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What Would Happen If All Developing Countries Expanded Their Manufactured Exports?

Will Martin

As more developing countries expand their manufactured exports, all developing countries benefit, because the prices of their manufactured imports (purchased from each other) decline.

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This paper — a product of the International Trade Division, International Economics Department — is part of a larger effort in the department to analyze developing country trade in manufactures. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Dawn Gustafson, room S7-044, extension 33714 (March 1993, 28 pages).

Despite the achievements of the export-oriented economies of East Asia, many policymakers doubt that a development path led by manufactured exports is feasible for all developing countries.

Martin examines what happens if all developing countries, rather than merely a few, expand manufactured exports. He considers two driving forces for export expansion: the liberalization of trade barriers, and productivity growth in the production of manufactured exports.

With only trade liberationalization, the static welfare gains are small (with the standard Armington specification used in the analysis). Even the export growth rates are far too small to replicate the essential East Asian experience. And when all developing countries participate in static trade liberalization, the small welfare gains diminish slightly.

Under the more realistic assumption of dynamic export growth driven by productivity gains for manufactured exports, the welfare effects are much greater and the efforts of developing countries are mutually reinforcing. Because of strong South-South trade links, and developing countries' dependence on manufactured imports, developing countries buy more manufactured goods from each other.

Martin accepts the view of "export pessimists" that a country expanding its manufactured exports will receive depressed prices for those exports. But his results differ because he uses a general equilibrium framework with intra-industry trade rather than a partial equilibrium model of the export market. The general equilibrium model captures the fact that developing countries still import most manufactured goods, often from each other. They will suffer, but they will also benefit, from declining prices. So they are better off if they all expand those exports.

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Rapid growth in exports of manufactures has been a central feature of the successful development of the high growth economies in East and South-east Asia during the past three decades. Prior to the 1980s, this growth pattern was largely confined to the four small economies known as the Asian tigers (Hong Kong; Korea; Singapore and Taiwan, China) and hence could be dismissed as a feasible strategy only for small economies. In this context, it was frequently argued that expansion of manufactures exports by developing countries was subject to a fallacy of composition. If all developing countries attempted to expand their exports of manufactures, the resulting volume of exports could not be absorbed.

The success of the larger developing countries, such as China, Thailand and Malaysia and Indonesia, which achieved high growth rates of manufactures exports in the 1980's has allayed many policy makers' concerns about a potential fallacy of composition for manufactures exports and encouraged a wide range of countries to embark upon a similar course. If, indeed, the fallacy of composition argument should prove to be correct, then its adverse consequences in the 1990's would be much greater than in earlier periods when implicit acceptance of this proposition discouraged developing countries from attempting to stimulate their exports of manufactures.

Despite its critical importance for policy, the precise nature of this alleged fallacy has rarely been made specific. On the supply side, the specific cause of the expansion of manufactures exports is rarely clearly identified despite the likelihood that the source of the increase would have important implications. Faini, Clavijo and Senhadji-Semlani (1992) consider an unexplained, exogenous, devaluation as their supply shock, while Cline (1982) examined an exogenous restructuring of all developing economies to increase the share of their manufactures exports in line with the East Asian Newly Industrializing Economies (NIEs). Other plausible sources of export expansion, such as import liberalization in the developing countries and export growth resulting from technical advances or growth fuelled by direct foreign investment have been discussed in general terms but not formally analyzed.

On the demand side, at least two distinct versions of the fallacy appear in the literature: the elasticity and the protectionist versions of the fallacy. The elasticity version of the fallacy recently re-examined by Faini *et al* (1992) is based on the partial equilibrium notion that the elasticity of export demand for a group of countries is smaller in absolute value than the corresponding elasticity for an individual country. The protectionist version of the fallacy emphasized by Cline (1982) is based on the argument that, beyond some critical level of import penetration, exports from developing countries will face a rapid escalation of protective barriers in developed countries. As Hughes and Waelbrock (1981) have argued, however, the support for such a mechanical link between market shares and protection is not strong, and the market shares of developing countries in many important export products are very low.

