Testing the USA Generalized System of Preferences

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I. Introduction and Outline

The United States Generalized System of Preferences (GSP) was implemented in 1976. According to this system the USA granted generalized tariff preferences to certain imports from less-developed countries (LDCs) in order to help them expand their exports and diversify their economies.

The idea for such a system was introduced at the first UN Conference on Trade and Development (UNCTAD) held in Geneva in 1964. The goal of this conference was to establish a new international trade policy that would contribute to raising the material wealth of the developing countries through trade, not foreign aid. The basic desire was to reduce the developing countries' excessive dependence on primary commodity exports for foreign exchange earnings by creating international trade incentives to stimulate their exportation of industrial goods. It was recognized that the developing countries found it very difficult to produce and sell manufactured goods in the industrial countries, especially competing for access to markets on an equal basis with producers in industrial nations. Being unequal producers, they should not be expected to compete effectively on an equal basis. Instead, their exports should receive preferential treatment; thus, the GSP was proposed.

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During the interim period from 1964 to 1971, numerous international negotiations on the GSP took place in the UNCTAD Special Committee on Preferences, and these discussions finally culminated in an initial system. Since 1971 additional negotiations have taken place (with limited success) to discuss ways of improving the GSP.[1]

Countries are designated eligible for USA GSP treatment in accordance with the criteria outlined in Section 502 of the Trade Act of 1974. In 1982, 143 developing countries and territories were eligible for GSP treatment. GSP duty-free treatment is currently granted by the United States on approximately 2,800 tariff items, largely manufactures and semi-manufactures. The 1974 Trade Act excludes certain import sensitive articles from GSP duty-free treatment, such as footwear, most textile articles, watches, some electronic products, and certain glass and steel products.

In addition, under the "competitive need" provisions, a country loses GSP duty-free treatment for a particular product if its shipments of the product in one calendar year exceed either fifty percent of total US imports or a certain dollar value ($50.9 million for 1981), which is adjusted annually to reflect the growth of the US gross national product (GNP). To qualify for preferential treatment goods must, at present, comply with the rules of origin specified by the USA. Under US regulations GSP eligible imports must embody "domestic processing costs plus locally-produced materials and components" which exceed thirty-five percent of the export value of an item.[2]

Other work done on testing GSPs has already been conducted. This includes studies by Baldwin and Murray (1977), Ahmad (1978), Murray (1980), and Sapir (1981). All of the above works, except Sapir's, evaluate GSP quantitative effects without using econometric techniques and are exclusively based upon *ex ante* estimates.

The purpose of this study is to test through formal econometric techniques for the existence of a statistically significant

[1] See Ginman and Murray (1977, pp. 190-191).

[2] For more information on provisions, administration and limitations of the US GSP, see U.S. House of Representatives, Report to the Congress (1980).

effect of the USA GSP on actual trade flows between developing countries and the USA. More specifically, we will examine if tariff cuts due to the USA GSP were significant factors in influencing USA imports from LDCs.

Two approaches will be used for testing the US GSP. The first will be based on the estimation of US import demand equations for several product groups covered by GSP, and the application of the Chow test for structural change in the US import pattern from LDCs, to the same product groups with the critical time point being the beginning of year 1976. In the second approach a cross-sectional gravity-type model will be constructed, which includes a dummy variable to reflect preference group membership.

II. Estimation of US Import Demand functions and Chow Test

A. Import Demand Functions

Given the fact that Taiwan, Korea, Hong Kong, Brazil, Mexico, and Singapore provide seventy percent of the total GSP duty-free imports to the USA, we therefore analyze USA imports of manufactured commodities eligible for treatment from these top LDC beneficiaries.

The commodities studied include veneer sheets, hardboard, copper products, calculating machines, transformers,[3] and cameras. All product groups are taken from the 4-digit Standard International Trade Classification (S.I.T.C.). These categories were chosen to represent both consumer and intermediate goods of which imports constitute a large and growing share of the US domestic market (after the exclusion of some products not covered by GSP because of the competitive need provisions).

