CANADA	JAPAN
1964	1.6	7.3	19.8	5.5	11.4	44.0	17.2	21.2	4.6
1973	4.7	8.0	19.1	6.0	7.1	40.2	13.8	18.8	7.3
1978	6.3	7.9	17.4	6.8	6.8	38.9	12.5	17.1	9.1
1979	6.4	8.2	17.5	7.0	6.9	39.6	12.8	16.9	8.1
1980	6.5	8.2	17.1	6.8	6.9	39.0	13.0	16.8	8.8
1981	7.5	7.6	15.7	6.2	6.3	35.8	14.4	18.9	10.7
1982	7.9	7.5	16.3	6.4	5.9	36.1	13.4	18.1	10.7
1983	8.8	7.1	15.5	6.3	5.5	34.4	13.6	18.7	11.2
1984	10.0	6.5	14.4	5.8	5.3	32.0	13.6	19.6	12.4
1985	9.5	6.5	14.8	5.8	5.5	32.6	13.1	18.8	13.1

Source: OECD Trade Series C, SITC Revision 2, OECD (1988).

Table III.2 Total OECD Imports from NICs

YEAR	BRAZIL	MEXICO	LATIN-AMERICAN NICS	HONG KONG	SOUTH KOREA	SINGA-PORE	TAIWAN	ASIAN NICS	TOTAL NICS
1964	.1	.2	.3	1.1	.1	-	.1	1.4	2.6
1973	.3	.5	.8	1.4	.9	.3	1.2	3.8	4.7
1978	.5	.6	1.1	1.6	1.6	.4	1.6	5.2	6.3
1979	.5	.6	1.1	1.6	1.6	.5	1.7	5.3	6.4
1980	.5	.6	1.1	1.7	1.4	.5	1.7	5.4	6.5
1981	.6	.7	1.3	1.8	1.7	.6	2.1	6.2	7.5
1982	.6	.7	1.4	1.4	1.8	.6	2.2	6.5	7.9
1983	.7	.9	1.6	1.9	2.0	.7	2.6	7.2	8.8
1984	.9	1.1	2.0	2.0	2.2	.8	2.9	7.9	10.0
1985	.9	1.1	2.0	1.8	2.1	.7	2.9	7.5	9.5

Source: OECD Trade Series C, SITC Revision 2, OECD (1988).

II.2 Trade Flows Over Time, 1967-1987

In this Section I identify the most basic characteristics of the flow of exports from the NICs to the United States and the European Community. The databank used covers the period from 1967 to 1987, beginning- and end-year included. Data are annual, and expressed in millions of current U.S. Dollars. The NICs are represented as an area, which implies that in this Section we are not going to identify individual export-country behavior. Since data for the Community as such are not available, we have concentrated on the four largest member countries --France, Germany, Italy, and United Kingdom.

Figure III.1 Total Value of U.S. Imports from NICs. Millions of Current U.S. Dol

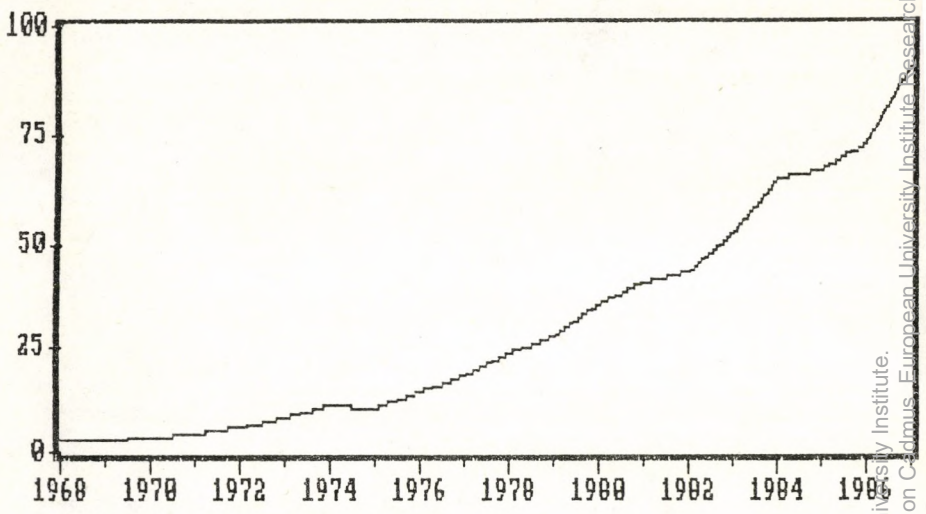
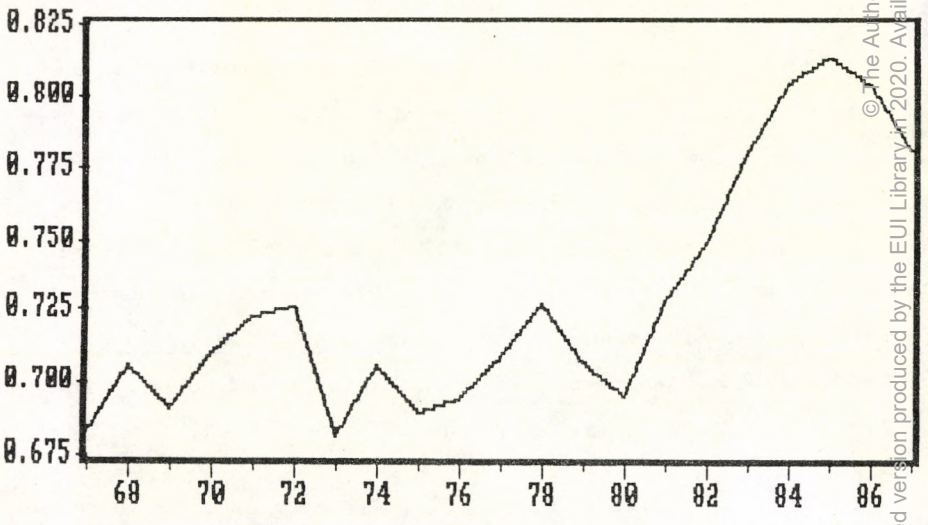


Figure III.2 U.S. Share of Total NICs Exports. Data in Current U.S. Dollars



We start out by concentrating our attention on the **distribution** of **total** exports by NICs between the United States and Europe. Figure III.1 is a plot of the total value of U.S. imports from the NICs area measured in current Dollars. Figure III.2 plots the percentage of NICs exports going to the U.S. as percentage of total exports in any given year — where "total exports" is defined as the sum of exports to each of the five countries that are the focus of our attention.

The Figures show that the total value of NICs exports to the U.S. has increased steadily over the sample period with three noteworthy exception: the post-1973 and 1982 recessionary periods, and the sharp slowdown of 1985 (and partly 1986). As to the share of exports going to the United States (Figure III.2), it was a remarkably steady 70% up to 1979. The troughs are in 1973, the year of extensive trade controls introduced by the Nixon Administration in an attempt to control the possible trade effects of the large Dollar depreciation in that year; and in 1980, the year in which the Dollar was weakest. From 1980 on the U.S. of total NICs exports increases steadily to reach its peak of 81% in 1985, year of maximum strength of the Dollar. The fall in the following two years is quite noticeable.

Figures in the next four pages are plots of total Dollar value of imports (top figure) and share of imports from NICs of each of the four largest European countries relative to total European imports --such total being defined as the sum of those four countries' imports. France's total imports (Figure III.3) grow steadily up to 1981, and they flatten out for the entire period during which the Dollar is strongest. As the Dollar starts depreciating the growth of French imports from NICs resumes. The **share** of France in total European imports from NICs (Figure

Figure III.3 Total Value of Imports of France from NICs. Current U.S. Dollars.

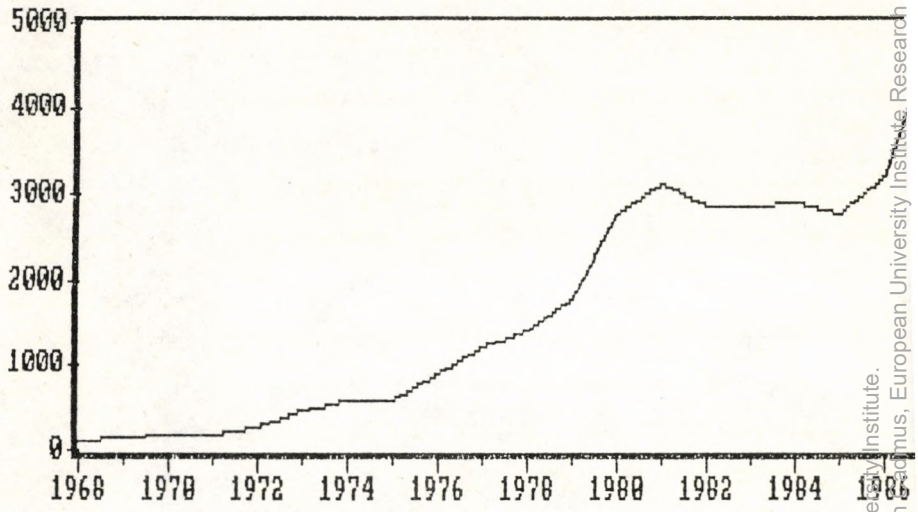


Figure III.4 France Share of Total European Imports from NICs. Data in U.S. Dol

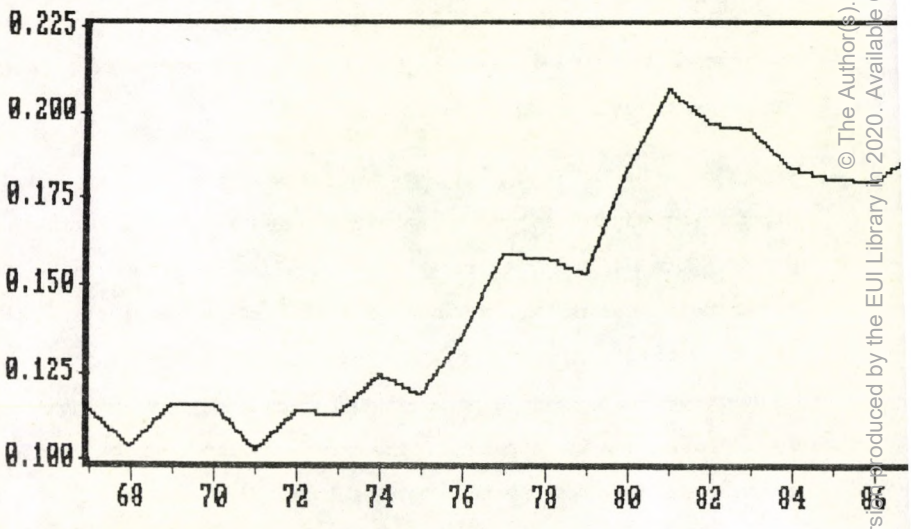


Figure III.5 Total Value of German Imports from NICs. Current U.S. Dollars.