Quantitative analyses of the fallacy of composition in manufactures (e.g. Cline 1982; Faini, *et al*, 1992) have tended to adopt a partial equilibrium approach even though the problem is patently general equilibrium in nature and involves interlinkages between imports and exports. Successful increases in exports increase income levels which, in turn, increase the demand for imports. Further, while increases in the supply of exports from one group of countries typically requires a lowering of their export prices, this also implies a lowering of the prices paid for imports by their trading partners. Given the apparent bias of developing country exports of manufactures towards other developing countries (Havrylyshyn and Wolf 1983, p350; Martin and Panoutsopoulos 1991), these general equilibrium effects and interlinkages seem likely to be important.

Another feature of world trade in manufactures ignored in previous quantitative studies of this issue is the importance of intra-industry trade. The presence of intra-industry trade makes it possible for developing countries to be both importers and exporters of a wide range of manufactured goods. In this situation, developing countries can directly benefit from each others' export expansion even when they are exporting the same good.

The purpose of this paper is to analyse the importance of the fallacy of composition when expansion in manufactures exports occurs across the whole range of developing countries. To make the results relatively transparent, the model used in the analysis was kept as simple as possible while still capturing intra-industry trade, the relevant trade linkages and a general equilibrium specification: all of which appear to be of critical importance.

The broad features of the global general equilibrium modeling framework used in the analysis are summarized in the next section of the paper. Then, in the third section, the experiments to be conducted are explained and their results discussed. Conclusions are presented in the final section.

2. The Modeling Framework

The model used in this analysis is an extremely simple global general equilibrium model (Martin 1992) designed to capture the central features of the problem with no additional features which could complicate interpretation of the results. The simplicity of the model has many advantages, particularly in allowing quick changes in regional disaggregation when this is required for particular purposes. It also makes the results obtained from the model dependent upon only a very small number of specified elasticity parameters so that the sensitivity of the model results to these parameters can readily be examined.

The basic general equilibrium structure of the model is based upon the one sector general equilibrium model proposed by de Melo and Robinson (1989) extended from production and consumption of two commodities in one country to three commodities in 13 trading regions. In addition, the global nature of the model allows for endogenous determination of all relative prices given an arbitrarily chosen numeraire price.

With the resources and technology available for production in each region, a single composite production sector operating under constant returns to scale at the industry level produces three commodities: manufactured exports; other exported goods and services; and nontraded goods. The mix of outputs is determined by relative prices and technology according to a constant elasticity of transformation production frontier. This curvature of this production possibility frontier is summarized by a single elasticity parameter, the elasticity of transformation in production.

Technical change in production is incorporated in a very general way by distinguishing between actual and effective outputs (see Dixon *et al* 1982 for very extensive applications of this approach). Under this very flexible and general specification of technical change, a technical advance is specified as increasing the actual, physical quantity of output associated with any given effective quantity, and hence as raising its effective price. Producers optimize over effective quantities and prices so that improvements in the technology of production for any good increase its output both directly by increasing the quantity produced with the initial input mix and indirectly by increasing the effective price of a unit of this output and drawing resources from the production of other goods. This specification can also capture the broad features of sector specific investment which expands output both directly by raising the marginal product of the mobile factors currently employed in the sector and, indirectly, by drawing additional mobile resources into the production of the good. Consistent with Helpman and Krugman's (1985, p131) dichotomy between increasing returns at the level of the firm and constant returns at the broad sectoral level,

our specification, with constant returns to scale at the broad sectoral level, can also be used to capture the effects of pro-competitive policies which increase the extent to which size economies at the level of the firm are exploited.

Total income at domestic prices consists of revenue obtained from production and revenue raised from tariffs on imported goods. Absorption of goods and services in each region is specified as proportional to income in the absence of changes in intertemporal preferences, making the trade account a constant share of national income in all of the experiments reported in this paper. The model is comparative static, eschewing modeling of dynamic stock adjustment responses in favor of an emphasis on real sector behavior.

Three composite consumer goods are consumed in each region: imported manufactures; other imported goods and services; and nontraded goods. The single household in each region allocates its income in order to minimize the cost of achieving any given level of welfare. Thus, increases in the price of any consumer good cause a reduction in the quantity of that good consumed, with the quantity decline depending upon the flexibility with which consumers respond to changes in relative prices. This flexibility is specified using a single elasticity of substitution parameter in a simple Constant Elasticity of Substitution (CES) social welfare function.