An import function will be estimated for each of the above commodity groups in the following version:

[3] Actually transformers constitute a part of the 4-digit S.I.T.C. commodity group "electric power machines."

$$(1)\quad \log M_i(t) = a_0 + \sum_{j=0}^{3} b_j \log P^i_{LDC}\ (t-j) + \Sigma\ C_j \log P^i_{USA}\ (t-j) + d \log Y + \sum_{j=1}^{3} e_j D_j + g\ GSP$$

where $M_i(t)$ = US imports from LDCs of commodity group i at time t.
P^i_{LDC} = price of LDC's exports to USA (c.i.f.)
P^i_{USA} = wholesale price index of domestic products.
Y = USA GNP in 1972 dollars.
D_j = dummy variable reflecting seasonal shifts.
GSP = dummy variable for GSP.
log = refers to natural logarithms.

Quarterly data are used for the time period 1971-1980. Our purpose is to test if the coefficient of dummy variable GSP is statistically significant.

The equation has a log-linear form because, as it can be shown, when a fixed weight geometric price index series is used (as in this study), a log-linear specification of import demand is more appropriate.[4]. Using this specification we have the additional advantage that price elasticities given by the estimated coefficients of domestic and foreign prices are constant.

The equation includes a four-quarter lag on import prices and a three-quarter lag on domestic price. The shorter lag on domestic price reflects shorter information lags involved in purchasing domestically produced goods. It also reflects the fact that wholesale price data are based on contract prices, not prices recorded at the time of delivery. The lengths of the lags are chosen to be consistent with recent empirical research on the price lag structure in import demand equations, which suggested that the largest part of the response to import price changes occurs within three-quarters.[5]

The estimation of the equation required import price data disaggregated by commodity and region of origin. Import prices

[4] See Grossman (1980, p. 34).
[5] See Hooper (1976).

represent the terms at which goods are available from abroad; thus, they represent foreign supply factors. Unfortunately, such data are not collected for the United States. Thus, researchers who conduct empirical trade studies are forced to rely on unit values derived by deflating the value of imports in a given trade category by the physical volume of imports for that class of goods. When these unit values are constructed at aggregate levels, the relationship between the unit values and the true prices become distorted over time due to changes in the composition of the commodity bundles represented by the indexes.

To avoid this aggregation problem emphasis is thus placed on generating price indexes relying on unit values calculated for the most homogeneous groups on which data is available. The unit values are collected for import categories at the 7-digit S.I.T.C. level and are used to form fixed weight, geometric average price series for each of the 4-digit level commodity groups. Statistically appropriate import quantities are chosen as weights. Real import quantities are then generated by dividing total value of imports by the price index. In addtion the domestic price series for each good, which represent USA supply factors, were taken from the United States Bureau of Labor Statistics. Monthly domestic price indexes were converted to quarterly price indexes by using the simple geometric mean formula.[6] Real GNP is used as an activity variable and represents USA demand factors. Finally, dummy variables for each quarter to reflect seasonal shifts of the constant term of the regression and a dummy preference variable for the US GSP are included. Data values of 0 and 1 are used for these dummy variables.

A final econometric consideration involves the search for the presence of multicollinearity and autocorrelation. In time series import demand equations based on quarterly data, allowance must be made for the possibility that the disturbances are autocorrelated. Failure to correct for existing serious correlation in the error term would result in inconsistent estimates of the parameters of the equation. The Durbin-Watson statistic and the autocorrelation coefficient are indicative statistics in the detection

[6] For more information on the construction of price indexes, see Pantelides (1983, pp. 101-103).

of serious autocorrelation. If autocorrelation is detected, corrections should be made by the Cochrane-Orcutt method.

B. The Chow Test for Structural Change

This test is applied by splitting the relevant sample period at the point where the change allegedly occurred and then performing the exact F-test devised by Chow. Our critical point is the beginning of 1976. Quarterly data will be used in order to estimate three regressions for each commodity group used in the first approach. The regressions are of the type

$$(2)\quad \log M_i(t) = a_0 + \sum_{j=0}^{3} b_j \log P^i_{LDC}\,(t-j) + \sum_{j=0}^{2} d_j \log P^i_{USA}\,(t-j) + d \log Y + \sum_{j=1}^{3} e_j D_j$$

and are estimated for periods 1971-1975, 1975-1980, and 1971-1980.