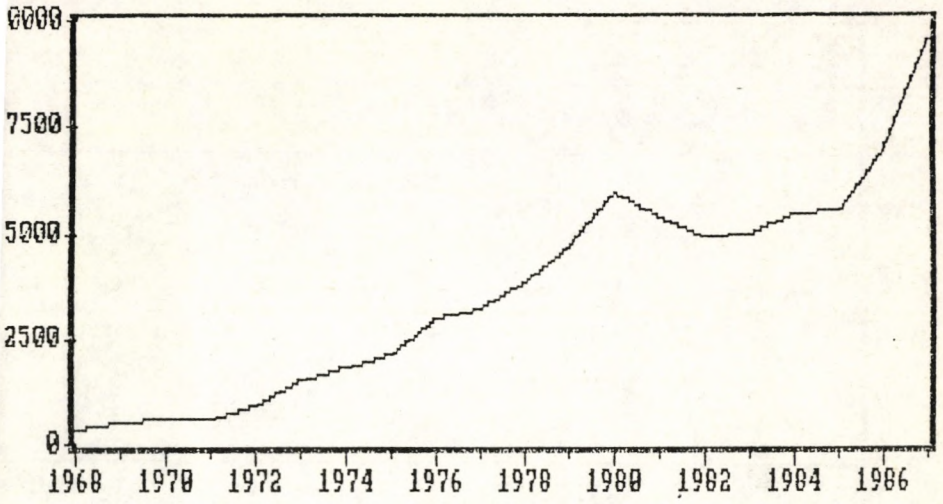


Figure III.6 Share of German Imports on Total European Imports from NICs. Data in current U.S. Dollars.

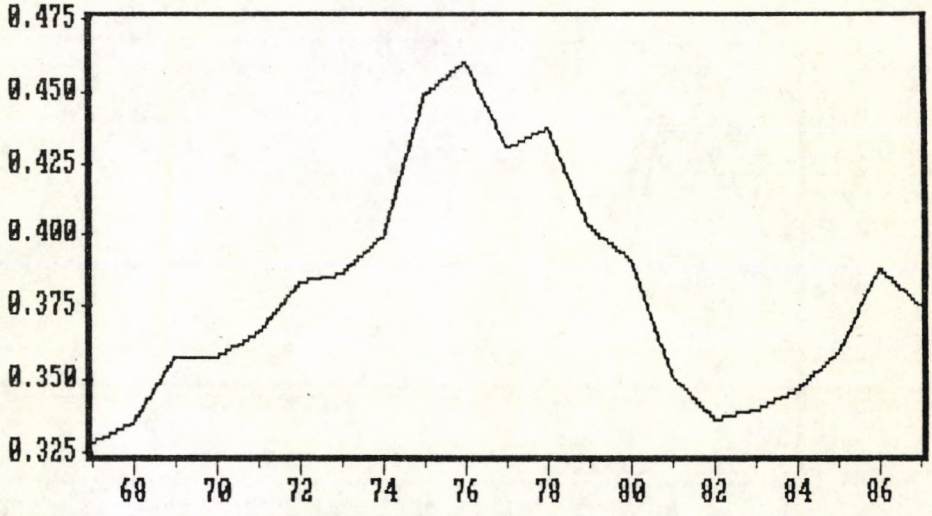


Figure III.7 Total Value of Imports of Italy from NICs. Current U.S. Dollars.

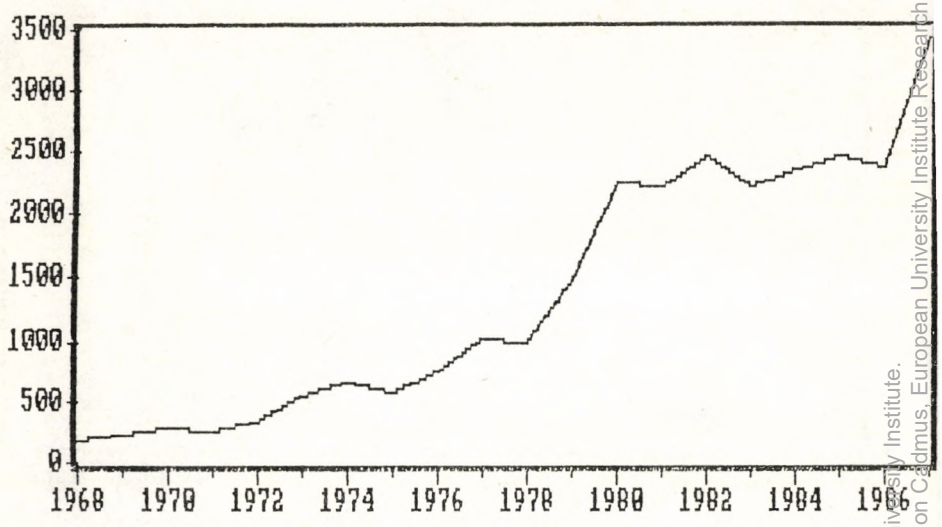


Figure III.8 Italian Share of Total European Imports from NICs. Data in current U.S. Dollars.

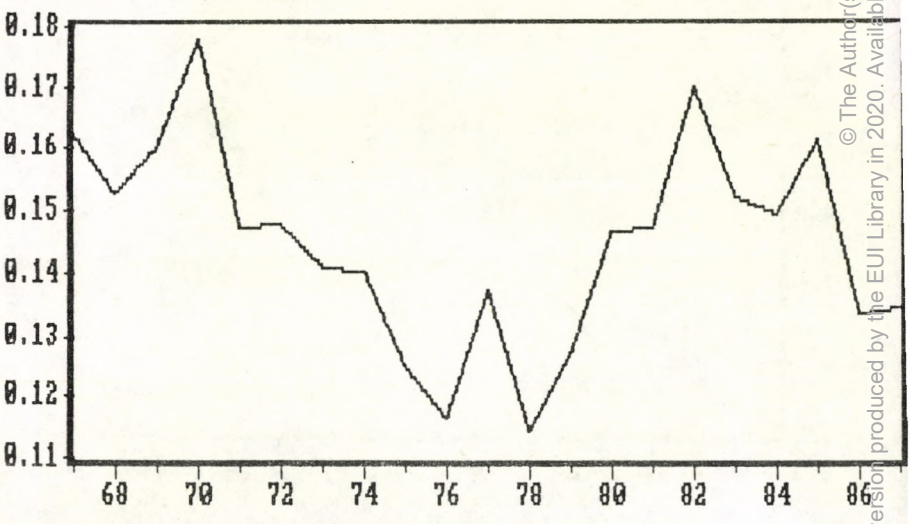


Figure III. 9 Total Value of U.K. Imports from NICs. Current U.S. Dollars.

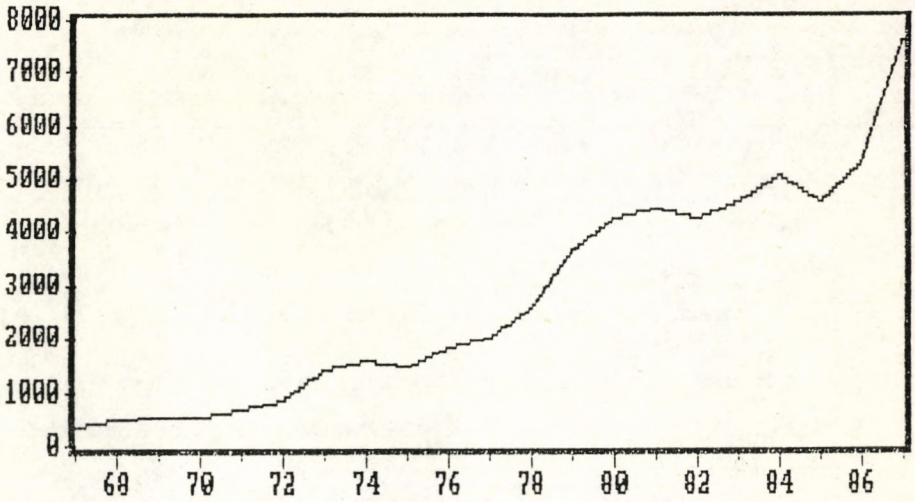
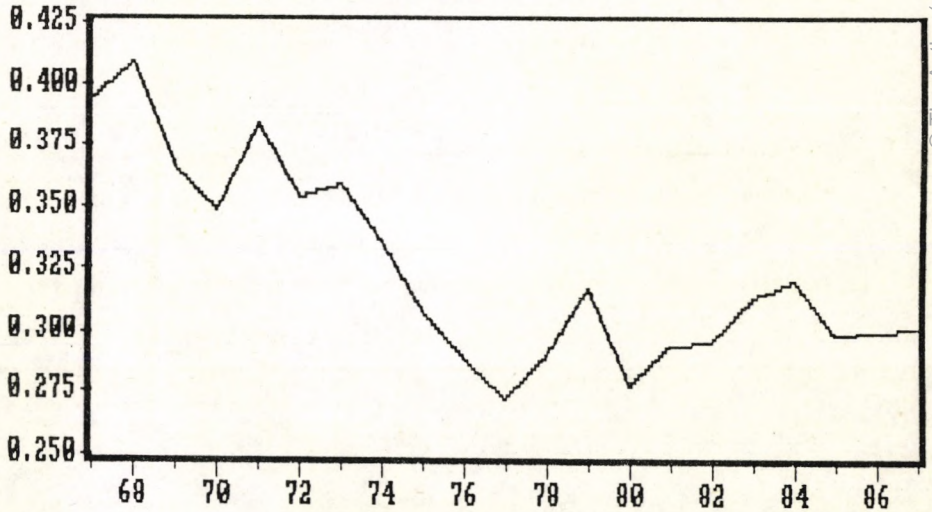


Figure III.10 Share of U.K. Imports in Total EEC Imports from NICs.
Data in current U.S. Dollars.



