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The Biggest Losers (and Winners) from U.S. Trade Liberalization

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Abstract

Many development experts worry that continuing reductions of tariff levels in high-income countries will limit trade flows from developing countries that benefit from preferential trade programs because of "preference erosion." Using a panel of U.S. import data between the years of 1997 and 2005, I find that reductions in preference margins will significantly diminish imports of some products, particularly from lower-middle and low income countries; for example, a one percent reduction in the U.S. tariff on a product that is currently imported duty-free from developing countries will decrease imports of that product from lower-middle countries by an average of 2.6 percent. However, many products produced by developing countries fail to qualify for preferential tariffs, thus a gradual reduction in all U.S. tariff rates is expected to have only a modest impact on trade flows from developing countries.

Key words: Generalized System of Preferences, Preference Erosion, Preferential Tariffs

JEL classification: F13, F15, O1

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1 Introduction

The United States ushered in a new era in development assistance with the establishment of the Generalized System of Preferences (GSP) program in 1976. The program, which eliminated duties on thousands of products from developing countries, was intended to promote economic growth in the developing world through "trade, not aid." Since its inception, the program has been a small but important part of the U.S. development assistance strategy. The GSP program accounted for 1.8 percent of total U.S. imports and 10.5 percent of imports from GSP-eligible countries in 2006.

The level of development "aid" available to beneficiary countries under the GSP program fluctuates on an annual basis depending on most-favored nation (MFN) tariff rates in the United States and program guidelines. Since the inception of the GSP program U.S. tariff rates have gradually fallen due to global trade negotiations at the World Trade Organization (WTO). According to the World Bank's "Trends in Average Applied Tariffs", the simple average U.S. tariff rate fell from 4.3 to 3.0 percent between 1997 and 2005.[1] As tariff rates have fallen, so has the artificial comparative advantage granted to developing countries under the GSP program.

Some developing countries recently lost their preferential status all together, at least for certain products. In October of 2005, the United States launched a comprehensive review of the GSP program, seeking to determine whether the eligibility of beneficiaries should be changed. According to U.S. Trade Representative Susan Schwab, the review was initiated at the request of Congressmen who were concerned that the bulk of GSP benefits go to a few countries, while other developing countries were not trading much under the program. As discussed below, the changes Congress enacted to the GSP program in December 2006 attempted to address these concerns by limiting competitive need limitation waivers.[2]

[1] In contrast, the calculated trade-weighted average U.S. tariff rate, as calculated by duties divided by the dutiable value of imports, increased from 4.6 percent to 5.1 percent between 1997 and 1999, before falling back to 4.6 percent by 2005.

[2] In 2007, nine products from seven countries lost their GSP benefits under the new rules. The number

Many development experts worry that a reduction of MFN tariffs in high-income countries, or changes in preferential trade programs, will significantly limit trade flows from developing countries through "preference erosion." Anecdotally, even the removal of a fairly small tariff on an individual product can have large implications for trade patterns. For example, the gradual removal of tariffs on telephone sets between 1997 and 2000 caused imports from countries eligible for duty-free status under the GSP program to fall significantly even as imports from other countries increased, as illustrated in Figure [1].[3] Previous econometric studies of "preference erosion" have predicted that reductions in MFN tariff rates, or removal of preferential programs all together, will significantly decrease exports from developing countries. Subramanian (2003), for example, predicts that trade liberalization in the United States, European Union, Japan, and Canada will result in a 1.7 percent loss of export revenue accruing to the least developed countries; Alexandraki and Lankes (2004) similarly find this liberalization would result in a 0.5 to 1.2 percent reduction in the value of exports from middle-income countries.

In contrast, recent trade statistics suggest that the erosion of tariff preferences has not had as big an impact on developing countries as one might expect. While the simple average U.S. tariff rate fell from 4.3 to 3.0 percent between 1997 and 2005, the share of U.S. imports from developing countries actually increased by 13.9 percent, from 11.3 to 13.0 percent, as illustrated in Figure [2]. These aggregate statistics suggest that the impact of preference erosion on developing countries deserves further study.

This paper analyzes the impact of U.S. tariff reductions on imports from the developing world using a panel of U.S. import data from 157 trade partners in over 4,700 six-digit harmonized system (HS) code products between the years of 1997 and 2005. Estimating a model of bilateral trade flows in which the elasticity of substitution between domestic and foreign

of products impacted by the new rules may increase in the future.

[3]Specifically, imports from countries paying normal U.S. tariff rates, particularly China, Malaysia, Taiwan and Korea, grew 5.8 percent in 2000 after the 2.1 percent tariff was removed on telephones. At the same time, products from GSP-eligible countries, particularly Thailand, Indonesia and the Philippines, fell 121 percent.

varieties is allowed to differ from the elasticity between foreign varieties, I find that reductions in preference margins will significantly diminish imports of *some* products, particularly from lower-middle and low income countries. For example, a one percent reduction in the U.S. tariff on a product that is currently imported duty-free from developing countries will decrease imports of that product from lower-middle countries, such as Thailand, Indonesia and the Philippines, by an average of 2.6 percent. Low-income countries such as India will experience a much smaller reduction in exports to the United States of 0.4 percent from this same tariff reduction.

As one might expect, the complete elimination of preference margins due to recent changes in the GSP program will have a much more dramatic impact on U.S. imports from effected developing countries. However, because many products produced by developing countries fail to qualify for preferential tariffs, a gradual reduction in *all* U.S. tariff rates is expected to have only a modest impact on trade flows from developing countries.