The imported consumption goods in each region are aggregates of exports supplied by other regions. Because of differences in the specific products contained in the broad

"manufacturing" and "other" aggregates, and because of fundamental differences in the quality of products from different regions, the products supplied by different regions are assumed to be imperfect substitutes. Their aggregation into manageable aggregates is undertaken using the conventional Armington (1969) approach under which the degree of substitutability between the products of different regions is specified using a single elasticity of substitution. Imported goods are assumed to be subject to import protection which drives a wedge between domestic and world prices. These tariff barriers generate revenues which are redistributed to consumers.

The Armington approach is the best known and simplest approach for incorporating intra-industry trade in a model of world manufactures trade. It captures the product differentiation between products exported by the developing countries and developed country products inherent in earlier, partial equilibrium studies and allows the incorporation of intra-industry trade and general equilibrium effects. It has recently been criticized because, with conventional values for the import demand elasticities, export expansion leads to large adverse terms of trade effects (Brown and Stern 1989). Thus, the results obtained for trade liberalization using this approach are likely to be biased, if anything, towards export pessimism.

The model contains market clearing conditions for the nontraded goods produced and consumed in each region, and equating global supply and demand for the traded goods produced by each region, allowing the supply, demand and price of all goods in the model to

be determined simultaneously. The US aggregate price of consumption goods is generally a convenient numeraire allowing all prices to be reported in terms of real US dollar prices. For the experiments reported in this paper, it is particularly convenient since the numeraire is largely unaffected by the shocks considered.

The constant elasticity of substitution between composite commodities in consumption was set at 1.5, consistent with Whalley (1984) and with the range of empirical estimates summarized by Goldstein and Khan (1985, p1086). The same value of the elasticity of substitution was used across all regions for simplicity and for want of convincing evidence on systematic differences in this parameter. The elasticity of transformation in production was also set at 1.5, a value consistent with the middle of the range of export supply elasticities reported by Goldstein and Khan (1985, p1088) and with preliminary evidence on the export supply of manufactures in a range of developed and developing countries (Martin and Gunnu 1991). The CES and CET specifications do not impose constant import demand and export supply elasticities for all regions: they capture Goldstein and Khan's stylized fact that trade elasticities are typically larger for countries with small trade shares than for those with large trade shares.

The elasticity of substitution between products supplied by different regions was set at 3.0, making traded goods from different regions closer substitutes than traded and nontraded goods within the one region. Such a specification is consistent with Goldstein and Khan's conclusion that the elasticity of demand for the exports of a typical small country is well

above the elasticity of import demand in the country.

The data used in construction of the model were obtained from two sources: World Bank National Accounts data for GDP, exports and imports of goods and nonfactor services; and the UN trade matrix system (Campano 1989) for data on bilateral trade in manufactures and miscellaneous goods (SITC 5-9) and total merchandise trade. Since both sources contain data on an fob basis, the differences between total National Accounts imports/exports and the trade matrix estimates for merchandise trade were used to represent imports and exports of nonfactor services which were then allocated to specific bilateral trade flows via a simple probability model. For consistency, all data were for 1987, the latest year for which the full trade matrix data set is available. Unfortunately, this data base did not allow manufactures trade to be distinguished into consumption goods and industrial inputs, thus requiring the specification of all manufactures either as intermediate inputs or as final goods. Since the choice is somewhat arbitrary and should not affect the results of the experiments reported in this paper, the consumption goods specification of de Melo and Robinson was followed.

Estimates of average tariff rates for the regions included in the model were based on preliminary assessments of tariff rates in developing regions prepared by Roland-Holst (1991) and should be treated as indicative of a very rough lower bound estimate of prevailing protection levels expressed in tariff equivalent form. To save space, the estimates are presented in Table 1. While the tariff estimates are undoubtedly approximate, their general ranking, with South Asia having the highest protective barriers and Latin America and the

Caribbean the second highest appears broadly reasonable, although the omission of nontariff barriers and exchange rate distortions probably leads to an underestimation of protection in Sub-Saharan Africa.

The regional groupings used in the analysis were based on the aggregates used in the World Bank's *Global Economic Prospects*. The developing country regions were: East Asia; South Asia; Latin America and the Caribbean; Sub-Saharan Africa; Middle East and North Africa; Other Europe; and Eastern Europe and the former Soviet Union. The developed country regions were: the European Community; the United States of America; Canada; Japan; Other Industrial; and Other High Income. A notable feature of the regional classification is the inclusion of Singapore, Taiwan and Hong Kong in the developed (Other High Income) group. Full details of the country classification are given in *Global Economic Prospects* (World Bank 1992, Appendix 1). Intra-regional trade was explicitly included in the model since, given the structure of the regions, this trade is typically subject to trade restrictions.