The Chow test for structural change is conducted by comparing the F-statistic calculated from the formula (3) which follows, with critical from statistical tables, for the six commodity groups:

$$(3)\quad F = \frac{\dfrac{PRSS - URSS}{k}}{\dfrac{URSS}{n_1 + n_2 - 2k}}$$

where

RRSS = restricted residual sum of squares (one regression)
URSS = unrestricted residual sum of squares (two regressions)
k = number of estimated coefficients = 12
n_1 = number of observations in period 1971-1975 = 17
n_2 = number of observations in period 1976-1980 = 20

If F > F critical, then a structural change happened in 1976 due to the imposition of GSP. If F < F critical, then the imposition

of the GSP did not cause any structural break in the US import pattern from LDCs.

C. Time Series Results

All of the import demand equations are estimated using quarterly observations on the variables for the time period 1971:1 through 1980:4. The results are recorded in Table 1 and discussed individually below. To interpret the table, note that in each case the sum of the current and lagged price variables is reported as a measure of the total price elasticity. Standard errors are presented below the point estimates.

There is no indication of existing multicollinearity in the equations since the coefficients have the expected sign.

For the detection of autocorrelation, the Durbin-Watson statistic indicates that there is no autocorrelation in the veneers and cameras commodity groups. In all other cases the Durbin-Watson statistic lies in the inconclusive area. For this purpose we estimated the autocorrelation coefficient ρ and tested its significance at the ten percent level. This test proved that autocorrelation exists in the regressions of copper products and transformers.

In those two cases the Cochrane-Orcutt method was used for correction of autocorrelation; however, the Cochrane-Orcutt transformation was applied to all variables except the dummy variables (seasonal and GSP) since those variables do not cause the autocorrelation.[7]

The F-statistics for the Chow test for each commodity group are reported in Table 2. We compare these statistics with $F_{12,13}^{0.05} = 2.60$, and it is proved that in four commodity groups a structural change happened in 1976, due to the imposition of GSP.

The estimation of import demand regressions shows that the GSP coefficient is significant in three product groups (transformers, veneer sheets, and cameras). The foreign price coeffi-

[7] If the regression is estimated without dummy variables, autocorrelation will still exist. This means that autocorrelation is not caused by dummy variables.

Table 1

ORDIANRY LEAST SQUARES ESTIMATES OF IMPORT DEMAND EQUATIONS FOR PERIOD 1971-1980

Commodity Group	Constant	ΣP_{LDC}	ΣP_{USA}	Y	D_1	D_2	D_3	GSP	R^2	Durbin-Watson	ρ
Veneers	17.199	-2.072*	.638	.392	-.321	-.116	.024	.609*	.786	1.992	-.040
	(21.744)	(.601)	(1.892)	(4.076)	(.172)	(.180)	(.167)	(.257)			
Hardboard	-26.864*	-.457	-1.086	6.818**	-.010	.079	.002	.089	.732	1.723	.190
	(12.736)	(.350)	(.889)	(2.239)	(.139)	(.122)	(.135)	(.167)			
Copper Products	-38.882	-1.143	1.314	9.404	-.476	.497	.332	-.121	.483	2.132	.289**
	(40.530)	(4.437)	(4.207)	(8.967)	(.478)	(.499)	(.476)	(.669)		1.480(a)	
Calculating Machines	-68.588	-2.581*	10.852**	6.820	.250	.273	-.238	-1.364*	.949	1.880	-.092
	(61.204)	(.433)	(6.206)	(4.878)	(.313)	(.314)	(.299)	(.595)			
Transformers	-9.202	-.558	-1.795*	5.480*	-.047	-.021	.021	.409*	.801	2.123	.309**
	(9.967)	(.367)	(.630)	(1.971)	(.082)	(.077)	(.078)	(.184)		1.584(a)	
Cameras	1.888	-.025	-4.530*	4.884*	-.127	-.259*	.039	.656*	.862	1.951	.062
	(6.299)	(.134)	(1.091)	(1.149)	(.093)	(.089)	(.906)	(.144)			

In cases of detected autocorrelation, corrections were made by Cochrane-Orcutt method.