2 U.S. Preferential Tariffs

In 1976, the United States eliminated tariffs on approximately 3,000 eight-digit HS tariff-line items for 138 beneficiary developing countries and territories under the GSP program. Today, duty-free entry is available for approximately 3,400 products from 134 beneficiary countries and territories.[4] Countries are graduated from the GSP program when the country's GNP per capita exceeds the threshold for high-income countries as determined by the

[4]To be eligible for duty-free treatment under the GSP program at least 35 percent of the value of product must be produced in the beneficiary country. Each year the U.S. Trade Representative (USTR) accepts petitions to add or eliminate eligible products and countries. While certain products are statutorily banned from eligibility from the GSP program, including textiles, footwear and other "import-sensitive" products, an additional 1,450 products are designated eligible for the GSP program for least developed beneficiary countries and the African Growth and Opportunity Act (AGOA) expands GSP-benefits for countries in sub-Saharan Africa to include an additional 1,200 products, including many of the import-sensitive products statutorily banned from the basic GSP program.

World Bank, or when the United States deems that the country is no longer a developing country. The United States can also remove countries as beneficiaries due to worker rights, intellectual property, or other policy concerns.[5]

Countries can lose preferential status for specific products under the competitive need provisions of the GSP program. If imports from an individual country exceed 50 percent or more of total U.S. imports of that product, or if imports exceed a designated threshold ($130 million in 2007), then the product is excluded from GSP eligibility. Historically, many of the competitive need limitations have been waived under various provisions in the GSP law. The December 2006 changes to the GSP program forbid the President to continue to award competitive need limitation waivers that have been in effect for more than five years if the country accounts for 75 percent of all imports of that product or its imports exceed 150 percent of the annual competitive need cap. Although this new provision does not appear to impact many products and countries currently, it may become a more important impediment to the ability of developing countries to benefit from the GSP program in the future.

Some may argue that U.S. tariffs on GSP-eligible products are so low today that preferential trade programs should have little impact on trade patterns. As noted above, between 1997 and 2005 the simple average U.S. tariff rate fell from 4.3 to 3.0 percent. However, over 50 percent of the products eligible for GSP status still had tariff rates over 3.8 percent in 2005, and tariffs on individual products reached over 30 percent. The reduction in average U.S. tariff rates has not seemed to reduce the importance of the GSP program to developing countries. Imports under the program reached $32.6 billion in 2006. While the share of products imported under the GSP program fell between 1997 and 1999 from 1.8 percent to 1.3 percent, the share of U.S. trade imported under the GSP program has since increased, now accounting for 1.8 percent (See Figure [3]).[6] For some countries the GSP program plays

[5]Some developing countries, such as China and Vietnam, have never been eligible for the GSP program.

[6]Part of the decline in the early years of the sample period could be due to the uncertainty surrounding the GSP program during this time period. Between 1997 and 2001, the U.S. GSP program expired three times for periods ranging from two to nearly six months. The program was always renewed retroactively, however, and duties returned to those businesses importing under the GSP program during the expiration

a much larger role in their ability to export to the United States. For example, over 80 percent of U.S. imports from Yemen and Equatorial Guinea are imported under the GSP program.

A handful of lower-middle income countries, including Angola, Thailand, Brazil and Indonesia, account for over half of imports under the GSP program. India, which the World Bank classifies as a low-income country, accounts for an additional 17 percent of GSP imports. Leading imports under the GSP program include oil and gas products, jewelry, and motor vehicle parts.

2.1 Literature Review

Since the passage of the GSP program, several methods have been used to estimate the trade and welfare effects of preferential trade programs such as the GSP program, as well as the degree of preference erosion that has occurred due to trade liberalization over the past 30 years. Most methods can fall into one of two categories: ex ante studies which try to study the potential impact of the program prior to its implementation and ex post studies which try to isolate the effect of the preferential tariff treatment on actual trade flows.

One of the earliest studies, Baldwin and Murray (1977), estimated the impact of the GSP program using a partial-equilibrium model in which imports from beneficiary countries are considered imperfect substitutes for products from industrialized countries, and production from all countries is characterized by perfectly elastic supply curves. They predicted a 27 percent increase in trade flows following implementation of the U.S. GSP program, while a 50 percent decrease in MFN tariffs on GSP-covered items would reduce trade flows by approximately 10 percent from the baseline estimates. As noted in MacPhee and Ogulego (1991), ex ante studies conducted shortly after the establishment of the U.S. program typically estimated that GSP would result in an increase in U.S. imports from developing countries of somewhere between 11 and 64 percent. Part of this wide range can be traced to different assumptions regarding the average tariff rates and supply elasticities. In contrast, the gen-

period.

eral equilibrium model estimated by Brown (1987) predicted that the GSP program would increase trade with developing countries by a much lower 6 percent while tariff reductions scheduled to be implemented due to the Tokyo Round would eventually reduce the increase in imports due to the GSP program by 62 percent.

Many of the ex post studies that utilized actual trade flows following the implementation of the GSP program found relatively small effects of the program. For example, Sapir and Lundberg (1984) used cross-section regressions of the import market share and growth in import market shares, with the preference margin associated with the GSP program as the key explanatory variable of interest. They found a positive and significant impact of GSP only on the growth in import market shares; this finding corresponded to a 15 percent increase in U.S. imports from beneficiary countries between 1975 and 1979 due to the GSP program. MacPhee and Oguleldo (1991) found that the GSP program resulted in a 15 percent growth in U.S. imports from beneficiary countries between 1975 and 1980. More recently, Truett and Truett (1993,1997) estimated an equation of U.S. import demand function for goods from Bolivia, Brazil, Cyprus, Romania, Turkey and Yugoslavia with a dummy variable for inclusion in the GSP program and found a positive and significant impact on trade for all countries but Yugoslavia and Brazil. They concluded that the U.S. GSP program has a greater impact on the export growth of lower-income beneficiary countries than more developed beneficiaries, due perhaps to the fact that competitive need limitations limit the usefulness of the program for more developed countries.