3. Experiments and Results

The experiments undertaken for this paper involve export expansion in the developing countries caused by trade liberalization or by investment or improvements in technology, which are frequently linked with trade liberalization. Protection policies are the primary policies affecting export levels, but the static welfare gains from trade liberalization are

typically very small. The welfare gains which are sought from trade liberalization are, in fact, primarily the "dynamic" gains resulting from efficiency improvements rather than the generally small "static" gains from trade liberalization. Thus, two different analyses were undertaken: one focussing on the comparative static effects of liberalizing trade barriers and a second focussing on productivity gains potentially brought about by a range of policy enhancements, including trade reform.

The fallacy of composition argument is analyzed by comparing the consequences of an export growth shock in one developing region alone with the outcome when all developing countries experience the same shock. The test is something of an extreme one since it is unlikely that *all* developing countries are likely to experience the same shock at the same time. However, it does provide a sensible test of the logical implications of the theory.

Trade Liberalization Experiment

The first experiment conducted involves a ten percent reduction in the rate of protection for manufactures in developing countries. Since the model is linear in percentage changes, the effects of a tariff change of any size can be inferred simply by scaling all of the results as required. The comparison required was performed by comparing the implications of unilateral liberalization with those resulting from contemporaneous liberalization by all developing country regions. This experiment focussed only on the static welfare consequences of trade liberalization, with no allowance made for dynamic gains resulting

from improved technology or increased investment following trade liberalization. Results for key variables from a ten percent reduction in border protection levels are presented in Table 1.

Table 1: Ten Percent Reduction of Manufacturing Protection in Developing Countries [a]

	EA %	SA %	LAC %	SSA %	MENA %	OE %	EER %
Region Alone							
Base Manuf. Protection	28	91	42	25	19	17	15
Manuf. Exports	0.7	2.6	1.4	0.7	0.5	0.6	0.6
Manuf. Export Price	-0.2	-0.8	-0.3	-0.2	-0.1	-0.2	0.1
Manuf. Import Price [b]	0.05	0	0.01	0	0.02	0	0.07
Welfare Change [c]	0.03	0.01	0.07	0.01	-0.03	-0.05	0.01
Output Increase	0	0	0	0	0	0	0
All Developing Regions							
Manuf. Exports	0.8	2.7	1.5	0.9	0.8	0.7	0.8
Manuf. Export Price	-0.2	-0.8	-0.3	-0.1	-0.0	-0.1	0.2
Manuf. Import Price [b]	0.1	0.09	0.08	0.07	0.08	0.09	0.13
Welfare Change	0.03	0	0.05	-0.02	-0.05	-0.06	0.01

[a] Regions: EA, East Asia; SA, South Asia; LAC, Latin America and the Caribbean; SSA, Sub-Saharan Africa; MENA, Middle East and North Africa; OE, Other Europe; EER, Eastern Europe and the former Soviet Union.

[b] Border Price Exclusive of Protection.

[c] Measured using the aggregate change in real absorption. Since preferences are restricted to be homothetic, this exactly measures Hicksian Compensating Variation.

The first set of results presented in Table 1 refers to the situation in which each region, alone, reduces the magnitude of its protective barriers by ten percent of their initial level. This reduction in import barriers lowers the domestic price of manufactured imports and the revenue obtained from import tax revenues. Increased competition from imported manufactures and declining spending on domestic goods resulting from the fall in tax revenues both reduce demand for nontraded goods, causing producers to divert production to export markets so exports of manufactures (and non-manufactures) both increase.

The size of the increase in exports of manufactures depends upon the initial size of the manufactures export sector and the importance of the tariff distortion. In South Asia, where manufactures exports are a very small share of output, only a small shift of resources is required to achieve any given percentage increase in the output of manufactures.

Even the small increases in exports of manufactures observed in this experiment lead to some downward pressure on the prices obtained for exports of manufactures in all regions except Eastern Europe and the former Soviet Union, where intra-regional trade was so strong that the tariff decline resulted in an increase in export prices. In other regions, the magnitude of the decline in prices of manufactures exports was generally proportional to the increase in the volume of exports. As noted previously, this result is very much a feature of the use of the Armington specification and biases the results towards an outcome of export pessimism.

