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A COMPARISON OF LATIN AMERICAN AND ASIAN PRODUCT EXPORTS TO THE UNITED STATES, 1972 TO 1999

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1. INTRODUCTION

This paper examines the evolution of Asian and Latin American trade with the United States between 1972 and 1999. It compares both the mix of each region's exports as well as the relative prices those exports command in the U.S. market. Trade is examined across thousands finely detailed product categories, and results are summarized by industry and year. The analysis yields both expected and unexpected results.

As expected, Latin America trails Asia in terms of manufacturing exports to the U.S. This result is unsurprising given Latin America's relative land abundance and human and physical capital scarcity, which is summarized in Table 1. Asia's relative specialization in manufacturing is manifest in several dimensions, including its rapid increase in U.S. manufacturing import market share and its more pronounced reallocation toward manufacturing exports over time.

A more surprising finding is that Latin American exports command higher prices when they enter the U.S. in product markets where countries from each region compete directly. One explanation for this result is that Latin America's exports are of higher quality than Asian exports, but, assuming quality is skill and capital intensive, that conclusion is at odds with Latin America's comparative advantage.[1] An alternate explanation that is also supported by 'new' trade theory models focusing on heterogenous productivity is that Asia's relatively low prices reflect greater productive efficiency.[2] This second explanation is also consistent with Asia's relative increase in U.S. market share at the expense of Latin America and other countries over time. It raises the question of why any manufactures are imported from Latin America at all.

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1 Schott (2003) finds a significant positive relationship between U.S. manufacturing import unit values and source country endowments across all exporters. He argues that unit value differences reflect comparative advantage: countries relatively abundant in human and physical capital are able to embed higher quality or additional feature in their exports, raising their relative price.

2 In new trade theory models (e.g. Krugman 1979, 1980, Bernard *et al.* 2003 and Melitz 2002), a product variety's price varies inversely with its producer's productivity.

TABLE 1
LATIN AMERICAN VERSUS ASIAN PCGDP GROWTH AND ENDOWMENTS

	Latin America						Asia				
	PCGDP growth 1972-1999	PCGDP level 1999	Capital	Education	Land		PCGDP growth 1972-1999	PCGDP level 1999	Capital	Education	Land
Argentina	0.5	8,075	7.7	0.44	7.61	China	21.0	769	1.4	Na	0.32
Bolivia	0.2	955	3.1	0.28	25.88	Hong Kong	8.5	22,171	12.8	0.62	0.01
Brazil	2.1	4,483	14.1	0.17	10.13	India	4.4	450	2.8	0.24	0.71
Chile	4.0	5,146	17.9	0.44	2.77	Indonesia	7.4	964	8.6	0.17	1.93
Colombia	1.9	2,268	9.7	0.30	5.28	Korea	14.4	12,111	32.4	0.76	0.48
Ecuador	1.5	1,419	12.6	0.35	4.23	Malaysia	7.4	4,538	22.7	0.35	3.34
El Salvador	0.1	1,751	3.2	0.11	0.49	Pakistan	3.5	506	2.8	0.32	0.72
Guatemala	0.8	1,549	4.3	0.15	2.14	Philippines	0.9	1,143	5.3	0.45	0.81
Honduras	0.5	695	17.7	0.44	2.40	Singapore	10.9	26,117	51.3	0.39	0.00
Mexico	1.8	3.621	2.3	Na	4.21	Taiwan	15.6	12,572	25.7	0.58	0.41
Nicaragua	0.0	450	7.7	0.25	11.23	Thailand	9.3	2,722	8.6	0.17	1.22
Paraguay	2.0	1,749	10.4	0.40	10.49						
Peru	-0.1	2,335	10.3	0.46	1.64						
Uruguay	2.2	6,561	19.3	0.25	5.06						
Venezuela	-0.8	3,260	0.0	0.00	0.00						
Average	1.1	2,954	9.3	0.30	6.51	Average	9.4	7.642	16.6	0.43	0.87

Notes: Per capita GDP (PCGDP) data are from the World Bank website and are expressed in constant (1995) U.S. dollars. PCGDP growth is the annualized growth in local currency per capita GDP from 1972 to 1999. Endowment data are for 1990. Capital per worker is in thousands of U.S. dollars and is from Maskus (1991). Education is percent of population attaining secondary or tertiary education and is from Barro and Lee (2001). Land is hectares of cropland and forestlan per worker and is from the World Bank website. Final row reports the unweighted average.