ΣP = the sum of the current and three-lagged price elasticities for import prices, and the sum of the current and two-lagged price elasticities, for the domestic price.

The values in parentheses are standard errors.

* = means significant at the five percent level.

** = means significant only at the ten percent level.

ρ = the autocorrelation coefficient.

(a) = Durbin-Watson statistic before correction for autocorrelation.

cient has the expected negative sign, and is significant in two cases. The domestic price coefficient has the expected positive sign in three cases. The activity coefficient has the expected positive sign, and in three cases is significant.

D. Interpretation of Time Series Regressions and Chow Test for Each Commodity Group

Veneer Sheets and Strips

Wood veneers are principally consumed in the production of plywood, the latter product being an important construction input. LDCs supply the US market with Philippine mahogany and lauan veneer and the bulk of the unspecified hardwood veneers. Domestic producers supply all varieties of hardwood and softwood veneer. The LDCs' veneers have an estimated price elasticity of -2.072, which is significant at the five percent level of significance. The US cross-price elasticity is .638, which shows that US products are not competitive. The GSP coefficient is statistically significant. Also, the Chow test shows that GSP tariff cuts after 1976 had a significant impact on US imports of veneer sheets.

Hardboard

Hardboard is used chiefly in construction and in production of cabinet furniture and fixtures. The domestic industry produces both tempered and untempered hardboard for construction, as well as a more specialized product for decorative panelling and furniture. Both tempered and untempered hardboards of similar quality to domestic production are imported from LDCs, mainly from Brazil, Mexico, and Korea.

The estimation of the import demand equation for LDC's hardboard indicates that the LDC's hardboard has an estimated price elasticity of -.457. The activity elasticity is 6.818 and is statistically significant at the ten percent level. The GSP coefficient is insignificant in the time series regression but the Chow test shows that a structural change due to the GSP has happened to hardboard import patterns of the USA since 1976. I cannot give any reasonable explanation for this contradiction.

Table 2

CHOW TEST FOR STRUCTURAL CHANGE*

Commodity Group	F-Statistic
Veneer Sheets	2.605**
Hardboard	2.897**
Copper Products	2.223
Calculating Machines	.958
Transformers	2.974**
Cameras	5.944**

* The critical value for five percent level of significance is $F^{0.05}_{12, 13} = 2.60$
** means significant at the five percent level.

Copper Products

This category covers a variety of products like copper bars, copper rods, copper shapes, angles and sections, copper sheets, strips, copper tubes, and pipes. Those products find their chief use in the construction industry. They are additionally used in the production of such varied products as ships, motor vehicles, agricultural implements, appliances, industrial equipment and furniture. Multi-national companies are playing an important role in copper exports from Brazil and Mexico. The elasticity of demand for copper products imported from LDCs is -1.143 and the US cross-price elasticity is 1.314.

Both the GSP coefficient and the Chow test show that the GSP did not have any significant effects on copper products imported from LDCs. Competing production from both the USA and other developed countries such as Canada and West Germany, together with the existence of non-tariff barriers (i.e., export restraints), explain the above results.

Calculating Machines

This category covers a variety of products which includes electric calculators, non-electric calculating machines, electric and non-electric adding machines, and cash registers. Each of these products is produced in the USA. Main LDC suppliers are Hong Kong, Korea, and Taiwan. In this product group electronic

technology is playing an increasingly important role in product development and is a significant determinant of the competitive position of companies within industries. Large multi-national firms have taken up dominant positions in more product markets. This market structure has resulted from the considerable commitments which must be made to research and development and capital investment that only large firms can afford. Calculating machines imported from LDCs have an elasticity of demand of -2.581 which is significant at the five percent level of significance, and a US cross-price elasticity of 10.852 which is significant at the ten percent level. The latter number indicates strong competition from domestic producers. The GSP has a negative and significant coefficient. Thus, US imports of calculating machines from LDCs were reduced after 1976. The Chow test does not show any change in USA import patterns after 1976. Both domestic and developed countries' competition, together with the facts that LDC's prices had already been reduced to low levels before 1976 and the existence of non-tariff barriers, can be given as explanation for the results.