In these unilateral liberalization experiments, the border price of imported manufactures

was affected very little by the increase in import demand resulting from liberalization. Since each of these regions, except EER, was very small in relation to world trade, they were individually able to obtain additional imports of manufactures without causing a substantial increase in their pre-tariff prices.

The overall change in welfare (measured using the aggregate volume of absorption) depends upon whether the static efficiency gains from improved resource allocation outweigh the adverse effects of changes in export and import prices (the terms of trade) and in import tariff revenues. In most regions, the overall effect is a very small gain in welfare. However, in the Middle East and North Africa (MENA), Sub-Saharan Africa (SSA) and Other Europe (OE) regions, initial imports were particularly large because of current account imbalances and the adverse terms of trade effects resulting from import and export expansions result in small welfare losses.

The final row in the top section of Table 1 merely confirms that the effect of a tariff change on the volume of output is zero in a full-employment neoclassical model such as the one employed in this analysis. Any change in welfare results from movement around a production possibility frontier towards a point which will result in a more efficient allocation of the available resources.

The results in the lower section of Table 1 refer to the situation where all developing countries simultaneously reduce the protection applying to their imports of manufactures. As

is evident from the table, the increases in export volumes of manufactures are slightly greater in the simultaneous liberalization case than in the unilateral liberalization case. This is because developing countries are important markets for manufactures from other developing countries (Havrylyshyn and Wolf 1983; Martin and Panoutsopoulos 1991) and simultaneous liberalization increases the demand for the exports of any one country.

While simultaneous liberalization increases the volume of manufactures exports from developing countries, it has very little impact on the prices received for these exports. At the level of precision given in the table, the decline in export prices is the same for most regions. The decline in export prices, however, offset slightly in SSA, MENA and OE, and the export price rises slightly more in EER than in the unilateral case.

The most significant difference between the unilateral liberalization simulations and the all developing region simulation is the general rise in the border prices for imports of manufactures when all developing countries liberalize their import protection on manufactures. Since most developing countries are still net importers of manufactures, the loss resulting from higher prices of imports has a larger impact on welfare than the gains from improvements in export prices for manufactures.

The overall welfare effects of simultaneous liberalization, given in the final row of Table 1 are, like the effects of unilateral liberalization, extremely small. Primarily because of the increase in the price of manufactures imports relative to the unilateral liberalization case,

the welfare gains are smaller, and the welfare losses larger, than in the unilateral liberalization case. The overall effect on welfare in all developing countries is still positive, but extremely small at 0.01 percent of initial consumption levels, with the gains in East Asia, Latin America and the formerly Centrally Planned Economies outweighing the losses in the other regions. This result contrasts with the substantial welfare loss reported by Whalley (1984) in a model utilizing a much lower elasticity of substitution and hence lower cross-price elasticities of demand between products from different countries.

The outcome of these experiments might be interpreted as being consistent with a fallacy of composition hypothesis since the welfare gains do decline slightly when all developing countries liberalize, rather than when one region liberalizes at a time. However, the initial welfare gains are extremely small, and the subsequent changes generally even smaller, making this form of the fallacy of composition a theoretical *curiosum* rather than a matter of practical policy importance. Further, the results reflect the well known tendency of the Armington specification to yield small estimates for the effects of trade liberalization because of the adverse terms of trade effects which it imposes. It seems highly likely that alternative specifications of product differentiation, which also capture intra-industry trade, would yield positive welfare consequences from trade liberalization.

Productivity Growth Experiment

As is clear from the results presented in Table 1, trade liberalization is rarely

undertaken for the conventionally measured static welfare benefits which it yields. The primary objective of trade liberalization is typically thought to be the productivity gains associated with increased opening to trade (Edwards 1992). The extensive literature on trade liberalization and growth has identified a wide range of channels through which these gains might be achieved. These channels include: externalities associated with production for export; differences in marginal productivity between export and other activities; increased factor accumulation following trade liberalization; increased exploitation of size economies internal to the firm; learning by doing in export production; improved availability of high productivity imported inputs following trade liberalization; and transferring resources from socially unproductive uses such as rent-seeking to productive activities. Some of these gains are one-off gains like the static welfare gains identified in the previous section but others, such as learning by doing, can lead to sustained output growth.