Recent studies on the GSP program have focused on the impact of preference erosion on developing countries. For example, Subramanian (2003) and Alexandraki and Lankes (2004) attempted to identify the least-developed and middle-income countries, respectively, that are vulnerable to loss of export revenue due to preference erosion. Using a partial equilibrium small-country model, Subramanian (2003) found an overall reduction in export revenues to the least developed countries of 1.7 percent due to complete trade liberalization by the United States, European Union, Japan, and Canada. Using a similar model, Alexandraki and Lankes (2004) found this liberalization would result in a 0.5 to 1.2 percent reduction in

the value of exports from middle-income countries. However, their results suggest that some countries are much more vulnerable to export loss due to preference erosion, particularly the leading exporters of sugar and bananas.

Francois, Hoekman, and Manchin (2006) found using a threshold mechanism that traders will only utilize preferential programs if the preferential tariff is 4.0 to 4.5 percentage points lower than the MFN rate. The authors then used a general equilibrium model to estimate the magnitude of costs and benefits of non-discriminatory trade liberalization, allowing for their compliance cost estimates. Their results suggest that the impact of preference erosion on developing countries is much lower when compliance costs are taken into consideration.

Other papers use the utilization rate of preferences to evaluate the importance of preference programs to developing countries. Dean and Wainio (2005) and Candau and Jean (2006) estimated the value of the tariff preference programs of the United States and European Union, respectively, to developing countries. They define the "value" of tariff preferences as the beneficiary country's duty savings as a share of its total dutiable exports to the country under investigation. Using these valuation calculations, Dean and Wainio (2005) concluded that the erosion of tariff preferences may have a significant impact on more countries and products than typically thought; 29 countries had values of U.S. tariff preferences exceeding 5 percent of their dutiable exports to the United States. Most of this value accrued to countries benefiting from non-agriculture preferences, particularly on apparel products. Candau and Jean (2006) similarly found that European Union preferences are important for a number of developing countries, particularly in sub-Saharan Africa and the Caribbean.

Finally, Haveman and Shatz (2004) estimated the increase in least developed country (LDC) exports to the United States, European Union, and Japan due to preference programs between 1993 and 2000. The authors decomposed the impact of tariffs into a trade-reduction effect that occurs due to tariffs and a tariff-diversion effect that occurs due to preferential trade programs. This tariff diversion effect measures the degree to which developing countries experience an increase in exports due to preference programs such as the GSP program. Using this model, the authors estimated that preferential tariff programs increase U.S. im-

ports from LDC countries by 10.5 percent, or approximately $0.4 billion. Because the bulk of the increase in exports is due to a small subset of products (half of the estimated import expansion in the United States from preference programs is in the mineral products sector), countries that produce these products benefit much more from U.S. preferences than others.

This paper builds upon the work described above by exploring recent complaints that the bulk of benefits from preferential trade programs accrue to a small subset of countries. Specifically, I estimate a model similar to Haveman and Shatz (2004) that allows some countries to benefit from preferential tariff access more than other countries based on the country's level of development. The results suggest that preferential tariff programs benefit lower-middle income countries much more than those countries at other levels of development; these countries may experience a significant decrease in exports of certain products to the United States due to preference erosion.

3 Empirical Model and Data Sources

Like customs unions, part of the growth in imports that occurs due to preferential trade programs like the GSP program is caused by "trade diversion." In other words, the tariff reduction on products under the GSP program reduces the U.S. price of products from eligible beneficiary countries; as a result, imports from developing countries increase as U.S. consumers both increase consumption and substitute products produced by the developing world for domestically-produced goods (trade-creation) and other industrialized countries (trade-diversion). Economists believe that the welfare effects of preferential tariff programs increase with the amount of trade-creation but fall with the amount of trade-diversion as consumers substitute products from less-efficient producers for those produced by more-efficient producers.

In order to estimate the impact of the reductions of U.S. tariff rates on developing countries, I estimate the trade-creation and trade-diversion effects of preference programs using an empirical model originally developed in Haveman, Nair-Reichert and Thursby (2000).

The authors derive the empirical model from a theoretical model of bilateral trade flows in which industries are monopolistically competitive and the elasticity of substitution between domestic and foreign varieties of goods differ from that between foreign varieties. Based on this model, the estimating equation for a single year of the value of bilateral trade in product k between country i and country j (M_{ij}^k) is specified as:

$$\begin{aligned} lnM_{ij}^k &= \alpha + \delta_j E_j + \omega_i M_i + \kappa_k H_K + \beta_1 x_{ij} \\ &\quad + \beta_2 lnTAR_i^k + \beta_3 lnTARDiv_{ij}^k + \beta_4 lnTARComp_{ij}^k + \epsilon_{ij}^k. \end{aligned} \tag{1}$$

In this equation, E_j, M_i, and H_k are exporter, importer and product-specific fixed effects. The matrix x_{ij} includes a number of explanatory variables that are commonly used in gravity-equation specifications of bilateral trade, including the distance between the two countries and whether the two countries share a common border and language.

The main variables of interest, however, both in the Haveman, Nair-Reichert and Thursby (2000) specification and in this research, are the tariff variables.[7] One would expect imports to decrease as the average tariff level increases. The trade-reducing effect, TAR_i^k, is the trade-weighted average of the bilateral tariffs imposed upon U.S. importers of product k.[8] Under the Haveman, Nair-Reichert and Thursby (2000) theoretical model, the coefficient on TAR_i^k, β_2, can be interpreted as the elasticity of substitution between home and foreign varieties of goods.