III.4) was stable up to 1975, increased sharply between 1975 and 1981, and never reached the 1981 peak of roughly 20% again after that.

Germany's imports also flatten out right after 1981, and resume their growth after 1985, even though with apparently more sluggish reaction than France. Germany's share of European imports (Figure III.6) reached a peak of 41% in 1976, and has since declined to 38%. Germany is today the most important European partner for the NICs, but its importance has diminished over the last decade.

The behavior of Italy's total imports (Figure III.7) is a further replica of the French and German pattern: imports grow in the latter part of the 1970s, peak in 1980, are flat until 1986, and then pick up again sharply. Like Germany, Italy was in 1987 a less important partner of NICs than it had been in the past, its share having declined from 18% in 1970 to 14% in 1987. Figure III.8 shows troughs in 1976 through 1978, exactly the years of maximum weakness of the Lira relative to all foreign currencies, but especially relative to the Dollar.

Finally, Figure III.9 shows that the pattern of U.K. imports followed closely the other European countries', even though in a smoother fashion. The pick up in imports starts right along the depreciation of the Dollar. The British share of imports (Figure III.10) has also fallen over time, but it has been substantially stable recently.

We want to focus now on the rates at which imports from NICs have increased during our sample period for each of the countries considered. Table III.3 reports some crucial descriptive statistics.

Table III.3 Descriptive Statistics on Average Growth Rates of Imports from the NICs Area, 1968-87. Data for the Period 1978-87 in Brackets

[1] Country	[2] Mean	[3] S.D.	[4] Maximum	[5] Minimum
FRANCE	22.7 [16.8]	24.0 [22.5]	65.4 [58.7]	-8.5 [-8.5]
GERMANY	19.7 [12.7]	18.9 [16.6]	68.1 [38.1]	-11.2 [-11.2]
ITALY	18.4 [14.9]	22.1 [23.4]	58.8 [52.6]	-10.4 [-9.6]
U.K.	17.3 [15.4]	18.8 [18.0]	69.0 [43.9]	-9.5 [-9.5]
U.S.	21.1 [17.7]	11.6 [8.9]	39.5 [29.0]	-6.7 [2.5]
EUROPE	18.8 [14.2]	18.1 [16.8]	66.7 [42.4]	-4.4 [-4.4]
TOTAL	20.3 [16.7]	12.1 [9.6]	43.6 [27.3]	-4.6 [1.4]

Contemporaneous Correlations

FRANCE/EUROPE:	.90	[.91]
GERMANY/EUROPE:	.95	[.93]
ITALY/EUROPE:	.82	[.80]
U.K./EUROPE:	.90	[.90]
U.S./EUROPE:	.65	[.57]

The top part of the Table reports in column 2 the average growth rates of imports (measured in current U.S. Dollars), their standard deviations (column 3), the maximum [4] and the minimum [5] values over the sample period. "Total" stands for total NICs exports. What one can learn from this Table is that only France has had a higher rate of growth of imports from NICs than the United States. The latter country,

however, has followed a much steadier path of growth, as it is shown by the fact that its maximum rate of growth is the lowest, its minimum rate is among the highest, and the standard deviation is one half the computed average rate of growth. This implies that the process of market penetration in Europe is more chaotic and therefore more difficult to model, and to forecast, than that into the American one.

It may be interesting to know to what degree market penetration into each individual national market is "synchronized" with that into the rest of the Community. To address this issue one can look at the simple contemporaneous correlation coefficients between the growth rates in each country and in Europe as a total. These descriptive statistics are reported in the bottom part of Table III.3, from which one can see that Italy is the most "independent" country relative to the Community, while Germany is the most "representative." (9)

In order to gain some insights on the dynamics of import growth without resorting to econometric analysis, I have reproduced the same calculations for the period 1978 to 1987. (10) They are reported in brackets in Table III.3. What is noteworthy here is that all average

9. Obviously one must keep in mind that the country share of total European imports is a factor in determining the size of the correlation coefficient we are looking at, in the sense that the higher the share, the higher is likely to be the correlation. However, there may also be economic interpretation of this difference in correlations.

10. Clearly, there is little economic reason why the 1978 cut-off date ought to be relevant for, if our problem is to study the relationship between exchange rates and volume of trade, the period 1985 and onward would have been more appropriate to choose. But this choice would have left us with only two observations in the latter sample, and very little insight on the trends.

growth rates are lower than they are for the entire sample period. This may be due to the small volumes of imports in the early part of the sample, which makes growth rates appear to be high. However there may be some economic interpretation to this as well, such as the slowdown of the growth of international trade in the early 1980s. This particular issue ought to be investigated further.

There are several interesting conclusions to be drawn from the foregoing descriptive analysis, though each of them is somewhat weakened by the fact that we had to think in terms of Dollar value of imports, rather than in actual volumes.

First, it is apparent that the great increase in the share of NICs exports absorbed by the U.S. begins in 1980 and ends in 1985. Issues of causality aside for the time being, the association of **share** of imports with the growing strength of the Dollar over those very years is unquestionable. This is a first, though tentative, indication that the value of a currency is very relevant to the direction of trade flows of a country.

Second, the dynamics of nominal exchange rates between the Dollar and European currencies appear to be associated with the dynamics of European imports from NICs. This is a first confirmation of our working hypothesis according to which the depreciation of the Dollar not only brings about changes in competitiveness between U.S. and Europe, but potentially affects the whole pattern of relative prices and trade flows.

Third, the relative importance of the four European countries as importers from the NICs area has changed markedly over the years. One

cannot say at this stage whether these changes have been influenced by changes of exchange rates among European countries, as well exchange rate changes of European currencies relative to the Dollar, but it is clear that the latter have played a role. If one chooses 1968 as the year to be used for comparisons, this is the way weights have changed over the last twenty years:

Table III.4 Share of Each Country's Imports as a Percentage of Total European Imports from NICs

	France	Germany	Italy	United Kingdom	Europe
1968	11	33	15	41	100.0
1987	18.5	37.5	13.5	30.5	100.0

N.B.: Total European imports defined in the text.

III.2 Evolution of the Commodity Composition of Trade Over Time, 1967-1987

III.2.1 Commodity Composition of Trade Between NICs and U.S., 1967-1987

We have data on exports for the industrial sector subdivided in eleven sectors, and the total. The sectors are

1	: CONSTRUCTION MATERIALS, GLASS AND CERAMICS
2	: IRON AND STEEL INDUSTRIES
3	: TEXTILE
4	: WOOD, PAPER, AND MISCELLANEOUS
5	: MECHANICAL AND ELECTRICAL
6	: CHEMICALS
7	: MINERALS
8	: ENERGY
9	: AGRICULTURE
10	: FOOD PRODUCTS
11	: MISCELLANEOUS
12	: TOTAL

I have computed the ratio of each sector's share on total imports of the United States from the NICs area for every year for which data are available. For each sector I report only the 1967, 1985, and 1987 data to identify the relative weight of that particular sector in overall imports from the NICs area in those years. (11) An important difference between the 1967 and the 1987 pictures is that agricultural and food products no longer play a major role, which is now played by mechanical and electrical machinery. Textiles appear to have a stable

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11. Table A.III.5.US in the Appendix reports such values for every year for which data are available. Table A.III.6.US, also in the Appendix, reports descriptive statistics --mean, standard deviation, maximum, and minimum values for the shares of each sector in total exports to the U.S. Statistics for the period 1967-1979 are reported in the top part of the Table, those for the period 1980-1987 in the bottom part.

Table III.5 Sectoral Shares of Total Imports in the U.S. from NICs

		1967	1985	1987
1	CONSTRUCTION MATERIALS, GLASS AND CERAMICS	.49	1.12	1.37
2	IRON AND STEEL INDUSTRIES	2.41	3.14	2.51
3	TEXTILE	16.12	22.53	23.31
4	WOOD, PAPER, AND MISCELLANEOUS	13.23	9.46	11.40
5	MECHANICAL AND ELECTRICAL	7.51	35.84	44.00
6	CHEMICALS	4.04	4.26	4.00
7	MINERALS	4.43	.71	.43
8	ENERGY	3.24	14.47	5.70
9	AGRICULTURE	30.04	4.11	3.13
10	FOOD PRODUCTS	15.54	3.23	3.11
11	MISCELLANEOUS	2.94	1.14	1.06

N.B.: Columns may not add up to 100.00 due to rounding.

share, and all the other sectors are stable and relatively less important. The naked eye cannot identify any correlation between these shares and the 1985 depreciation of the Dollar. Using the average share in each period as a criterion, the ordering of sectors has changed as shown in Table III.6.