The productivity gains identified in the previous paragraph can be modeled very simply as exogenous productivity increases for one or more outputs in the model. Given the focus of the study on manufactures exports, the results presented are for an increase in productivity in the production of manufactures exports. This is a plausible scenario in response to a trade liberalization since most of the sources of productivity enhancement reported in the literature are likely to apply primarily in the production of manufactures. While the productivity growth analyzed in this section may be due to trade liberalization, the links between trade liberalization and growth are not yet well defined (see Edwards 1992 for recent estimates) and so no particular relationship between the two experiments has been incorporated in the

analysis. Given the linearity of the model in percentage changes, any reader willing to specify a particular relationship can simply combine the two sets of results to obtain the total effect of trade liberalization.

Results for a ten percent productivity increase in the production of manufactures exports are presented in Table 2. The general format of the table is similar to Table 1, with the upper half of the table referring to cases of unilateral productivity growth while the lower half deals with the case where all developing countries simultaneously experience productivity gains.

Table 2: Ten Percent Productivity Increase in Production of Manufactures for Export [a]

	EA %	SA %	LAC %	SSA %	MENA %	OE %	EER %
Region Alone							
Manuf Exports	16.6	16.5	16.6	16.7	16.6	16.8	16.0
Manuf Export Price	-6.0	-5.5	-5.6	-5.6	-5.6	-5.7	-7.0
Manuf Import Price	-0.4	-0.1	-0.6	-0.3	-0.2	-0.1	-4.3
Nontraded Price	-0.1	0.0	0.0	0.0	0.0	0.1	-0.9
Welfare Increase	0.65	0.17	0.28	0.28	0.08	0.52	0.48
Output Increase	1.4	0.34	0.47	0.53	0.14	1.2	0.58
Welfare/Output Ratio	0.5	0.5	0.6	0.5	0.6	0.4	0.8
All Developing Regions							
Manuf Exports	16.4	15.5	16.0	16.2	15.8	16.4	15.6
Manuf Export Price	-6.4	-6.2	-6.1	-6.3	-6.3	-6.3	-7.1
Manuf Import Price	-1.2	-2.0	-1.7	-1.6	-2.4	-1.2	-4.7
Nontraded Price	-0.3	-0.2	0.0	-0.2	-0.1	-0.3	-0.6
Welfare Increase	0.79	0.43	0.49	0.56	0.39	0.77	0.6
Output Increase	1.35	0.34	0.47	0.53	0.14	1.17	0.58
Welfare/Output Ratio	0.6	1.3	1.0	1.1	2.8	0.7	1.0

[a] Please see Table 1 for definitions of regions and variables.

The increases in output of manufactures exports following the unilateral productivity shocks lie between 16.0 and 16.8 percent in all regions. The productivity shock creates two forces for export expansion: one due to increased productivity with the resources currently in use and another due to the attraction of additional resources into the industry. The first effect alone would cause a ten percent expansion in output. At constant actual prices, the second effect, operating through the higher effective price of output, would account for a further 15 percent increase. However, these positive impacts are offset by two other price changes: the decline in the price of manufactures exports which results from the increase in their supply; and rises in the relative price of nontraded goods.

The decline in export prices following the productivity shock arises from the model specification that the developing countries are not "small" in the conventional sense of being very small suppliers of homogeneous products onto world markets, but rather supply products which are differentiated from those of other supplying countries. In the unilateral productivity shock case, the decline in export prices for manufactures is very closely related to the magnitude of the output effect, with prices declining by around one third of the increase in output volume.

An important difference from the tariff experiment is the effect of the shock on import prices for manufactures. Even when only single regions experience the productivity

shock, there are typically small declines in the price of imported manufactures. These declines arise because there is a significant volume of intra-regional trade in the model given the diversity of the regions and the geographical proximity of their members.

The welfare gains arising from the productivity shocks are substantially larger than the welfare gains resulting from the pure trade liberalization experiment considered in this paper. In most cases, the welfare gains are smaller than the increase in the total volume of output, but the welfare gain exceeds the output gain in South Asia. The welfare gain has three components: a direct output component; a terms of trade effect; and a tariff revenue effect arising from the presence of distortions. The direct output effect is obviously positive in all cases. The terms of trade effect is negative, with the declines in the price of manufactured exports substantially outweighing the gains from the small declines in the prices of manufactures imports. In the presence of continuing protection, the tariff revenue effect of this shock will be positive and more important the higher the level of protection. In South Asia, the tariff revenue effect is particularly strong and results in the welfare gain from increased productivity being greater than the gain in the volume of output.