2. Product-Level Trade Data

Product-level U.S. import data available from the U.S. Census and compiled by Feenstra (1996) record the customs value of all U.S. imports by exporting country from 1972 to 1999.[3] Imports are recorded according to thousands of finely detailed categories, which I refer to as 'products' or 'goods'. Imports at higher levels of aggregation, such as the one-digit Standard International Trade Classification (SITC1) system summarized in Table 2, are referred to as 'industries'. Table 2 reports the number of products in each industry in 1999; industries 0 through 4 and 5 through 8 generally encompass resource and manufacturing products, respectively. Two manufacturing industries, Manufactured Materials (SITC1=6), which includes textiles, and Miscellaneous Manufactures (SITC1=8), which includes

[3] Use of this dataset to compare Latin American and Asian trade assumes that countries' exports to the U.S. accurately reflect their overall output and the prices they receive in other markets. This assumption is partially justified by the relative openness of the U.S. economy and its attractiveness as an export destination to countries from both regions. Nevertheless, the existence of tariff and non-tariff barriers, as well as more general trade costs such as transportation, can be influential in determining which of a country's goods are exported to the U.S. In any case, comparable product-level trade data for other countries is unavailable.

apparel, account for the largest share of products. The idiosyncratic products captured by industry 9, Not Elsewhere Classified, are excluded from the analysis.

TABLE 2
MAPPING PRODUCTS TO INDUSTRIES

SITC1 industry	SITC2 examples	Product examples	Number of products
0 Food	Meat. dairy, fruit	Live sheep	1858
1 Beverage/tobacco	Wine, cigarettes	Carbonated softdrinks	177
2 Crude materials	Rubber cork, wood, textile fibers	Silkworm cocoons suitable for reeling	811
3 Mineral fuels	Coal, coke, petroleum	Uleaded gasoline	96
4 Animal/vegetable oils	Lard, soybean oil	Edible tallow	81
5 Chemicals	Organic chemicals, dyes, medicines, fertilizer, plastics	Chloroform	2038
6 Manufactured materials	Leather, textile yarm, paper steel	Diaries and address books of paper or carboard	4378
7 Machinery	Generators, computers, autos	Ultrasonic scanning apparatus	3113
8 Misc. manufacturing	Apparel, footwear, scientific equipment	Boy's shorts cotton playsuit parts, not knit	3718
9 Not elsewhere classified	Special transactions, coins, gold	Sound recordings for state department use	87

3. Latin American versus Asian Export Patterns

Figures 1 and 2 display a breakdown Latin American and Asian countries' export value by industry for 1972 and 1999. Each panel in the figures displays the breakdown of U.S. exports for a particular country via a bar graph. Countries are identified via their three-character World Bank country code at the top of each panel; data for 1972 are represented by dark bars and for 1999 by light bars. The x-axis of each graph ranges from 0 to 8 corresponding to the SITC1 industries listed in Table 2. Note that the countries displayed in each figure (and also listed in Table 1) are the set of countries making up each region for the remainder of the analysis.

Comparison of Figures 1 and 2 reveals that Asia is relatively more specialized in manufacturing than Latin America. There are exceptions to this pattern. In Asia, relatively land-abundant Malaysia exports relatively more natural resource goods (SITC1 industries 0 through 4) in 1972 than land-scarce Korea and Taiwan. In Latin America, Chile exports relatively more manufactures to the U.S. than Brazil. Comparison of the dark and light bars in Figures 1 and 2 also illustrates changes in the pattern of trade over time. The share of natural resource exports decline across countries of both regions between 1972 and 1999, though resource exports remain relatively more important in Latin America. The shift toward manufacturing is more complete in Asia: China, Malaysia and the Philippines virtually cease exporting natural resources, in relative terms, by 1999.

The Asian tilt toward manufacturing is also evident in U.S. import value market shares, as reported in the first four columns of Table 4. Manufacturing market shares are substantially higher for Asia than Latin America in both periods, and virtually all of Latin America's manufacturing market share growth between

1972 and 1999 is due to Mexico, whose close ties to the U.S. set it apart from the other countries of the region.