Table III.6 Ordering of Industrial Sectors as Shares of Total U.S. Imports from NICs

1967-1979		1980-1987
TEXTILE	1	MECHANICAL AND ELECTRICAL
MECHANICAL AND ELECTRICAL	2	TEXTILE
AGRICULTURE	3	ENERGY
WOOD, PAPER, AND MISCELLANEOUS	4	WOOD, PAPER, AND MISC.
FOOD PRODUCTS	5	AGRICULTURE
ENERGY	6	FOOD PRODUCTS
CHEMICALS	7	CHEMICALS
IRON AND STEEL INDUSTRIES	8	IRON AND STEEL INDUSTRIES
MINERALS	9	MISCELLANEOUS
MISCELLANEOUS	10	CONSTRUCTION MATERIALS, GLASS AND CERAMICS
CONSTR. MATERIALS, GLASS, CERAMICS	11	MINERALS

III.2.2 Commodity Composition of Trade Between NICs and Europe, 1967-1987

I have computed the ratio of each sector's share on total imports for each of the four major European economies from the NICs area for every year for which data are available, (12) as well as average shares for two subperiods, and report in the series of Table III.7 the two orderings of sectors according to their relevance in each period. (13)

Table III.7.FR Ordering of Industrial Sectors as Shares of Total Imports of France from NICs

1967-1979		1980-1987
AGRICULTURE	1	MECHANICAL AND ELECTRICAL
FOOD PRODUCTS	2	ENERGY
TEXTILE	3	FOOD PRODUCTS
MECHANICAL AND ELECTRICAL	4	TEXTILE
MINERALS	5	WOOD, PAPER, AND MISC.
WOOD, PAPER, AND MISCELLANEOUS	6	AGRICULTURE
CHEMICALS	7	CHEMICALS
IRON AND STEEL INDUSTRIES	8	MINERALS
ENERGY	9	MISCELLANEOUS
MISCELLANEOUS	10	IRON AND STEEL INDUSTRIES
CONSTRUCTION MATERIALS, GLASS AND CERAMICS	11	construction MATERIALS, GLASS AND CERAMICS

12. Unlike what I did for the U.S., I do not report in the text the 1967, 1985, and 1987 data shares of each sector in overall imports from the NICs area to the relevant country. Such data are available upon request for every year in the sample.

13. Descriptive statistics equivalent to those presented for the U.S. in Table A.III.6.US are not reported but available upon request for each of the four European countries in the sample.

Table III.7.GE Ordering of Industrial Sectors as Shares of Total Imports of Germany from NICs

1967-1979		1980-1987
TEXTILE	1	TEXTILE
AGRICULTURE	2	MECHANICAL AND ELECTRICAL
FOOD PRODUCTS	3	AGRICULTURE
MECHANICAL AND ELECTRICAL	4	WOOD, PAPER, AND MISC.
MINERALS	5	MINERALS
WOOD, PAPER, AND MISCELLANEOUS	6	FOOD PRODUCTS
CHEMICALS	7	CHEMICALS
IRON AND STEEL INDUSTRIES	8	IRON AND STEEL INDUSTRIES
MISCELLANEOUS	9	MISCELLANEOUS
ENERGY	10	CONSTRUCTION MATERIALS, GLASS AND CERAMICS
CONSTRUCTION MATERIALS, GLASS AND CERAMICS	11	ENERGY

Table III.7.IT Ordering of Industrial Sectors as Shares of Total Imports of Italy from NICs

1967-1979		1980-1987
AGRICULTURE	1	MECHANICAL AND ELECTRICAL
FOOD PRODUCTS	2	ENERGY
TEXTILE	3	AGRICULTURE
MECHANICAL AND ELECTRICAL	4	TEXTILE
MINERALS	5	WOOD, PAPER, AND MISC.
WOOD, PAPER, AND MISCELLANEOUS	6	FOOD PRODUCTS
IRON AND STEEL INDUSTRIES	7	MINERALS
CHEMICALS	8	CHEMICALS
ENERGY	9	IRON AND STEEL INDUSTRIES
MISCELLANEOUS	10	MISCELLANEOUS
CONSTRUCTION MATERIALS, GLASS AND CERAMICS	11	CONSTRUCTION MATERIALS, GLASS AND CERAMICS

Table III.7.UK Ordering of Industrial Sectors as Shares of Imports of the United Kingdom from NICs

1967-1979		1980-1987
TEXTILE	1	MECHANICAL AND ELECTRICAL
AGRICULTURE	2	TEXTILE
MECHANICAL AND ELECTRICAL	3	WOOD, PAPER, AND MISC.
WOOD, PAPER, AND MISCELLANEOUS	4	AGRICULTURE
FOOD PRODUCTS	5	FOOD PRODUCTS
MINERALS	6	CHEMICALS
CHEMICALS	7	ENERGY
IRON AND STEEL INDUSTRY	8	MISCELLANEOUS
ENERGY	9	IRON AND STEEL INDUSTRIES
MISCELLANEOUS	10	MINERALS
CONSTRUCTION MATERIALS, GLASS AND CERAMICS	11	CONSTRUCTION MATERIALS, GLASS AND CERAMICS

France and Italy share very similar patterns of import behavior. For both countries agricultural, food, and textile products were the most important imports in the late 1960s and the 1970s. In the 1980s mechanical and electrical machinery are the most important import for both countries, energy products and food/agricultural products follow, and textiles are only fourth in the list. Also in the U.K. textiles have ceased to be the major import expenditures, and they weigh now less than expenditures on imports of mechanical and electrical product. Germany is the only country for which textiles have kept their role of leading imports. However, manufactured mechanical and electrical products, in the fourth place a decade ago, are now a strong second.

Thus, two unambiguous indications emerge from these tables. First, European countries are converging toward a merchandise composition of imports from NICs that more and more resembles that of the U.S.. Second, "traditionally" strong export products from the NICs have been replaced by "modern" mechanical and electrical manufactures.

IV. LONG RUN TRENDS OF EXPORTS FROM NICS TO US AND EUROPE: ECONOMETRIC MODELING AND ELASTICITIES ESTIMATIONS

Our goal is to determine whether there is sizable and (statistically) significant relationship between exchange rate policy and export performance. In this section I address this question by estimating partial-equilibrium models of export demand functions. First, I discuss a model for the effects of exchange rates on the demand for exports. Subsequently, the model is estimated for aggregate exports from a country to another. The estimated elasticities with respect to exchange rates are the criteria through which potential for import penetration can me measured. I also run Granger-causality tests to assess the direction of causality between exchange rate and total exports for each pair of countries for which the estimated model supports the existence of a positive and significant exchange rate-export volumes relationship. Finally, we turn to the question of what sectors appear to be most affected by exchange rate changes. This issue is addressed by estimating import demand functions for many of seventy-one industrial sectors from a selected country. The methodological problems involved with the estimation are mostly discussed along with the model itself, but sometimes they are where results are discussed.

IV.1 A Model for the Effects of Exchange Rate Changes on Demand for Exports

Partial equilibrium models of exports of developing countries are among the most subjected to empirical estimation. Since reviewing existing theoretical and empirical literature on the issue is beyond the

scope of this report, the reader is referred to the excellent survey by Goldstein and Khan (1985) and, for more recent developments, to Marquez (1988).

The model employed here draws on the imperfect substitute prototype models discussed in Marquez (1988), but I specify the model in a different form. In general the model is specified as

$$[4.1] \quad X_t - X_{t-1} = b_0 + b_1 Y_t + b_2 R_t + b_3 Y_{t-1} + b_4 R_{t-1} + m_t ,$$

where X is the volume of real exports from one country to another, Y is a measure of real economic activity in the importing country, -- usually the real gross national or domestic product--, R is the price of the exported goods relative to the domestic price of that good in the import country, m is the error term, and the subscripts denote time.

This type of model specification may be adequate for cross-section type of data, where there is no autocorrelation for the variables. In a time series framework, however, variables expressed in levels are generally strongly autocorrelated, and the conditional correlations among them may be spurious (Granger and Newbold, 1976). To remove this problem I have adopted an error-correction model as suggested by Hendry (1979). (14) The error-corrected model specified for estimation of short- and long-run impact of exchange rate changes on the volume of

14. While working on this report I became aware that Moreno (1989) was carrying out estimations of exchange rate effects on the trade balance of South Korea and Taiwan using a different data set but a similar estimation technique.

Nics exports is

$$[4.2] \quad dX_t = b_0 + b_1 dY_t + b_2 dR_t + b_3 Y_{t-1} + b_4 P_{t-1} + b_5 X_{t-1} + m_t,$$

where all the symbols are as above and a "d" in front of a variable name stands for "first difference" of that variable. With all variables expressed in natural logs, b_1 and b_2 are estimates of the short-run impact of changes in economic activity in the importing country and prices on the volume of exports. The long-run elasticity with respect to income is equal to $b_3/(-b_5)$, and the long run elasticity with respect to relative prices is measured by $b_4/(-b_5)$.

IV.2 Empirical Evidence on the Relationship Between Exchange Rate and Aggregate Exports

A number of data-related issues arise prior to estimation of the model specified above. The first problem is related to the definition of the dependent variable, which should be expressed in real terms, whereas data are available in current U.S. Dollars only. To convert U.S. Dollar-denominated exports I have expressed their values in the exporting country's currency first, and then deflated such values by the export unit value for the exporting country. Thus, at any point in time real exports X are given by

$$X = X(\$) * e / P_X,$$

where e is the domestic currency price of U.S. Dollars, P_X is the

domestic currency price of exports, and the $ sign in parentheses means that the variable is expressed in U.S. Dollars.

This transformation is obviously not very satisfactory. The deflator for exports ought to be based on the actual export prices of the exported goods, weighted by the volume of export of that particular good. This type of data is not available, and I use export unit values instead. (15)

The second variable involved in the estimation is a measure of economic activity in the importing country. I use the real GDP for all four European countries and real GNP for the U.S. (15) Finally, we need a measure of competitiveness to match the export price variable in the theoretical model. This variable is defined as

$$R = e\ P^* / P \quad ,$$

where R is the real exchange rate, e (15) is the domestic currency price of the importing country's currency, P* is the price of the good in the importing country's currency, and P the price of the good in the exporting country's currency. Again, data on the price of individual goods or baskets of goods in different currencies do not exist. Among the possible alternatives, I have chosen to use the export unit value as a proxy for the exporting country's currency price of the goods, and the importing country's CPI (15) to deflate it. Advantages and shortcomings of these choices are discussed in Edwards (1989). Table IV.1 reports estimation results for exports from S. Korea to five countries.