Transformers

The domestic transformer industry has faced well publicized competition from producers in Taiwan, Hong Kong, and Korea. Plant closings, worker displacements and cries for protection have been prevalent. This explains the negative, yet insignificant US cross price elasticity. The LDC's price elasticity of demand is .558. The activity elasticity is 5.840 and is significant. The GSP coefficient is significant, and the Chow test shows that we had a change in USA import patterns in this commodity group after 1976. This result was expected since LDCs (especially Korea, Taiwan, Hong Kong) have a newly developed industry of electric power machines initiated either by domestic producers or multi-national companies.

Cameras

The category of still cameras covers a variety of products that differ widely in quality. Imported cameras from LDCs are close substitutes for domestic products. The camera market is divided along quality lines, with the LDCs supplying the inexpensive miniature cameras. Several of the larger US companies have overseas subsidiaries which produce various products; cameras, for example, are manufactured by US affiliates in several LDCs. De-

mand for camera imports from LDCs has a price elasticity of -.025, and an activity elasticity of 4.884 which is significant at the five percent level. In addition, a dummy variable for seasonality is significant. The GSP coefficient is significant, and the Chow test shows GSP has an important impact on US import patterns from LDCs.

III. The Cross Sectional Gravity Model

A. Methodology

This approach, developed by Tinbergen (1962) and Linneman (1966), is to construct a cross-sectional "gravity" type model and include a dummy variable to reflect preference-group membership. A variant of this approach was introduced by Aitken (1973), who proposed to estimate a similar model on a yearly basis for years both before and after tariff preferences were implemented. This method was also used by Sapir (1981), who estimated trade benefits under the EEC GSP.

In the same spirit of Sapir, the following trade flow equation is estimated for each year of the period 1971-1980:

$$(4)\quad \log X_{ij} = a_0 + a_1 \log Y_i + a_2 \log Y_j + a_3 \log N_i + a_4 \log N_j + a_5 \log D_{ij} + a_6 \log P^{GSP}$$

where

X_{ij} = the dollar value of i's manufactured exports to j.
Y_i, Y_j = the nominal GNP of countries i and j in dollars.
N_i, N_j = the populations of countries i and j.
D_{ij} = the geographical distance between the commercial centers of i and j.
p^{GSP} = a dummy variable for trade between USA and GSP beneficiary countries. Data values of 1 and 2 are used for this dummy variable.
log = refers to natural logarithms.

The equation is estimated for aggregate manufactured trade

flows.

This equation is a general equilibrium reduced-form of a competitive demand and supply model. The bilateral trade flow is a function of supply conditions in the exporting country, demand conditions in the importing country, and trade resistance between exporting and importing country. The potential export supply of an exporting country depends upon its GNP and population. Given economies of scale, then the larger the population, the larger will be the domestic market to foreign market ratio, and the smaller to potential export supply. In a similar way, the potential import demand for the importing country depends upon its GNP and population. The trade resistance factors include distance (as a proxy for the cost of transportation) and preferential trade arrangements. In summary, Y_i, Y_j and a dummy variable used to represent preferential trade arrangements are postulated to have a positive effect on X_{ij}. On the other hand, N_i, N_j and D_{ij} are hypothesized to have a negative impact on the bilateral trade flow.[8]

The use of yearly cross-section regressions serves several purposes. First, it allows one to test for non-significance of the GSP coefficient during the pre-GSP period and for significance in the post-GSP period. Assuming these tests are successful, one could then reasonably be sure that the preference variable is not acting as a porte-manteau for omitted variables. The estimation of the cross-sectional model for each year in the post-implementation period renders the possible examination of annual schemes. This is a desirable feature given the fact that the benefits attached to the USA GSP are likely to vary from year to year.[9]