FIGURE 1
BREAKDOWN OF LATIN AMERICAN COUNTRIES' EXPORT VALUE TO THE U.S. BY SITC1 INDUSTRY AND YEAR

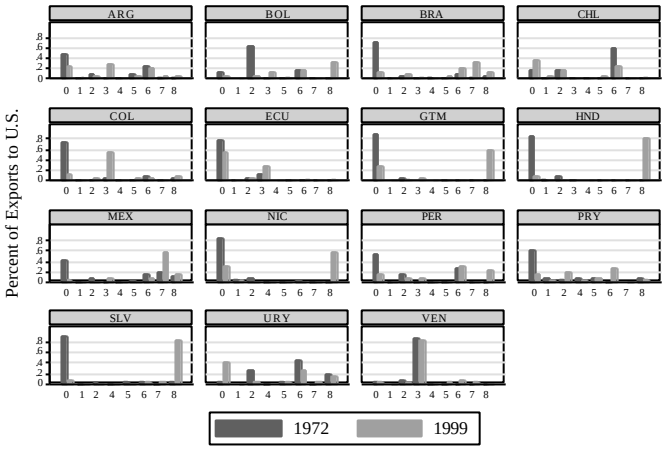
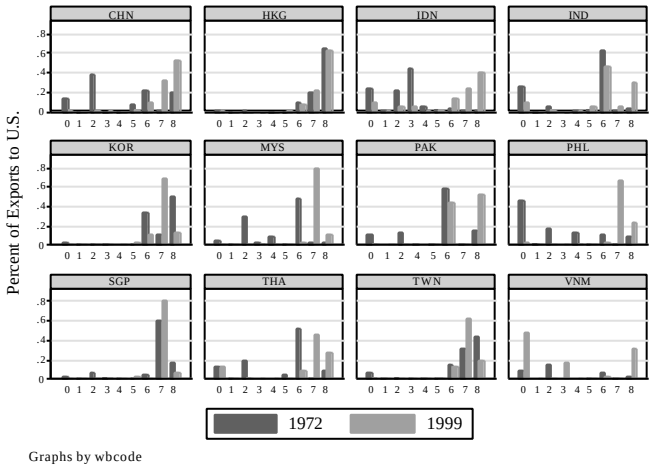


FIGURE 2
BREAKDOWN OF ASIAN COUNTRIES' EXPORT VALUE TO THE U.S. BY SITC1 INDUSTRY AND YEAR



Figures 3 and 4 demonstrate that Latin America and Asia also differ in terms of the number of export product markets in which they participate. The most striking difference between the panels is relatively high number of products exported

by Asian countries relative to Latin American countries. Part of this difference is driven by Asia's relatively more intense exporting of manufactures, which encompass a larger number of products than natural resource industries (see Table 2). However, even within manufacturing industries, Asian countries compete in far more product markets than Latin American countries. Among Latin American economies, only Mexico in 1999 resembles the average Asian economy.

FIGURE 3
BREAKDOWN OF LATIN AMERICA'S PRODUCT EXPORTS TO THE U.S. BY SITC1 INDUSTRY AND YEAR

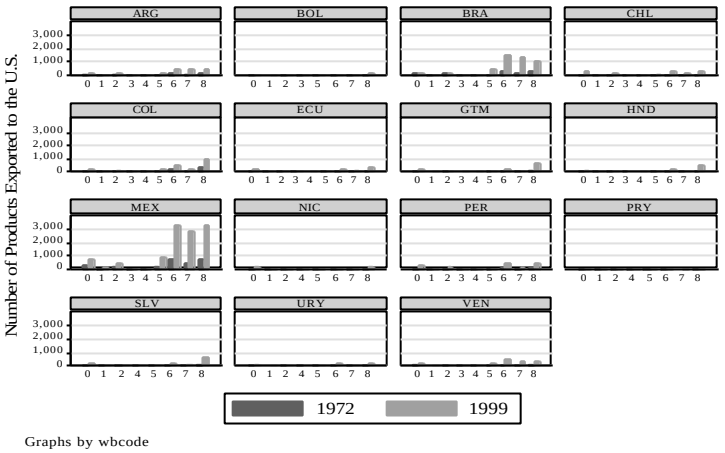
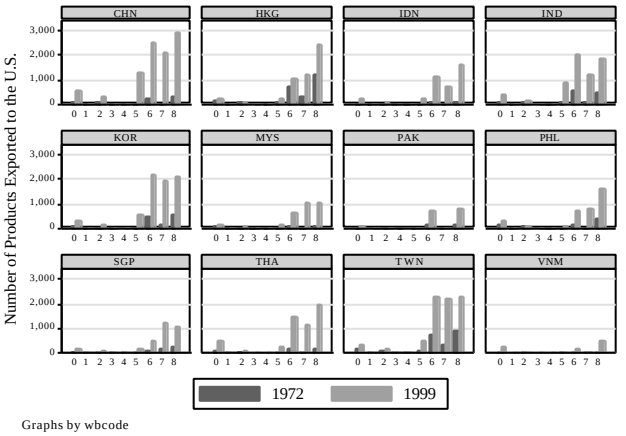