15. Published by IMF, International Financial Statistics.

Table IV.1 Results of Estimation of Model [4.2]

	FRANCE	GERMANY	ITALY	UNITED KINGDOM	UNITED STATES
C	-27.636	- 8.894	-2.854	-8.027	-5.052
	[3.14]	[1.14]	[.360]	[.808]	[1.02]
Change in GDP (*)	-6.059	2.293	2.769	3.242	2.461
	[1.33]	[1.36]	[1.01]	[1.44]	[2.10]
Change in R	1.256	.752	1.147	.397	.756
	[1.64]	[2.44]	[1.71]	[.727]	[2.35]
Lagged GDP (*)	2.565	.896	.772	.817	.512
	[2.23]	[.887]	[.512]	[.390]	[.693]
Lagged R	2.439	.805	.438	.723	.454
	[2.87]	[2.07]	[.433]	[1.34]	[1.91]
Lagged Export	-.417	-.238	-.177	-.146	-.170
	[3.38]	[2.05]	[.872]	[.929]	[1.59]
$\bar{T}^2$	.501	.710	.200	.122	.542
Durbin's H	1.15	1.955	12.3	3.30	.23
F-statistic	4.419	9.805	1.904	1.502	5.266
Number of observations	18	19	19	19	19

Note: Numbers in brackets are t-statistics.
(*) GNP for the United States.

There are several features in these results that are worth discussing in some detail. First, with only one exception all signs in every regression are as expected: an increase in the importing country's level of real activity is associated with increasing imports. France is the exception, but the coefficient is insignificant by traditional standards of statistical significance. Similarly, increases in the

competitiveness of South Korean goods, as measured by the real exchange rate, are always associated with increasing exports.

The second important result is that the variance of explanatory power of the model across countries is very large. The model is significant at the 1% level in the case of Germany, at the 5% level for France and the United States, and insignificant for Italy and U.K. Furthermore, Durbin's h for Italy shows that the error term is serially correlated, and the estimates are therefore inefficient.

Thirdly, the impact --that is, within-year-- effect of real exchange rate changes on exports is large and significant for Germany and United States, large but not significant for France and Italy, and totally insignificant for the United Kingdom.

Finally, Table IV.2 summarizes many of these results by reporting country-specific long run elasticities of imports from South Korea. The elasticities are computed according to the method discussed in section IV.1 above.

Table IV.2 Long Run Income and Real Exchange Rate Elasticities

	FRANCE	GERMANY	ITALY	UNITED KINGDOM	UNITED STATES
Income	6.15	3.76	4.35	5.60	3.00
Real Exchange Rate	5.85	3.38	2.47	4.95	2.66

The estimated elasticities reported in Table IV.2 are very high for both income and real exchange rate when compared to results presented in the literature. This may be due to having used annual data as opposed to quarterly, as it is often the case in the literature, or to the choice of deflators to compute the real exchange rate used in the estimation. Furthermore, only elasticities for France (both) and Germany (real exchange rate only) have been computed on the basis of regression coefficients significant at the 5% level or above. All these considerations notwithstanding, since the ordering of countries by size of elasticity reflects the ordering by regression coefficients sign and significance, we can conclude that over the period that goes from 1967 to 1986 France and Germany were the two countries most affected by changes in price of their own goods relative to those of imports. This relationship is weaker for the U.S., Italy, and the U.K., in descending order. For the latter three countries the increase in domestic purchasing power has had a larger effect on imports from South Korea than changes in international relative prices.

IV.3 Issues of Time Patterns of Variability and Directions of Causality

The estimates of lung-run elasticities supplied above sufferfrom some weaknesses related to the model's apparent inability to remove serial correlation of the error terms in the case of Italy and the U.K.. In addition, regression coefficients are measures of co-variation of variables, and in general have little to say about the actual direction of causality among variables: it is the modeler's prior that allows to say whether the explanatory variables in the model are pre-determined

relative to the dependent variable.

A way to test the robustness of our results is to resort to the basic causality test devised by Granger, which is a way of assessing whether the independent variable in the regression equation does actually precede the dependent variable in time. Obviously, time ordering does not necessarily reflect causality ordering --a variable may react today to a future expected change in another variable, if the agent is forward-looking, and the time ordering of changes would mislead the observer as to the "true" direction of causality.

In the present context, however, Granger causality tests should not be too worrisome. We are going to test for the time pattern of changes in the bilateral real exchange rate and the importing country's income on the one hand, and the volume of exports from a small country to a large one on the other. As to the relationship between imports and importing country's income, there is no prior theoretical reason why exports from South Korea to France --a small fraction of France's total imports anyway-- ought to lead France's income. On the other hand, theory suggests that the real bilateral exchange rate ought to lead changes in the volume of trade between two countries. If the exchange rate is, at least to some extent, the relative price of assets, theory suggests that changes in fundamentals ought to be reflected in the exchange rate before changes in goods prices and real economic activity. Thus, we would expect to see both the exchange rate and the importing country's income to lead the volume of trade in time. Table IV.3 reports the results of all the Granger causality tests run for exports of South Korea to the five large countries we are interested in.

Table IV.3 Granger Causality Tests for the Relationship Between Imports, Income, and Competitiveness. Null Hypothesis: Imports Are Not Led by "Variable"

	Unconstrained Model		Constrained Model		Causality Test
[1]	[2]	[3]	[4]	[5]	[6]
Variable	$\bar{R}^2$	F(6,12)	$\bar{R}^2$	F(3,16)	F(3,13)
FRANCE					
GDP	.88	20.60	.88	38.28	1.706
R	.86	16.47			.577
GERMANY					
GDP	.94	42.84	.94	80.27	1.716
R	.94	46.54			2.247
ITALY					
GDP	.74	8.76	.71	14.07	6.408
R	.67	6.35			.619
UNITED KINGDOM					
GDP	.99	195.88	.97	176.20	1.580
R	.96	69.71			1.851
UNITED STATES					
GDP	.98	156.39	.96	135.32	9.071
R	.97	85.76			2.920

Results from the last column in Table IV.3 lend support to the hypothesis that the real bilateral exchange rate never leads the volume of real imports for any of the five countries in the sample. On the other hand, real income is the leading variable for two countries out of five --Italy and the U.S., at the 1% significance level.

Two results stand out in concluding this section. The first is that general models of import demand and export performance are too simple-minded to be of much relevance for any given country. The model specified and estimated here is insignificant for two countries out of five --Italy and the U.K. More qualitative and institutional-type work is needed before more complete country-specific import demand functions can be specified to yield results of interest to the policy maker.

The second result to be highlighted is that the level of aggregate demand in the importing country appears to be a better predictor of export performance by the exporting country than the real bilateral exchange rate. This conclusion is supported by both the error-correction model and the Granger causality tests. While one cannot simply conclude that therefore price competitiveness is irrelevant, there results do support the theoretical claim that exchange rate policies are short-run policies, whose effects on export performance disappear over the longer run.

The issue of short-run effectiveness of exchange rate policy to promote export performances is discussed further in section V. We now attempt to identify correlations between exchange rate and export volumes at a more disaggregated level of merchandise definition.

IV.4 Using Export Demand Functions to Identify Sectors Sensitive to Exchange Rate Changes

Goal of this section is to determine whether there exists a relationship between exchange rate and export performance at a disaggregated level of product definition. The dataset (15) contains annual data, from 1967 to 1986, for seventy-one industrial sectors, plus a miscellaneous goods sector.

We start out by grouping sectors according to data availability, (16) and distinguish among five categories:

A. Sectors for which all observations take on zero values;
B. Sectors for which no more than five observations are non-zero;
C. Sectors for which no more than ten observations are non-zero;
D. Sectors for which at least fourteen observations are non-zero;
E. Sectors for which all observations are non-zero. (17)

I arbitrarily decided to restrict model estimation to those sectors with at least fourteen non-zero observations. The thirty-six sectors meeting this requirement --actually thirty-five, plus the total-- are those identified with a letter D or F in Table IV.4 .

15. The data, collected and published by EUROSTAT, was accessedthrough CEPII, Paris.

16. Our criterion for the choice of sectors to focus upon does not allow to identify the "emerging" sectors, but this is a price that must be paid in order to be able to attach statistical significance to the results.

17. Obviously this classification is also revealing of the time pattern of import penetration. For instance, goods represented in group E have been imported since 1967, whereas most of the goods represented in group B have only recently began being imported.

The problem is now to determine which of thirty-six sectors appears to be sensitive to exchange rate changes, and which does not. One way of addressing the question would be to estimate import demand functions for each sector from the rest of the world. We do not follow this route because the real effective exchange rate for Hong Kong is not available, and we would have to build our own. Furthermore, I prefer to stay away from estimates of the world's real aggregate activity level. Thus, I have chosen to estimate the model for exports from Hong Kong to Italy. This is a totally random choice, and there is little a-priori knowledge that things should be radically different, or very close, for the other major industrial countries for which data are available.

The model to be estimated is

$$[1] \quad dM_t = b_0 + b_1 dRGNP_t + b_2 dRER_t + b_3[M_{t-1} - RGNP_{t-1}] + b_4[M_{t-1} - RER_{t-1}] + m_t$$

where $dY_t = Y_t - Y_{t-1}$, M is the volume of imports, RGNP is the Real GNP of the importing country, RER is the Real Exchange Rate, and t denotes time. Estimates of b_1 and b_2 are reported in Table IV.4, columns 5 and 7 respectively. Coefficient estimates for the error-correction parts of the model are not reported but available from the author.