Countries that are awarded preferential tariff treatment, including developing countries and members of free trade agreements, should experience an increase in trade due to their now lower prices compared to other trading partners. In other words, the trade-diversion effect, $TARDiv_{ij}^k$, captures the extent to which the preferential tariffs lead to a diversion of imports

[7] The Haveman, Nair-Reichert, and Thursby (2000) specification also includes a number of non-tariff barrier variables.

[8] As noted in Haveman, Nair-Reichert and Thursby (2000), using the value of imports as a weighting-variable to calculate the trade-weighted average tariff, TAR_i^k, could result in simultaneity bias during estimation. I follow Haveman and Shatz (2004) in using imports at the five-digit HS level as the weighting variable when constructing trade-weighted average tariff rates to minimize this problem.

from one country to another, preferred country. This variable is measured as the difference between the tariff paid by exporter j and the average tariffs paid by all other exporters. Because a high relative tariff would divert trade from an exporter, the coefficient on this variable is expected to be negative. The coefficient on $TARDiv_{ij}^{k}$, β_3, can be interpreted as the elasticity of substitution between foreign varieties of the same good. As explained in Haveman, Nair-Reichert and Thursby (2000), a higher degree of substitution between foreign varieties than between domestic and foreign varieties, or $\beta_3 < \beta_2$, indicates a domestic bias in consumption as well as tremendous potential for trade-diversion.

The final tariff variable included in Haveman, Nair-Reichert and Thursby (2000) is the tariff compression effect, $TARComp_{ij}^{k}$. Intuitively, because of the fixed cost of importing from each country, imports will likely be compressed into a smaller number of suppliers than would be ideal absent these fixed costs. In other words, the fixed costs will compress trade flows to a smaller number of large supplier. Haveman, Nair-Reichert and Thursby (2000) hypothesize that this trade compression effect will become more severe as the average tariff increases because the larger tariff will reduce consumer expenditures on imports; if a disproportionately high share of consumer expenditures on imports from one or more of the smaller suppliers is going towards paying for fixed costs, then the supplier will be dropped. I measure the tariff compression effect as the product of the average tariff rate for product k and exporter $j's$ export potential, or the value of a country's total exports to the United States at the four-digit North American Industrial Classification System (NAICS) level.[9]

As discussed above, Haveman and Shatz (2004) estimated a model similar to the one described above to study the impact of preferential trade programs on developing countries using a panel of six-digit Harmonized System (HS) product imports from 240 countries between the years 1993 and 2000 (excluding 1994 and 1997). The model is estimated separately for three countries–the United States, European Union, and Japan–and for each of 165

[9]Because of the tariff compression variable, the coefficient on TAR_i^k must be adjusted in order for it to retain its original interpretation. In Section [4], I add the tariff compression effect from the average exporter onto the trade-reduction coefficient.

three-digit Standard Industrialized Classification (SIC) industries. The separate estimation not only makes estimation of the extremely large dataset more tractable, but allows the researchers to avoid problems caused by the larger number of omitted variables that would be present when trying to estimate trade flows over imports as a whole. The division also allows the researchers to consider potential heterogeneity in the tariff effects across broad-categories of products. The authors exclude the tariff compression variable described above, as well as the exporter and product-specific fixed effects, but include a set of four indicator variables for the income level of the exporter, as well as the gross domestic product of the importer.

Although the basic model used in this research is similar to that employed in the Haveman and Shatz (2004) study, I make a number of important modifications to their specification and estimation methods. First, I include the trade compression variable and estimate the model using imports from the United States during a more recent sample period, 1998 to 2005. Statistics suggest that use of the GSP program has been expanding since 1998, and the more recent sample period may capture important differences in the benefits of preferential trade programs. I estimate the model separately for each of 85 four-digit NAICS industries in the manufacturing sector, or the NAICS codes between 3111 and 3399, rather than the SIC-defined industries used in Haveman and Shatz (2004). I also address a number of other important econometric problems that were ignored in the Haveman and Shatz (2004) study.

Haveman and Shatz (2004) apparently ignore the panel aspect of their dataset, failing to account for unobserved characteristics of the importer or the product that may effect import levels using either fixed effects or random effects. Failure to control for these country- and product-specific effects may be causing significant omitted variable bias in their estimates. I instead estimate the model using a first-difference panel estimator. The first-difference estimator and the fixed-effect estimator used in the original Haveman, Nair-Reichert and Thursby (2000) study are both unbiased and consistent; in fact, with only two time periods the two estimators will result in identical parameter estimates. With more than two time periods, the fixed-effect estimator is more efficient under the assumption that the errors are

serially uncorrelated, while the first-difference estimator is more efficient when the errors follow a random walk. Tests for serial correlation described in Wooldridge (2002; pages 282-283) for each of the four-digit NAICS industries indicate that the data in all but one industry is characterized by serial correlation.[10] Note that all non-time varying variables, including those incorporated into the matrix x_{ij} described above, will fall out of the model using a first-difference estimator and, thus, cannot be estimated.

Finally, given that the majority of benefits under the GSP program are collected by a handful of developing countries, I am particularly interested in to what degree the trade-diversion effect is stronger or weaker depending on the income level of the exporting country. The Haveman and Shatz (2004) model assumes that the elasticity of substitution between foreign varieties, β_3, will be the same across all countries. I instead assume that this elasticity of substitution depends on the level of development of the country. In other words, U.S. consumers may consider a blouse from two high-income countries such as Italy and France more similar than a blouse from one of these high-income countries and a low-income developing country such as Bangladesh. As a result, the degree of trade diversion associated with a preferential tariff will depend on the level of development of the beneficiary country.