FIGURE 4
BREAKDOWN OF ASIA'S PRODUCT EXPORTS TO THE U.S. BY SITC1 INDUSTRY AND YEAR



To assess how directly Asia and Latin America compete in the U.S. market, Table 3 reports the share of all U.S. import products in which at least 1, 2, 3 or 4

countries from each region participates. Across all products, the percent originating in at least one country from each region has jumped from 27% in 1972 to 56% in 1999. As indicated in the table, growth in this share has occurred in all industries, and is most pronounced in Chemicals (SITC1=5) and Manufactured Materials (SITC1=6).

TABLE 3
PERCENT OF PRODUCTS WITH SOURCED SIMULTANEOUSLY FROM LATIN AMERICA AND ASIA, BY SITC1 INDUSTRY AND YEAR

	1972									
Number of countries	0	1	2	3	4	5	6	7	8	All
> 0 of each	26	20	21	18	12	9	23	39	40	27
> 1 of each	12	15	9	8	2	3	11	17	21	13
> 2 of each	7	8	5	2	9	1	4	7	12	7
> 3 of each	3	3	2	2	0	0	2	2	7	3
	1999									
Number of countries	0	1	2	3	4	5	6	7	8	All
> 0 of each	37	26	40	47	26	41	61	66	66	56
> 1 of each	20	15	21	19	16	16	34	37	42	32
> 2 of each	12	7	12	11	7	6	18	18	29	18
> 3 of each	7	5	7	3	2	3	9	9	22	11

Notes: Each cell displays the percent of products sourced simultaneously from at least the noted number of countries from Asia and Latin America, by SITC1 industry and year. The countries included in Latin America and Asia are as defined in Table 1. SITC1 industries are defined in Table 2.

4. Latin American versus Asian Export Quality

The unit value of product p from country c, u_{pc}, can be computed by dividing the customs value (V_{pc}), which excludes duties, insurance costs and shipping charges, by the import quantity (Q_{pc}), $u_{pc}=V_{pc}/Q_{pc}$. Quantity information is available for most but not all products.[4] Examples of the units employed to quantify U.S. imports include dozens of shirts in apparel, square meters of carpet in textiles and pounds of folic acid in chemicals. Because units vary by products within industries, unit values cannot be computed at the industry level.[5]

I compare Latin American and Asian product prices by regressing the log unit value of their product exports to the U.S. on a dummy variable equalling unity if the product is sourced from Latin America,

[4] Availability of unit values ranges from 77% of product-country observations in 1972 to 84% of observations in 1999. For some years and products, there are multiple country observations of value and quantity. In those cases, I define the unit value to be a value-weighted average of the observations.

[5] The unit values in this dataset are not perfect and may include classification errors (see GAO 1995).

$$(1) \qquad \ln(u_{pcit}) = \alpha_{pit} + \delta_{it} I\{c \in LA\} + \varepsilon_{pit}$$

where α_p is a product fixed effect and $I\{\bullet\}$ is an indicator function equalling unity for Latin American countries. A product fixed effect is included in the regression to net out differences in the levels of prices across products. The regression sample is restricted to products sourced from at least one Latin American and one Asian country in year t, and observations from non-Asian or Latin American countries, as well as observations from SITC1 industry 5, are excluded. Regressions are run separately for each SITC1 industry i. Table 5 reports the estimated δ's by industry and year and indicates their statistical significance via asterisks. Coefficients represent percentage point differences: overall, as reported in the final row of the table, Latin American export products to the U.S. were 11% more expensive than Asian exports in 1972, and 26% more expensive in 1999.[6]