Fifteen sectors turn out to pass the requirements I imposed: positive and significant coefficient on the importing country's real income, positive and significant coefficient on the real exchange rate. The results are reported in Table IV.4, columns [5] through [10].

TABLE IV.4 SectorDefinition,Category,and Responsiveness to Exchange Rate Changes

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[11]	[10]
1	BA	CEMENT AND PLASTERS	B							
2	BB	CERAMIC, TILES AND BRICKS	E	+	n	+	n	34	2.3	3.3
3	BC	GLASS FL. GLASS AND DER.	E	+	y	+	n	51	2.3	5.6
4	CA	IRON AND STEEL PRODUCTS	B							
5	CB	FIRST TRANSF. FER. PROD.	A							
6	CC	NON-FERROUS METALS	C							
7	DA	SPINNING AND WEAVING PR.	E	+	n	-	n	36	1.9	3.5
8***	DB	MANUFACTURED CLOTHES	E	+	y	+	y	67	1.6	10.3
9***	DC	HOSIERY AND KNITWEAR	E	+	y	+	y	63	1.4	8.6
10	DD	CARPETS ,OTH. FIN. TEXTIL	E	+	n	+	n	21	2.3	2.2
11***	DE	LEATHER FURS AND SHOES	E	+	y	+	y	66	1.8	9.8
12***	EA	WOOD PRODUCTS	E	+	y	+	y	39	2.0	3.9
13	EB	FURNITURES AND DERIVATED	E	-	n	-	n	.0	1.8	1.1
14	EC	PAPER PASTE,PAP.,P.BOARD	D	+	y	+	n	24	1.5	2.4
15***	ED	PRINTING PRODUCTS	D	+	y	+	y	64	2.0	8.9
16***	EE	MIS.MAN.PROD. N.E.S.	E	+	y	+	y	59	1.5	5.5
17	FA	MODELED FOUNDRY PROD.	C							
18	FB	METAL AND MECH. PROD.	E	+	y	+	n	32	1.7	3.2
19	FC	MOT.TURB.PUMPS ENG. N.E.S.	D	-	n	-	n	26	1.9	2.5
20	FD	MACHIN. AND AGRIC. PROD.	A							
21	FE	MACHINE-TOOLS	C							
22	FF	MOV. EXTRACT. CONST. ENG.	C							
23	FG	SPECIALIZED MACHINERY	D	+	n	+	n	.1	2.4	2.5
24	FH	WEAPONS	A							
25***	FI	PRECISION INSTRUMENTS	D	+	y	+	y	52	1.7	5.8
26***	FJ	CLOCK WATCH.MAKING INDUS.	E	+	y	+	y	50	1.9	5.6
27***	FK	OPT. PHOTO. AND FILMS EQ.	E	+	y	+	y	33	1.8	3.2
28	FL	ELECTRONICAL COMPONENTS	D	+	n	-	n	.0	1.9	1.0
29	FM	DOMESTIC ELECTRON. PROD.	E	+	n	+	n	.0	1.6	1.1
30	FN	TELECOMMUNICATION PROD.	D	+	y	-	n	20	2.5	2.1
31***	FO	OFFICE EQUIP. AND COMPUT.	D	+	y	+	y	52	2.1	5.9
32***	FP	HOUSEHOLD ELECTR. EQUIP.	D	+	y	+	y	54	2.1	6.3
33	FQ	HEAVY ELECTR. EQUIP.	D	+	n	+	n	12	3.0	1.6
34	FR	SMALL EL. EQ. AND DERIV.	E	+	y	+	n	56	2.4	6.7
35	FS	SPARE PARTS	B							
36	FT	CYCLES,MOTO ,PASS. CARS	D	-	n	+	n	40	2.0	4.0
37	FU	COMM. VEHIC. OTH. TRANSP.	B							
38	FV	SHIPS	D	+	n	+	n	24	1.8	2.5
39	FW	SPACE AERON.CONS	B							
40	GA	BAS. CHEMICAL PROD.	C							
41	GB	FERTIL. AGRIC. CHEMICALS	B							
42***	GC	ORGANIC CHEMICALS	D	+	y	+	y	56	1.7	6.7
43	GD	PAINTS VARNISHES TINTS	C							
44	GE	SHAV. LOT. SOAPS PERFUMES	C							
45	GF	PHARMACEUTICAL PRODUCTS	D	+	n	+	n	29	2.2	2.9
46	GG	PLASTICS FIBERS RESINS	C							
47***	GH	PLASTIC PRODUCTS	E	+	y	+	y	51	2.1	5.7
48	GI	RUBBER PRODUCTS	C							
49	HA	IRON ORES	B							
50	HB	NON FERROUS METALS ORES	C							

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
51	HC	RAW MATERIALS N.E.S.	C							
52	IA	COAL AND LIGNITE	A							
53	IB	CRUDE PETROLEUM	A							
54	IC	NATURAL GAS	A							
55	ID	OTH. PRIMARY ENERG. PROD.	A							
56	IG	COKE, COAL LIGNITE DERIV.	A							
57	IH	PETROLEUM DERIVATED	C							
58	II	GAS DELIVERIES	A							
59	IJ	ELEC.WARM WATER STEAM DEL	A							
60	JA	CEREALS	A							
61	JB	OTH FOOD AGRIC. PROD.	D	+	n	-	n	11	1.9	1.6
62	JC	AGRIC. PROD. FOR INDUSTRY	E	+	n	+	n	55	2.3	6.6
63	KA	CEREALS DERIVATED PROD.	B							
64	KB	VEGETABLE ANIMALS FATS	B							
65	KC	MEAT POULTRY AND FISH	E	+	n	-	n	21	1.9	2.2
66	KD	CANNED MEAT POULT. FISH	B							
67	KE	CANNED FRUIT VEGET. N.E.S.	D	+	n	-	n	17	1.6	1.9
68	KF	SUGAR CHOCOLATE CANDIES	B							
69	KG	PET FOOD	A							
70	KH	BEVERAGES (INCL. ALCOHOLIC)	B							
71	KI	TOBACCO	B							
72***		MISCELLANEOUS N.E.S.	E	+	y	+	y	41	2.1	4.1
73***		TOTAL	E	+	y	+	y	72	1.5	12.8

Note: Column [1]: ordering number; [2]: data-source code for the sector. The first letter identifies the sector in the 10-sector breakdownto which each of the 71 disaggregated sectors belong. [3]: sector definition (product description); [4]: product category; [5]: sign of the real income coefficient; [6]: significance of [5] at the 5% significance level; [7]: coefficient on the real exchange rate; [8] significance of [7] at the 5% level; [9] R-squared corrected for degrees of freedom; [10] Durbin-Watson statistic. The statistics are not valid as a test for serial correlation in the present context; [11] F-statistic of the regression; *** identifies sectors for which the estimated model yields coefficient estimates significant at the 5% level.

The list of products for which a significant correlation between export performance and exchange rate was found follows. Clearly, one should not conclude from these results that these are the only products whose degree of price competitiveness has increased due to exchange rate changes, nor that exchange rate changes alone have determined favorable

8	DB	MANUFACTURED CLOTHES
9	DC	HOSIERY AND KNITWEAR
11	DE	LEATHER FURS AND SHOES
12	EA	WOOD PRODUCTS
15	ED	PRINTING PRODUCTS
16	EE	MIS.MAN.PROD. N.E.S.
25	FI	PRECISION INSTRUMENTS
26	FJ	CLOCK WATCH.MAKING THINGS.
27	FK	OPT. PHOTO. AND FILMS EQ.
31	FO	OFFICE EQUIP. AND COMPUT.
32	FP	HOUSEHOLD ELECTR. EQUIP.
42	GC	ORGANIC CHEMICALS
47	GH	PLASTIC PRODUCTS
72		MISCELLANEOUS N.E.S.
73		TOTAL

changes in the goods' degree of price competitiveness. However, the fact remains that the goods in the above list are the same ones that anedoctal and qualitative evidence have identified as among the most competitive.

V. THE EFFECTS OF DOLLAR DEPRECIATION ON THE RE-DIRECTION OF NICS EXPORTS FROM THE US TO EUROPE: EVIDENCE FROM MONTHLY DATA

V.1 Exchange Rates and Pattern of Total Exports: the Case of South Korea

In February 1985 the U.S. Dollar peaked relative to all major European currencies and the Japanese Yen. Since then it has depreciated sharply and then recovered somewhat, but it is well below that all-time high. The question we address in this section is whether there exists a short run relationship between trade flows and exchange rate.

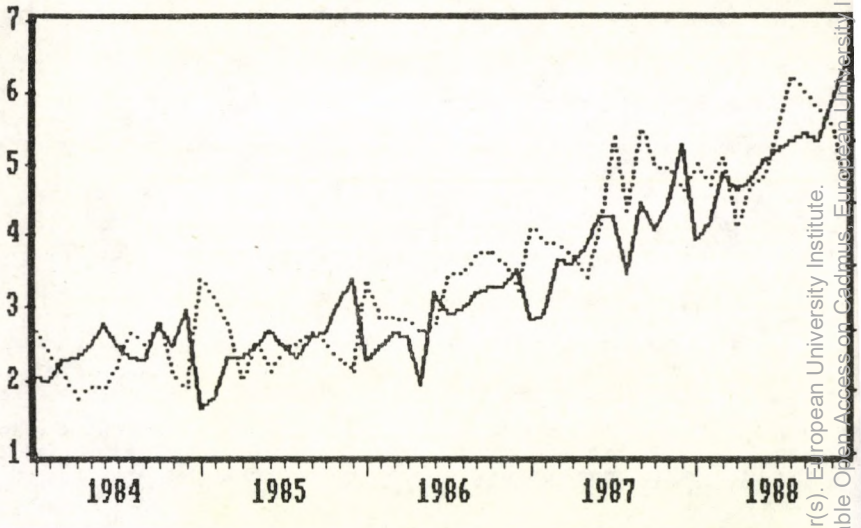
We start out with the analysis of monthly data on total exports from South Korea to the Community as a whole and to the world for the period from January 1984 to December 1988. The hypothesis we want to test is whether it can be said that the Dollar depreciation that began in February/March 1985 has had an impact on the allocation of exports between the Community and the rest of the world. (18)

Figure V.1 is a plot of total monthly exports from South Korea (solid line, left scale) and of South Korean exports to the Community of twelve. Both series are expressed in millions of U.S. Dollars, even though they have been derived from two different sources. (19) It is apparent

18. Unfortunately we do not have similar data for the Community as a whole and the United States. This implies that we have to focus on the rest of the world rather than specifically on the U.S.