I divide the exporters into four income groups using the 2001 Gross National Income per capita World Bank definitions. These income groups are: low income, $745 or less; lower middle income, $746-$2,975; upper middle income, $2,976-$9,205; and high income, above $9,205. Tariff diversion parameters are estimated for each income group. The final estimating equation takes the form:

$$\begin{aligned} \Delta lnM_{jt}^{k} &= \Sigma_{l=1}^{4}\alpha_l + \beta\Delta lnTAR_{t}^{k} \\ &\quad + \Sigma_{l=1}^{4}\delta_l\Delta lnTARDIV_{jt}^{k} + \omega\Delta lnTARComp_{jt}^{k} + T_t + \Delta\epsilon_{jt}^{k} \end{aligned} \tag{2}$$

where T_t denotes year dummy variables that are intended to capture any macroeconomic trends in imports, Δ denotes the change in the variable of interest between period t and $t-1$, and l indexes the income-groups.

[10] Industry-specific test statistics are available from the author upon request.

I construct a dataset of country-specific U.S. tariff barriers and the value of imports from 157 trade partners in over 4,700 six-digit harmonized system (HS) code products between the years of 1997 and 2005. Trade barrier information is taken from the U.S. International Trade Commission's Tariff Database. This database includes year-specific information such as the MFN tariff rate, indicators for preferential trade program eligibility, and program-specific tariff rates such as those that apply to U.S. trade with Mexico and Canada, by eight-digit HS product line. Using the lists of countries eligible for particular preferential trade programs that appear in the general notes of the annual Harmonized Tariff Schedule of the United States, as well as information such as GSP competitive need exclusions from the Tariff Database, I create a set of dummy variables that indicate whether a specific country and product was eligible for special tariff treatment. Using these dummy variables, I assign a tariff rate to each country and product.[11] For example, countries eligible for GSP treatment for a particular product were assigned a duty rate of zero; countries ineligible for any preferential trade program were assigned the MFN tariff rate. Using the tariff rates at the eight-digit HS level, I calculate country-specific simple average tariff rates at the six-digit HS level. To complete the database, I merge the average tariff rates with the annual value of imports from each trade partner taken from the United Nation's Commodity Trade Database.

It should be noted that the regressand in this research is total U.S. imports of a specific product from a specific country, not imports under a specific import program. Although a country may be eligible for GSP preferences, producers may choose to instead ship products under an alternative duty-free program, especially because the continued viability of the GSP program was uncertain during this sample period. Moreover, products from eligible countries may be shipped without tariff preferences if the shipper is unfamiliar with the GSP program or the product fails to meet U.S. rules of origin requirements. The dataset assigns

[11] Ad valorem MFN tariffs were estimated for those products with specific tariffs using the reported total duties collect and dutiable import value for each product from the U.S. Census Bureau. Similarly, ad valorem preferential tariffs were estimated for those products with specific preferential tariffs using the reported total duties collected and dutiable import value for the product from the country in question.

the lowest eligible tariff rate to all imports of a particular product from a particular country, even though some of the products may be imported under a higher tariff rate.

4 Results

Estimates from a baseline specification in which the trade diversion effect is assumed to be equal across all country groups are presented in Table [1]. For the sake of brevity, I do not report coefficient estimates from all 85 four-digit NAICS industries. Instead, I present a summary of the distribution of significant results, as well as the average coefficient estimates.

As expected, the results confirm that in general the higher the tariff rate the lower the level of trade, and the more trade is compressed among the largest suppliers. Nearly 45 percent of the trade reduction coefficients and three-quarters of the trade compression coefficients are significant and of the expected sign. On average, a one percent increase in the tariff rate results in a 1.16 percent decrease in trade flows from the average-sized exporter; the impact on individual countries diminishes with the size of the exporter.

The empirical evidence shows that tariff preferences will result in econometrically significant trade diversion, but only in a subset of industries. In 23.5 percent of the manufacturing industries considered in this research the results indicate that tariff preferences will increase trade flows from beneficiary countries as expected, while in another 4.7 percent of industries tariff preferences actually lower the trade flows from individual countries. On average, a one percent decrease in a country's preference margin will result in a 1.5 percent decrease in trade flows from the preferential trading partner. The difference between the elasticity of substitution between foreign varieties and foreign and domestic varieties, $\beta_3 - \beta_2$, is negative and significant in 16.5 percent of all industries-by an average of 6.8 percentage points-suggesting a fairly large potential for trade diversion in at least a subset of industries. A visual inspection of the industry-specific results does not reveal any clear pattern regarding which industries can be characterized by a high degree of trade diversion.

The estimated impact is much smaller than the impact estimated in Haveman and Shatz

(2004), who found that on average a 1 percent decrease in the tariff rate increases imports from the average trading partner by 8.3 percent while a one percent decrease in a country's preference margin results in a 19.4 percent decrease in trade flows from the preferential trading partner. The authors conclude from these large numbers that there are significant benefits to least-developed countries from unilateral preference programs.