Unit value differences are more pronounced and more statistically significant in manufacturing than natural resources. Manufacturing unit value differences are also more stable across time, and may even be increasing in Machinery (SITC1=7). The coefficient estimates for machinery imply unit value wedges of 53% and 85% in 1972 and 1999, respectively.[7]

TABLE 4
U.S. IMPORT MARKET SHARE BY REGION, INDUSTRY AND YEAR

	Latin American		Asia	
SITC1	1972	1999	1972	1999
0 Food	32	31	8	17
1 Beverage	6	18	1	0
2 Crude materials	25	13	9	9
3 Mineral Fuels	1	26	40	1
4 Animal oils	14	4	25	38
5 Chemicals	4	4	7	7
6 Manuf. materials	6	10	5	24
7 Machinery	1	12	23	30
8. Misc. manufacturing	5	9	19	47

Notes: Columns display the percent of U.S. import value originating in each region, by industry and year. The countries included in Latin America and Asia are as defined in Table 1.

6 Estimating a similar regression on the full sample of exporters indicates that Latin American and Asian products both have lower prices than products exported from the OECD.

7 The coefficients in Table 5 are robust to a number of alternative specifications including: restricting the sample to products where up to 4 countries from each region participate; restricting the sample to products where at least 10 countries (irrespective of region and including the rest of the world) participate; reducing the number of countries in each region to the 3 or 4 highest income; and adding a PCGDP control to the regression. Though coefficients are altered, the Latin American manufacturing unit value premium is preserved.

5. Conclusion

Examination of product-level trade reveals that Latin America lags Asia in terms of exporting manufacturing products to the U.S. This difference in regional specialization is in line with Latin America's comparative advantage in natural resource commodities. However, the data also indicate Latin American manufacturing exports command a higher price in the U.S. market than Asian exports. Assuming quality is intensive in capital and skill, that result is at odds with Asia's relative human and physical capital abundance.

TABLE 5
LOG DIFFERENCE OF LATIN AMERICAN VERSUS ASIAN UNIT VALUES, BY INDUSTRY AND YEAR

	1972			1999		
SITC1	δ	n	R^2	δ	n	R^2
0 Food	-0.32 ***	1,217	0.81	-0.03	5,305	0.74
1 Beverage	0.02	104	0.90	-0.03	381	0.92
2 Crude materials	-0.45 ***	653	0.93	-0.28 ***	2,020	0.81
3 Mineral fuels	-0.09	44	0.91	-0.33 **	233	0.77
4 Animal oils	-0.35	24	0.56	0.04	122	0.40
5 Chemicals	0.30 **	259	0.71	-0.06	4,646	0.60
6 Manuf. materials	0.17 ***	2,700	0.85	0.19 ***	18,545	0.72
7 Machinery	0.53 ***	794	0.86	0.85 ***	12,976	0.79
8. Misc. manufacturing	0.22 ***	3,714	0.71	0.20 ***	21,584	0.72
All industries	0.11 ***	9,509	0.86	0.26 ***	65,812	0.79

Notes: Table reports coefficient, observations and R^2 from regressing log unit value on a dummy variable for Latin America separately across SITC1 industries and years. Product-country observations are restricted to Latin America and Asia; the countries included in each region are as defined in Table 1 ***, ** and * signify statistical significance at the 1%, 5% and 10% level.

An alternate interpretation of Asia's rising manufacturing market share and its lower prices is that Asian producers are more efficient than Latin American producers, with the result that they can produce goods of comparable quality for a lower price. If that is the case, an important question for Latin American development is the extent to which the region will be able to continue exporting manufactures. It is possible that non-tariff barriers (e.g. the Multifiber Agreement) and distance (e.g. just in time delivery) plays a role in this survival, and that passage of a hemispheric free trade agreement will provide further support.

The analysis in this paper merits extension. Further examination of product trade across more disaggregate industries, and across individual countries within each region, will likely shed light on many of the issues raised. Other explanations for price differences should also be explored. For example, if Latin American trade is relatively more intra-firm that Asian trade, and if Latin American countries have higher tax rates than the U.S., the Latin American unit values recorded on U.S. Customs documents may be inflated for transfer pricing reasons.

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