The change in output resulting from the shock varies substantially from region to region depending upon the initial share of manufactures exports in the economy. Thus, the increase in output for a given productivity shock is much larger in East Asia and in Other Europe than in regions such as the Middle East and North Africa (MENA).

Results for the case where all developing countries experience the same productivity shock are presented in the lower section of Table 2. For many variables, these results are similar to those which arise when individual regions improve their productivity. The increases in exports of manufactures are of a similar order of magnitude, as are the declines in the price of exported manufactures. The developing countries are still sufficiently small in world markets for manufactures that increases in their combined output do not, on the assumptions used in this analysis, depress export prices substantially more than in the cases where only individual regions grow.

The major difference between the unilateral liberalization scenarios and the 'all developing country' scenario arises from changes in the prices of their imports of manufactures. Given the trading relationships among developing countries, the increase in export productivity results in noticeable declines in the aggregate border prices paid for imports of manufactures by developing countries. This decline in the price of manufactures imports is an important influence on the change in welfare resulting from the uniform productivity shock since, as is evident from Table 3, manufactures imports are a larger share of total absorption than exports are of production in all of the developing country regions considered.

Table 3: **Shares of Manufactures Exports in Total Output and Manufactures Imports in Total Demand**

	Manufactures Exports (%)	Manufactures Imports (%)
East Asia	14.0	18.7
South Asia	3.6	12.3
Latin America & the Caribbean	4.9	14.3
Sub-Saharan Africa	5.5	19.6
Middle East and North Africa	1.4	9.8
Other Europe	12.0	21.0
Eastern Europe & Soviet Republics	5.9	7

One other relatively minor contributing factor to the increase in welfare gains between the single shock case and the uniform shock case is an increase in the price of developing countries' Other Exports relative to their import prices. The technical advance in manufacturing which is the subject of this analysis draws resources out of the production of other goods, reducing their supply and raising their price by more than the increase in the price of other imports.

Because of these influences, the welfare gains arising from across the board productivity increase are generally larger, and frequently substantially larger, than the gains resulting from unilateral liberalization. Only in East Asia and in EER are the gains from concerted liberalization not substantially larger than in the case of single region shocks. This difference arises because these two regions are the only ones where the share of manufactures exports in total output is of a similar order of magnitude to the share of manufactures in imports. In all of the other regions, manufactures imports are a much larger share of consumption manufactures exports as a share of production and so gains from lower import prices of manufactures receive a relatively high weight in the welfare calculations.

4. Conclusions

The results of this analysis highlight the importance of treating a problem such as the alleged fallacy of composition in a context of global general equilibrium with two way trade, and of specifying very clearly the source of the export supply shock which causes the export expansion. While Havrylyshyn (1990) clearly identified the general equilibrium nature of the problem and highlighted the interdependence between increases in exports and increases in imports, even recent empirical analyses such as the econometric study by Faini *et al* (1992) appear to have utilized a partial equilibrium approach which rules out this form of feedback.

The results obtained in this paper for the static effects of trade liberalization were entirely conventional. The welfare gains were found to be, at best, small and sometimes

negative when terms of trade losses outweighed the efficiency gains obtained from liberalization.

When attention turned to export expansion resulting from productivity gains or investment in manufacturing for export, a different picture emerged. Particularly in the presence of continuing import protection on manufacturing, the welfare gains were typically much larger, even though some of the benefit of the increase in output was lost as manufactures exports expanded and drove down export prices. The critical difference emerged, however, when all developing countries expanded their production of manufactures exports. Instead of declining, the benefits to each individual region increased, primarily because of the benefits arising from the lower prices of imported manufactures.

The results of this initial study suggest that the incorporation of general equilibrium interactions and intra-industry trade may completely overturn the conventional view of the fallacy of composition. At least for export growth propelled by investment and technological advance, increases in exports from developing countries are mutually reinforcing rather than competitive. This result has immense policy implications: it vindicates the decisions of policy makers in many developing countries, and particularly in East Asia, to switch to a development policy based upon open markets and rapid growth of manufactures exports, and suggests that opportunities for such growth will tend to increase, rather than decrease, as more developing countries participate in the process.

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