B. Sample Composition

The model is estimated with a cross-section of bilateral trade flows among the countries listed in Table 3. There are twelve exporting and four importing countries. The number of bilateral trade flows is therefore forty-eight. The GSP beneficiary countries comprised in the sample are Mexico, Brazil, Singapore, Korea, Taiwan, and Hong Kong. These are the top GSP beneficiaries

[8] See Sapir (1981, pp. 341-342).
[9] See Sapir (1981, p. 342).

Table 3

COUNTRIES COMPRISING THE SAMPLE IN THE CROSS-SECTIONAL GRAVITY MODEL

Exporters		Importers
Beneficiaries	**Non-Beneficiaries**	
Mexico	Canada	USA
Brazil	Japan	Greece
Singapore	Australia	Portugal
Korea	West Germany	Spain
Taiwan	Norway	
Hong Kong	Switzerland	

used in the time series regressions. The other six exporting countries are developed nations. On the importing side, besides the USA, the sample includes three European countries, members of the Organization for Economic Cooperation and Development (OECD). For trade flows we use S.I.T.C. data. In this study manufactured exports are defined to include 1-digit S.I.T.C. classes 5 to 8.[10]

C. Regression Results

The least squares regressions, corrected for heteroscedasticity for equation (4) using aggregate manufacture trade flows, are presented in Table 4.

This is a cross-section study so we expect the presence of heteroscedasticity in our data sample. The variance of the disturbance term implicit in equation (4) is likely to be related to income of importing or exporting country. Accordingly we first estimated equation (4) for each annual cross-section by using ordinary least squares and then tested for the presence of heteroscedasticity by means of a procedure suggested by Glejser and

[10] Manufactured exports are defined to include chemicals, manufactured exports classfied chiefly by material, machinery and transportation equipment, and miscellaneous manufactured articles.

outlined in Maddala.[11] The presence of heteroscedasticity was confirmed. The heteroscedasticity was mostly caused by the income of the importing country (Y_j). For correction of heteroscedasticity, each variable was deflated by Y_j^{12}, and then by using ordinary least squares we estimated the coefficients presented in Table 4.

The signs of the coefficients of income, population and distance are in accordance with our theoretical considerations and in most cases the coefficients are statistically significant. The GSP coefficient is significant only in 1978 and 1979. The non-significance of the GSP coefficient in 1976 and 1977 is probably due to the lagged response of exporters and importers in establishing a commercial network. The GSP coefficient is positive, increasing from 1976 to 1979, and starts declining in 1980. This can be explained by the various restrictions which GSP eligible products face, especially the competitive need rule. From the results of the above regressions, we can not conclude that the GSP has a significant impact on LDC's aggregate exports of manufactures to the USA since 1976.

IV. Conclusions

The results of the time series regressions and the Chow test for each commodity group suggest that GSP played an important role for a few manufactured imports from LDCs. These imports include transformers, cameras, veneer sheets and hardboard.[13] The GSP is not significant for copper products and calculating machines.

Given the fact that GSP coefficients show statistically significant effects on imports of cameras and transformers and statistically insignificant effects on imports of copper products, we may thus draw the tentative conclusion that GSP affects advanced manufactured US imports from LDCs more than semi-manufac-

[11] See Maddala (1977, p. 262).

[12] That is the reason why variable Y_j has been eliminated in Table 4. Variable $1/Y_j$ comes from the deflation of the initial constant norm.

[13] Only the Chow test indicates that the GSP has a significant impact on hardboard imports from LDCs.