Further exploration into what is driving the large differences in estimates fails to reveal a single underlying cause. Estimating an empirical model identical to that in Haveman and Shatz (2004), which fails to account for the panel nature of the dataset, for all four-digit SIC industries, rather than four-digit NAICS industries in the manufacturing sector, comes closest to replicating the Haveman and Shatz (2004) results; the coefficients suggest that a 1 percent decrease in the U.S. tariff rate would increase imports by 1.4 percent, but reduce trade flows from preferential trading partners by 16.7 percent.[12] The remaining differences may be driven by the sample periods considered. Recall that the Haveman and Shatz (2004) estimates were calculated using a sample period from 1993 to 2000, excluding the years 1994 and 1997. The simple average tariff rate during this period fell 58 percent from 6.4 percent to 3.6 percent, compared to a 36 percent decrease in average tariff rates in the 1998 to 2005 sample period considered in this research. Moreover the share of U.S. trade entering under preferential trading programs increased throughout most of the Haveman and Shatz (2004) sample period, reaching a high of nearly one-quarter of all trade in 1998 before dipping to 20.7 percent by 2000. In contrast, the share of trade entering under preferential trade programs has not changed dramatically during the more recent sample period, averaging approximately 22 percent.

Table [2] presents similar results for the model that allows the trade diversion effect, or the degree of substitution between foreign varieties, to vary according to the level of development of the exporting country. The estimates on the trade reduction and trade compression effects

[12]Results available from the author upon request. Using an identical econometric model as Haveman and Shatz (2004) on the NAICS-based data sample considered in this research fails to resolve the large differences in estimates.

from tariffs are extremely similar to those estimated in the baseline specification. Nearly 46 percent of the trade reduction coefficients and three-quarters of the trade compression coefficients are significant and of the expected sign. On average, a one percent decrease in the tariff rate results in a 2.1 percent increase in trade flows from the average-sized exporter.

The results confirm that the trade-diversion effect of preferential tariff programs varies significantly according to the level of development of the beneficiary country. Recall that efforts to reform the GSP program were spurred, in part, by the fact that a handful countries, including Angola, Thailand, Brazil and Indonesia, and India, account for almost 70 percent of imports under the GSP program. With the exception of India, which is classified as a low-income country, all of the leading users of the GSP program are classified as lower-middle income countries. The estimates confirm that lower-middle income countries are the biggest beneficiaries of preferential trade programs; there is significant econometric evidence that tariff preferences increase trade flows from lower-middle income countries in approximately 36 percent of manufacturing industries considered in this research. On average, a one percent decrease in the preference margin will reduce imports from lower-middle income countries by 4.6 percent.

Countries in other income groups do not benefit as much from preferential trade programs. For example, preferential tariffs significantly increase trade for high income countries in only 14.1 percent industries, by an average of 1.4 percent. These coefficients primarily capture the benefits accruing to Canada and Israel, although Singapore and Australia both entered into free trade agreements with the United States in 2004. Although many upper-middle income countries continue to qualify for preferential treatment under the GSP program, and Mexico enjoys preferences under NAFTA, tariff preferences resulted in an econometrically significant increase in trade flows from upper-middle income countries in only 14 percent of manufacturing industries. A one percent increase in the preference margin results in an average 1.6 percent increase in flows from upper-middle income countries.

Finally, there is only weak evidence that tariff preferences successfully increase trade from low-income countries, despite the fact that India is one of the leading beneficiaries of the

GSP program. The average impact of a 1 percent decrease in the preference margin is significantly below that for lower-middle income countries-resulting in a 2.5 percent decrease in trade flows–and the econometric estimates suggest that tariff preferences result in significant increases in trade flows from low-income countries in only 10.6 percent of manufacturing industries. The average impact is primarily being driven by strong significant coefficients in the primary metal industries.

Another way of interpreting the results is that the degree of trade diversion-or the degree to which U.S. consumers substitute products from beneficiary countries for imports from alternative suppliers-is highest when the preferential tariffs are awarded to lower-middle income countries. This may be due to the fact that the types of products produced by low-income countries, for example, are only produced by the least developed countries, all of which are awarded preferential tariff treatment, thus no trade-diversion occurs. Canada is one of the few high-income countries that have been awarded preferential tariffs by the United States, but as a bordering nation Canada is also a natural trading partner for the United States thus no trade-diversion takes place from the preferential tariffs. In contrast, the results suggest that preferential tariffs significantly divert trade to lower-middle income countries like Thailand and Indonesia; GSP-eligible products imported from these lower-middle income countries may have otherwise been imported from upper-middle or high income countries that are subject to MFN tariff rates such as Malaysia, Hong Kong, or countries within the European Union.

The parameter estimates suggest that reductions of U.S. MFN tariffs on GSP-eligible products will have a significant impact on trade flows from lower-middle income developing countries. Combining the average trade reduction and trade diversion coefficient for lower-middle income countries, or those developing countries estimated to be the biggest beneficiaries of preferential tariff status, a one percent reduction in the U.S. MFN tariff on a GSP-eligible product will reduce U.S. imports from these countries by an average of 2.6 percent. Similar calculations suggest that low income countries will experience a lower reduction of just 0.4 percent, while U.S. imports from upper-middle income countries will

actually increase by an average of 0.5 percent.

The large decrease in preference margins that some countries will experience under the recent changes in the GSP program will have a much larger impact on imports from certain industries and countries due to the dramatic increase in tariffs these countries will experience. According to the U.S. Trade Representative's office, low income and lower-middle income GSP beneficiaries will be hardest hit by the recent changes in the U.S. GSP program that limit competitive need limitation waivers. Of the nine products that lost their GSP-status under the new law, three are from the low income countries of India and the Ivory Coast and five are from the lower-middle income countries of Brazil, Colombia, the Philippines, and Thailand. For example, as of July 1, 2007 both India and Thailand will be assessed the 5.5 percent MFN tariff on their U.S. exports of precious metal jewelry. The parameter estimates for NAICS code 3399, which includes jewelry manufacturing, suggest that India and Thailand will experience a reduction in their U.S. jewelry exports of 3.82 percent and 7.89 percent, respectively. Based on 2006 import statistics, this translates to a loss of export revenue of $84.5 million for India and $55.3 million for Thailand. Based on the results from this research and current trade statistics, China, the second largest exporter of precious metal jewelry to the United States, will likely gain significant market share from the two countries.