19. Total exports data are from the IMF's International Financial Statistics, country page on Korea, line 70. The data, originally in Won, was converted to dollars through the nominal bilateral exchange rate between the Won and the Dollar from IFS, line ae. The dotted line represents data for total exports to the Community of twelve, and is available in thousands of ECUs from the CRONOS database of EUROSTAT.

Figure V.1 Total South Korean Exports (solid line, left scale, billions of current Won) and South Korean Exports to EEC (billions of ECUs)



from the figure that exports to the EEC and those to the rest of the world have moved roughly at the same pace throughout the sample period. Figure V.2 reports the time pattern of the share of South Korean exports to the EEC relative to total exports (solid line, left scale), and the exchange rate between the U.S. Dollar and the Won. The first month of the year is always a local peak because of both high imports from the EC and relatively low total imports from the world in that month. In January 1985 this results in an abnormally high share of South Korean goods going to the Community: this latter fact is of no consequence, but the recurring peak in January points out the existence of important seasonal cycles.

It is important to notice in this figure that there appears to be a high correlation between the Dollar value of the Won and the share of total South Korean exports going to the Community. The latter falls as the Dollar appreciates relative to the Won in the early part of the sample, and it increases drastically in correspondence of a drastic Dollar depreciation. The breakdown of this correlation in the last two months of 1988 appears to be due to the seasonal behavior of exports. Sometimes in late 1985, therefore, there was a sharp turnaround in the trend of the share of EC imports from South Korea. Table V.1 reports some descriptive statistics for the two subperiods separated by December 1985. Even without correcting for the 1985.01 abnormally high value of the ratio, the average is higher in the second period, it variance is lower, and the range m is much narrower.

Figure V.2 Share of Total S. Korean Exports going to the EEC (solid line, left scale) and Bilateral Nominal Exchange Rate US$/Won, 1984-1988.

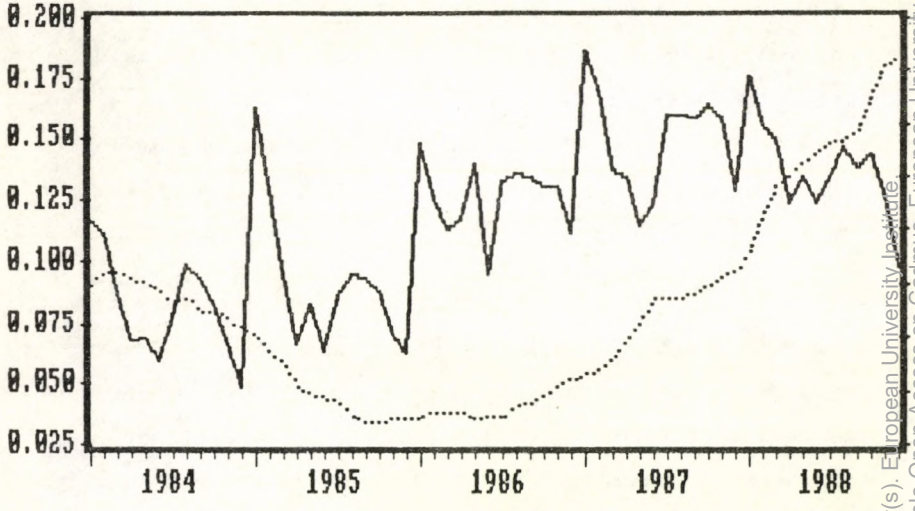


Table V.1 Descriptive Statistics for the Share of Total S. Korean Exports Going to the Community of Twelve

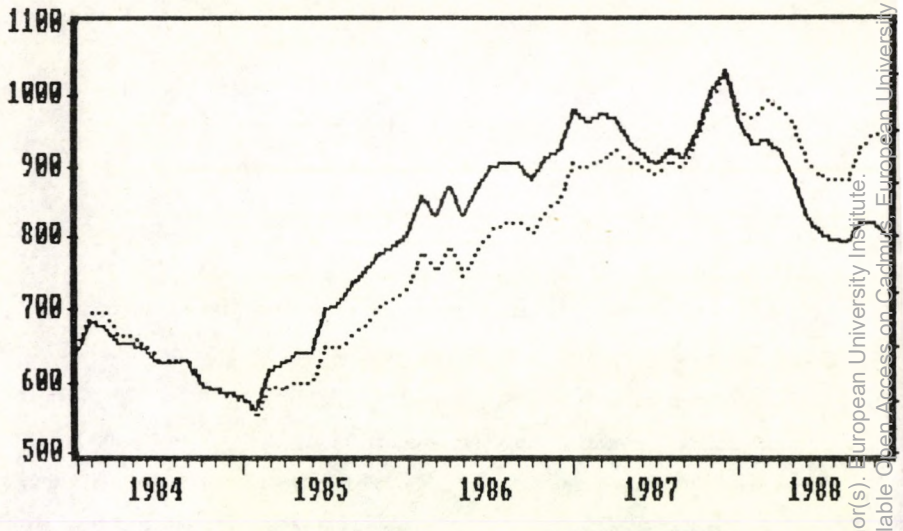
	Mean	S.D.	Max.	Min.
1984.01-1985.12	.086	.025	.162*	.049
1986.01 1988.12	.138	.021	.186	.095

* In 1985.01

Was this a result of the depreciation of the Dollar? Figure V.3 shows the time dynamics of the bilateral Won-ECU exchange rate (solid line, measured on the left scale) and the Dollar-ECU rate. (20) Dollar and Won follow exactly the same pattern relative to the ECU up until February 1985, when the ECU bottoms relative to both. After that, however, the Won depreciates much faster than the Dollar until the end of 1987, when the ECU peaks relative to both. The implication is that goods priced in Won were becoming less expensive in terms of ECUs even faster than goods priced in Dollars. Thus, it is fair to conclude that for nearly three years --from the beginning of 1985 to the end of 1987- movements of the Won/ECU nominal bilateral exchange rate were such to enhance the price competitiveness of South Korean exports even relative

20. The Won-ECU rate was computed as the cross-rate between Dollar and ECU on the one hand and Dollar and Won on the other. The source for exchange rates is IFS, country pages.

Figure V.3 Bilateral Won/ECU Exchange Rate (Left Scale, Solid Line) and Bilateral Dollar/ECU Rate, 1984-1988.



to Dollar-priced goods. For the whole of 1988 both the Dollar and the Won appreciate relative to the ECU, but the former does so at a much faster rate.

In order to test the hypothesis that the nominal bilateral exchange rate between the Won and the ECU has had an impact on the short-run distribution of South Korean exports between the Community and the rest of the world, I have experimented with four different econometric models. The general form of the four models is

$$[5.1] \qquad S_t = b_0 + b_1 S_{t-1} + b_2 X_t + b_3 e_t + m_t ,$$

where S is the share of total S. Korean exports going to the Community, X is the volume of real total exports, e is the nominal bilateral exchange rate between the Won and the ECU --the Korean currency price of the ECU, m is an error term, and the subscript t denotes time. This model is estimated first exactly the way it is specified in [5.1]; the second specification corrects for first-order serial correlation through the traditional Cochrane-Orcutt iterative procedure; the third is again model [5.1] with both dependent variables and real exports corrected for seasonal patterns; and the fourth specification replicates the second and the third together, in that it includes both seasonal adjustments and correction for first-order serial correlation.

Results are reported in Table V.2. All four models assume that some degree of price stickiness prevails in both importing and exporting

countries in the short run as it is reflected by the fact that we use the nominal exchange rate as a regressor, whereas the real rate was used in the previous section to estimate long-run elasticities.

Table V.2 Short Run Models for the Effects of Nominal Exchange Rates on the Share of S. Korean Exports Going to the Community

	[1]	[2]	[3]	[4]
Independent Variables	Dependent Variable: Share	Share	Seasonally Adj. Share	Seasonally Adj. Share
C	-.0178 [1.00]	.151 [2.10]	-.013 [1.08]	.112 [2.04]
Lagged Share	.323 [2.76]	----	.621 [5.68]	----
Total Real Exports	-.0025 [3.24]	-.006 [9.21]	-.0008 [1.12]	-.003 [4.74]
Nominal Rate Won/ECU	.00020 [5.36]	.00016 [1.91]	9.9D-5 [3.35]	1.2D-4 [2.08]
AR(1)	-----	.891 [13.7]	-----	.908 [15.4]
$\bar{R}^2$	.60	.73	.78	.82
F-statistic	29.92	55.45	71.62	86.87
Q-statistic (24 lags)	25.90	26.50	14.39	20.42
Number of Observations	59	59	59	59

The Q-statistics for whiteness of residuals show that seasonal adjustment does more to improve efficiency of estimates than correction for first-order serial correlation.

The four models yield rather consistent results, even though conclusions ought to be based largely on the third one. The nominal value of the Won vis-a-vis the ECU is always a significant factor affecting the share of total exports going to the Community. This share also appears to be a consistently negative function of the value of total real exports from South Korea --which is probably to be interpreted as a sign that the U.S. market is the "locomotive" for the South Korean export sector. There appear to be little doubt that exchange rate policies do have short run effects on the redirection of trade flows.