Table 4

REGRESSION RESULTS FOR AGGRECATE MANUFACTURED TRADE FLOWS, ESTIMATED COEFFICIENTS ON EXPLANATORY VARIABLES[a]

Year	Constant	Y_i	1/Y	N_i	N_j	D_{ij}	GSP	R^2
1971	3.969*	2.008*	6.747*	-.908*	-4.067*	-1.607*	.266	.751
	(2.894)	(5.078)	(3.143)	(2.169)	(2.154)	(2.678)	(.464)	
1972	1.861	1.505*	6.039*	-.626	-1.475	-1.417*	-.052	.780
	(1.360)	(4.516)	(3.316)	(1.756)	(.779)	(2.789)	(.112)	
1973	1.456	1.690*	4.336*	-.835*	-.765	-1.123*	.500	.821
	(1.182)	(6.542)	(3.316)	(3.030)	(.461)	(2.816)	(1.508)	
1974	1.030	1.434*	5.316*	-.731*	-.345	-1.120*	.415	.840
	(.918)	(5.741)	(4.387)	(2.762)	(.256)	(3.018)	(1.443)	
1975	3.304	1.664*	4.830*	-1.285*	-3.202	-.799	.339	.531
	(1.779)	(3.378)	(2.055)	(2.490)	(1.277)	(1.122)	(.648)	
1976	2.425*	1.361*	4.653*	-.717*	-2.096	-.792	.319	.723
	(2.208)	(4.051)	(2.912)	(2.068)	(1.350)	(1.664)	(.929)	
1977	2.284*	1.260*	5.576*	-.531	-2.187	-1.025*	.419	.798
	(2.742)	(4.279)	(4.012)	(1.773)	(1.811)	(2.516)	(1.44)	
1978	1.440*	1.443*	4.741*	-.761*	-1.064	-.843*	.569*	.809
	(2.328)	(5.073)	(3.462)	(2.603)	(1.106)	(2.180)	(2.104)	
1979	1.455*	1.397*	4.720*	-.790*	-.998	-.852*	.705*	.794
	(2.341)	(4.519)	(3.363)	(2.543)	(1.054)	(2.152)	(2.284)	
1980	.967	1.064*	5.665*	-.438	-.384	-.802	.391	.781
	(1.213)	(3.449)	(3.779)	(1.437)	(.324)	(1.896)	(1.452)	

(a) All variables are expressed in logarithms. Correction for heteroscedasticity was made by deflating all variables by $\log Y_i$.
The values in parentheses are t statistics; an asterisk means significance at the five percent level.
* means significant at the five percent level.

tures. Both facts that LDCs may have a comparative advantage in the production of advanced manufactures and the existence of non-tariff barriers in USA — LDCs' trade of semi-manufactures may be given as justifications of the above result.

The cross-section regression results show that the GSP coefficient, since 1976, is always positive and increasing from 1976 to 1979. This result implies that GSP is of increasing importance during this four-year period. More and more products eligible for GSP treatment are exported from the six top LDC beneficiaries to the USA. The GSP coefficient is insignificant in 1976 and 1977. As we mentioned earlier, this can be justified by a lagged response of LDCs' exporters to GSP tariff cuts.

However, the GSP coefficient becomes significant in 1978 and 1979. Therefore, it does appear that GSP caused an increase in manufactured LDCs' exports during these two years. In 1980 the cross-section regression results show a decrease in the GSP coefficient which also becomes insignificant. There are two reasons for this decrease: 1) many manufactured and semi-manufactured products in which the developing countries have a comparative advantage have been excluded from GSP treatment as import sensitive, and 2) other manufactured LDCs' exports covered by GSP lost their preferential tariff treatment because of the competitive need limitation or because of rigid processing and administration requirements specified in rules of origin.

This examination was taken in order to evaluate the effect of the GSP on the flow of manufactured imports of the USA from the six top beneficiary LDCs. The apparent success of the GSP indicated by the results of some product groups in the time series regressions and the Chow test, and for aggregate imports in 1978 and 1979 in the cross-section regressions, may reflect this study's choice of beneficiary countries which supply the bulk of USA preferential imports. Further work will be required in order to test the effect of the scheme on poorer countries with a less-developed industrial base. However, one would expect little effect since only a small fraction of the exports from these countries to the USA is eligible for preferential treatment under the GSP. This result is due to the narrow product coverage of agricultural goods or the fact that industrial raw materials exported by the least developed nations are already duty free on a most-favored-nation (MFN)

basis.[14]

We should point out that the top beneficiary LDCs had already developed a large production and export capability before 1976. Reasons for this characteristic include export-promotion oriented development process, foreign investment and probably anticipation of the GSP. It was thus expected that the GSP, which was implemented in 1976, would play a small role in the increase of aggregate manufactured exports.