4.1 Estimated Impact of a Reduction of U.S. Tariff Preferences

In order to estimate the impact of further reductions in U.S. MFN tariffs on developing countries, I use the parameter estimates discussed above to simulate the impact of a one percent reduction in U.S. MFN tariffs on a subset of manufacturing industries in 2005. Specifically, I simulate the impact of a one percent reduction of all tariffs, not just those products eligible for the GSP program, in the 52 four-digit NAICS industries in which I found at least one significant parameter estimate during the estimation of Equation [2]. These industries, which are listed in Table [4], accounted for 67.4 percent of total U.S. trade in 2005. Table [4] includes industry-specific results from the simulation, including actual

imports in 2005, the value of 2005 imports predicted by the parameters of the model, and the simulated change in these predicted imports that would occur if the United States had reduced all of its MFN tariffs by one percent in 2005.

Table [3] decomposes the simulated change in imports that would occur from the reduction in U.S. tariffs according to both income group and whether or not the country qualified for some type of preferential import program.[13] In general, those countries that qualified for preferential tariffs generally experienced a reduction in exports to the United States due to the decrease in MFN tariff rates, while those countries that failed to qualify for preferential tariffs enjoyed an increase in U.S. exports.

For example, although the simulation results indicate that upper-middle income countries will benefit from a reduction in U.S. tariffs regardless of whether they qualify for preferential tariff status, a closer look at the results suggest that these benefits are not universal. Upper-middle income countries that enjoy preferential tariff status are expected to experience a 0.002 percent increase in U.S. exports, or $2.1 million; while Mexico is expected to experience an increase in U.S. exports of $3.3 million, U.S. imports from upper-middle income GSP beneficiaries such as Turkey, South Africa and Russia are expected to fall. Imports from those upper-middle income countries that do not qualify for preferential duties, particularly Malaysia, the Czech Republic and Poland, will also enjoy increased export flows to the United States following a reduction in U.S. MFN tariffs.

High-income countries are generally expected to benefit from a reduction in U.S. tariffs. While Canada, which enjoys preferential duties under NAFTA, will see U.S. exports decrease by slightly over $2.0 million, high-income countries that have not formed a trade agreement with the United States are expected to experience a 0.008 percent increase in exports to the United States, or approximately $23.0 million. Leading beneficiaries of the reduction include Japan and, to a lesser extent, Germany, Italy and Korea.

Simulation results suggest that U.S. imports from low-income GSP beneficiaries would decrease by $3.4 million, or 0.02 percent, following a 1 percent reduction of U.S. MFN tariffs,

[13]Detailed results from the simulation exercise are available from the author upon request.

while imports from those low-income countries that did not qualify for the GSP program, namely Vietnam, would increase by 0.03 percent. Low-income GSP-beneficiaries expected to experience the greatest loss in export flows include India, Bangladesh, Cambodia, and Pakistan.

As one might expect from the parameter estimates, lower-middle income GSP beneficiaries are expected to suffer the greatest loss in U.S. export revenue following a 1 percent reduction in U.S. tariffs. Simulation results suggest that China would be the single biggest beneficiary from the reduction in U.S. tariffs; Chinese exports to the United States would increase by nearly 2 percent, or by $31.3 million. In contrast, lower-middle income GSP beneficiaries, particularly Thailand, Indonesia and the Philippines, would experience a 0.01 percent decrease in U.S. export revenues, or approximately $6.6 million.

Although many developing countries will experience a slight decrease in trade flows to the United States following a reduction in U.S. MFN tariffs, the overall negative impact is relatively modest. In total, low to upper-middle income countries that benefit from preferential tariffs are expected to experience a decrease in U.S. exports of just $8.0 million, or 0.004 percent of estimated trade flows. This modest effect is primarily due to the fact that many of the leading products produced by developing countries, such as apparel and agricultural products, are excluded from GSP eligibility and tend to have some of the highest MFN tariffs in the United States; both GSP beneficiaries and non-beneficiaries are expected to significantly benefit from a reduction in the U.S. tariffs imposed on these products.[14]

5 Conclusion

Many development experts have worried that current and future reductions of U.S. MFN tariffs, as well as recent changes in the U.S. General System of Preferences program, will limit

[14]For comparison with earlier studies, the complete elimination of all U.S. tariffs in the selected manufacturing sectors would result in a 1.6 percent reduction in U.S. imports from low-income GSP beneficiaries, a 0.9 percent reduction from lower-middle income beneficiares, and a 0.3 percent increase from upper-middle income countries.

trade flows from developing countries through "preference erosion." This paper estimates the impact of U.S. tariff reductions on imports from the developing world using a panel of U.S. import data from 157 trade partners in over 4,700 six-digit harmonized system (HS) code products between the years of 1997 and 2005. I find that the biggest losers from preference erosion are lower-middle and low income countries, while the average upper-middle income countries will not experience a significant reduction in trade flows due to a reduction in tariff preferences. Specifically, my estimates suggest that lower-middle income countries, such as Thailand, Indonesia and the Philippines, will be hit hardest by a reduction in U.S. MFN tariffs on GSP-eligible products; a one percent reduction in U.S. MFN tariffs will decrease imports from this group by an average of 2.6 percent. Low-income countries, such as India, will experience a much smaller reduction in imports of 0.4 percent. The recent changes in the GSP program that will entirely eliminate preferential status for a some products and countries will have a much larger impact on imports from particular industries and countries.