V.2 Exchange Rates and Merchandise Pattern of Exports from South Korea to the Community

I now want to present evidence on the pattern of South Korean exports to the Community on a sectoral basis. A breakdown of exports for ten industrial sectors is available on a monthly basis for the same period covered above. First, I present some descriptive evidence on the dynamics of the composition of imports for the Community; then we turn to estimating a model similar to the one used above for each of the ten sectors in the dataset. The meaning of the latter exercise is to generate a ranking of sectors in terms of their relative exposure to exchange rate policy.

Table V.3 reports monthly average rates of growth of EC imports from South Korea at the level of ten industrial sectors (plus the total). All rates have been computed out of series denominated in current ECUs.

Table V.3 Average Monthly Growth of Community Imports from South Korea

	1984	1985	1986	1987	1984-1988	1988
1. FOOD PRODUCTS	15.2	7.6	3.6	11.0	9.3	NA
2. BEVERAGES	9.1	4.3	3.5	- .9	3.9	NA
3. CRUDE MATERIALS	9.9	12.4	14.4	5.4	10.6	NA
6. CHEMICALS	5.8	5.8	4.7	8.0	6.1	NA
7. MANUFACTURED GOODS	- 4.9	6.9	4.5	3.4	2.6	NA
8. MACHINERY AND TRANSP. EQUIPMENT	5.5	7.6	7.4	4.7	6.3	NA
9. MISC. MANUFACTURES	- 4.6	7.1	8.6	6.9	4.6	NA
10. GOODS N.E.S.	35.9	27.0	9.0	10.9	20.4	NA
11. TOTAL	- 2.3	4.2	5.1	4.3	3.0	.16

N.B.: Values for sectors 4 (Mineral and Fuels) and 5 (Animal and vegetable oils) are not large enough for these statistics to be meaningful.

As one would have expected, 1984, which was the year in which European currencies were weakest relative to both the Dollar and the Won, was also the year of slowest growth of South Korean exports into the Community, with a negative monthly average growth. This never happens again in the following three years, nor do any of the ten

sectors show negative growth -with the exception of sector 2 in 1987. Since these figures are in ECUs, the support they lend to the hypothesis that nominal exchange rate changes do have real effects in the short run is all the stronger.

To see whether any sectoral effects of exchange rate changes can be detected, I specified and estimated the following model:

$$[5.2] \quad X_j = b_0 + b_1 \sum_j X_j + b_2 e + m \ ,$$

where X_j is the total import value of South Korean goods classified under sector j, b_0 is a constant, $\sum_j X_j$ is the total value of imports from that country, e is the nominal bilateral exchange rate between Won and ECU, and m is the error term. In the estimated model all variables are in log, and the coefficients can therefore be interpreted as short-run elasticities. Furthermore, the model has been estimated correcting for serial correlation of error terms. Table V.4 reports only the results necessary to 'rank' sectors according to their apparent reactivity to changes in nominal exchange rates.

In interpreting the results on Table V.4 it ought to be kept in mind that the overall effect of exchange rate changes on South Korean exports to the Community is captured in what I have called "estimated elasticity with respect to total imports." Estimated elasticities reported in the second column of the table, therefore, are to be interpreted as measures of sector-specific effects of nominal bilateral exchange rate changes beyond the average effect on every export sector.

Table V.4 Estimated Sectoral Short Run Elasticity with Respect to Nominal Exchange Rates and Total Imports. Standard Errors in Brackets

Sector	Estimated Elasticities	
	w.r.t. total imports	w.r.t. exchange rate
1. FOOD PRODUCTS	.431 [.237]	.506 [.428]
2. BEVERAGES	-.090 [.196]	-.359 [.352]
3. CRUDE MATERIALS	.532 [.310]	-.730 [.564]
6. CHEMICALS	.515 [.175]	.266 [.303]
7. MANUFACTURED GOODS	.650 [.082]	.121 [.857]
8. MACHINERY AND TRANSP. EQUIPMENT	.784 [.183]	1.228 [.430]
9. MISC. MANUFACTURES	1.265 [.109]	-.762 [.237]
10. GOODS N.E.S.	.984 [.400]	-.788 [.770]

I briefly comment on the results in each of the columns separately. It appears from the first column that the fastest-growing imports from South Korea into the Community are, in descending order of relevance, miscellaneous manufactures, assorted goods not assigned to a specific category, machinery and transport equipment. All the other goods imports grow at a rate lower than total imports, and the import of beverages is declining. As to the reactivity of each sector to changes in the exchange rate, machinery and transport equipment are the goods most benefiting from them, followed by food products and chemicals. On several other sectors the value of the Won appears to have had the opposite effect, often in a significant manner. There is no doubt that exchange rate changes are not sector-neutral.

VI. CONCLUSIONS

The research reported here had two goals: to document the time and commodity patterns of Community imports from Newly Industrializing Countries (NICs) over the last twenty years; and to identify the role of the exchange rate in determining the patterns of NICs trade over the same period. While the former goal was descriptive in nature, the latter is an attempt at uncovering the existence of possible causal links between the geographical distribution of NICs exports and their exchange rate policy.

In the first section I simply presented some descriptive statistics about a number of developing countries. The purpose here was to highlight the importance of outward orientation of countries that are known instances of "successful development."

Section II was divided in two parts. In the first part I discussed the theoretical channels that would lead changes in nominal exchange rates to have real effects --on the volume of trade and its direction, on aggregate economic activity, and resource reallocation within the exporting country. The discussion led to the tentative conclusion that the typical chain of causality devaluation-cheaper exports-current account surplus-higher aggregate economic activity is not necessarily working in the smooth fashion that much of the literature of the 1950s and 1960s described. In the second part of the section I reported state-of-the-art estimates of income and price elasticities of developed countries' imports from NICs. The low values of these estimates are strongly supportive of the doubts raised in the first part of the section about the ability of exchange rate changes to set in motion

smooth processes leading to export growth.

In section III I began working on the descriptive part of the project, which yielded some interesting tentative conclusions about the patterns of trade of the major EEC member countries and the U.S.. First, there exists a correlation between the bilateral exchange rate and the value of imports of these countries, as it is confirmed by the fact that U.S. imports from the NICs increased most during the years of maximum Dollar strength, and that EEC imports increased most after 1985, the years of Dollar weakness. Secondly, the shares of each of the major EEC member countries in total European imports from NICs have changed markedly, apparently in correlation with changes in each country's exchange rate relative to the U.S. Dollar.

The commodity composition of those imports has also changed. First, European countries are converging toward a pattern of import composition that more and more resembles that of the U.S.. Secondly, the "traditional" NICs exports such as textiles and agricultural products have become less important, while mechanical and electrical manufactures are now the most important import category.

In section IV I addressed the question of long-run effects of exchange rate changes: is it possible to identify long lasting effects of currency depreciation on the volume of exports at the aggregate or the industry level? The answer to this question is that in general income growth in the importing country is a more crucial factor than changes in relative prices. In the long run, when changes in domestic prices tend to adjust following exchange rate shocks, competitiveness is driven more by productivity differentials and product-related

considerations than by changes in exchange rates. But in the **short run** --one year or less in our framework-- exchange rate changes do appear to have a substantial impact. This is not necessarily so in general, for countries such as France and Italy do not show any sizable reaction to the change even in the shorter time frame; but the relationship is there, and rather strong, for Germany and the U.S..

As a way to test the robustness of these conclusions I run traditional bivariate causality tests to assess whether there exists any consistent patterns of lead-and-lag between the exchange rate and the volume of exports. The conclusion for all countries involved was that the real exchange rate **never** leads exports in time.

The next question to be addressed was whether such an apparent neutrality of the real exchange rate on the volume of trade hides any effects at the industry level. One may suspect that the effect of exchange rate changes is more on the composition of exports, than on the volume of exports itself, as I have argued to some extent in section II. I analyzed this issue for seventy-one sectors for which data are available since 1967, and generated a list of products whose export performance appears to have been positively affected by exchange rate changes. The list appears at the end of section IV.

On the basis of the econometric analysis conducted in section IV we have to conclude that exchange rate changes are more likely 1. to affect the export performance of a country in the short than in the long run; and 2. to affect the export performance of individual industries than of a country as a whole. Thus, in section V I shifted the focus of the analysis to the short run by estimating import demand functions at

the industry level on the basis of monthly data between 1984 and 1988. Data availability forced the choice of South Korea as the export country. It appears from our results that the fastest-growing imports from South Korea into the Community are, in descending order of relevance, miscellaneous manufactures, assorted goods not assigned to a specific category, machinery and transport equipment. All the other goods imports grow at a rate lower than total imports, and the import of beverages is declining. As to the reactivity of each sector to changes in the exchange rate, machinery and transport equipment are the goods most benefiting from them, followed by food products and chemicals. On several other sectors the value of the Won appears to have had the opposite effect, often in a significant manner. Once again we find, as we did in section IV, that exchange rate changes are not sector-neutral.

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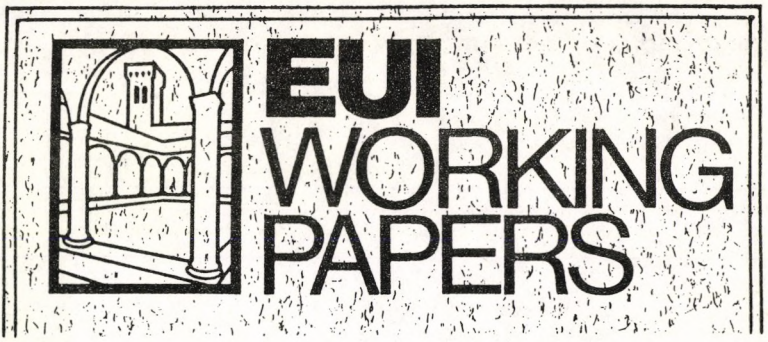

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