It was hoped that the GSP would influence investment decisions of governments and private investors, especially in the poorer developing countries. However, information gathered by the UNCTAD secretariat suggests that these long-term benefits do not seem to have materialized, mostly because of the climate of uncertainty about continuous availability of preferences. Had this availability been certain, there are indications that these benefits would have been realized.[15]

Rather than a program to help all developing countries, the vast majority of the GSP benefits accrues to only a few advanced developing countries. The others have little capacity to benefit from any tariff policy. This rather depressing conclusion is further enhanced by another observation. The analysis ignores the impact of the numerous non-tariff barriers to trade that are completely unrelated to the GSP, such as non-tariff restrictions as contained in health standards, packaging regulations, market controls, subsidies to import competitors and the voluntary export restrictions against trade in textile. The GSP provides for a reduction in tariffs but not for the relaxation of any other regulation governing international trade. For some products, non-tariff barriers pose a more serious barrier to trade than MFN tariff rates.[16]

The GSP was initially introduced for a ten-year period and made subject to extension if experience with the system warranted such action. Prolongation and improvement of the GSP depends not only on its performance, but also on the scope remaining for tariff preferences to be an effective stimulus for expanding the ex-

[14] See Sapir (1981, p. 351).
[15] See Sapir (1981, p. 352).
[16] See Ginman and Murray (1977, p. 205).

ports of the developing countries. Substantial MFN tariff cuts would necessarily reduce the GSP preferential tariff margine, thereby further eroding the trade advantages under the GSP.[17] However, the last round of multilateral trade negotiations under the auspices of GATT, which took place in Geneva in December 1982, did not achieve new tariff cuts. and new protectionist ideas have emerged again. Under these circumstances the existence of the GSP becomes much more important now of the LDCs.

The final conclusion can be stated as follows: the US GSP has a significant impact on US imports from top beneficiary LDCs in a few commodity groups. However, if we take into consideration the aggregate LDCs' manufactured exports to the USA, because of the ceiling-type safeguards and of rigid processing and administration requirements specified in various rules of origin, GSP does not seem to have a significant effect. Also, the GSP does not seem to give any significant help to non-advanced LDCs. Therefore, efforts should be made by all interested nations, developed and developing, towards improving the GSPs so that they can respond better to non-advanced LDCs' needs.

APPENDIX

Data Sources

The following were used as sources of data for this study.

Time Series Data

(1) Trade Flows: values and quantities, United States Department of Commerce, *U.S. General Imports: General and for Consumption,* Schedule A, FT 135 (various issues).

(2) Domestic price indexes: United States Bureau of Labor Statistics, *Wholesale Prices and Price Indexes* (various issues).

(3) USA GNP in 1972 dollars: *Economic Report of the President* (various issues).

[17] See Ginman and Murray (1977, p. 208).

Cross-Section Series Data

(4) Trade Flows: OECD, *Statistics of Foreign Trade,* Series C. Trade by Commodities (various issues). c.i.f. import values were used.

(5) GNP: IMF, *International Financial Statistics* (various issues). GNP in domestic currency and spot exchange rates were used to calculate $GNP for each country.

(6) Population: IMF, *International Financial Statistics* (various issues).

(7) Distance: (a) Sea distances were taken from U.S. Naval Oceanographic Office, *Distance Between Ports,* H.O. Pub. No. 151, U.S. Government Printing Office, Washington, D.C., 1965. (b) Land distances were obtained from *Rand McNally Road Atlas of Europe, and Rand McNally Road Atlas of U.S., Canada, and Mexico,* Rand McNally, 1977. In the case where both land and sea transport are involved, we multiply land distance by a factor of two, following Vernon (1970).

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