However, I also find that gradual reduction in all U.S. tariff rates will have only a modest negative impact on imports from most developing countries, a finding which seems to be confirmed by recent trade flow statistics. This is likely due to the fact that developing countries will benefit as tariffs on some of the most important developing-country products which are not eligible for the GSP program, such as apparel, are reduced.

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Figure 1

Imports of Telephone Sets, 1997-2005

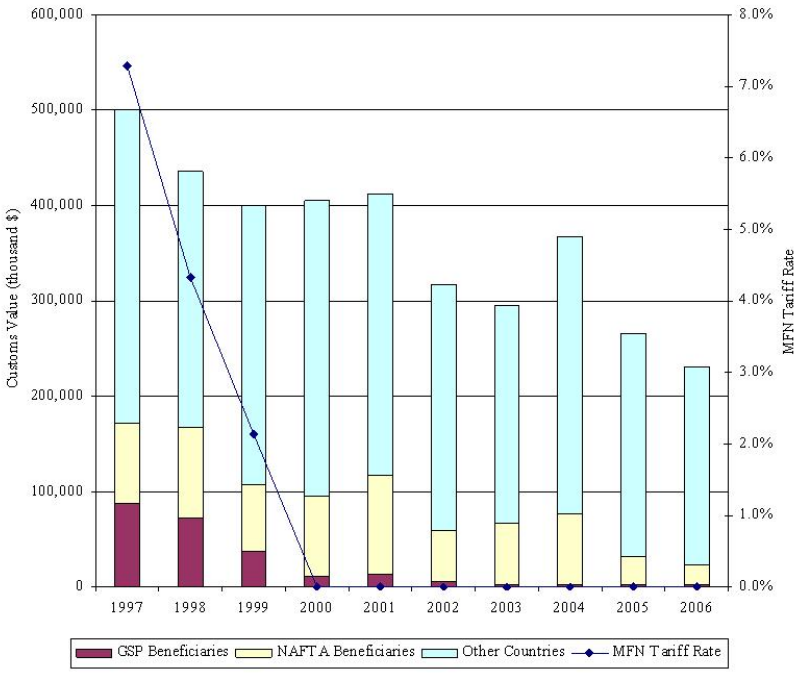

Figure 2

Average MFN Tariff Rates and Share of Trade from GSP-Eligible Countries, 1997-2005

Figure 3

Imports from Preferential Tariff Programs, 1997-2005

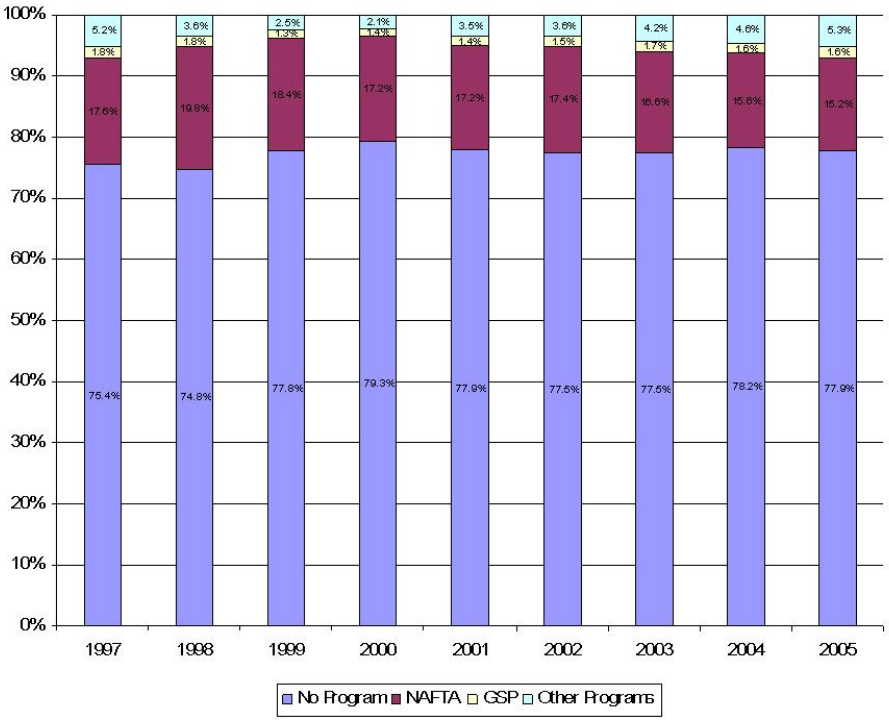

Table 1

Baseline Distribution of Significant (5%) Coefficient Estimates

	Variable			
Coefficient Range	Trade Reduction	Trade Diversion	Diversion Less Reduction	Trade Compression
<-10	3	1	2	0
(-10,-8)	1	0	2	0
(-8,-6)	1	0	2	0
(-6,-4)	8	2	0	0
(-4,-2)	12	3	4	0
(-2,0)	13	14	4	6
(0,2)	3	2	0	61
(2,4)	0	2	0	0
(4,6)	2	0	0	2
(6,8)	1	0	0	0
(8,10)	2	0	0	0
>10	1	0	0	0
All Coefficients				
Number	85	85	85	85
Average	-0.770	-0.764	0.006	0.256
Significant Coefficients				
Share of Total	55.3%	28.2%	16.5%	81.2%
Average	-1.164	-1.583	-6.834	0.314

Table 2

Distribution of Significant (5%) Income-Specific Coefficient Estimates

	Variable					
		Trade Diversion				
		Income Level				
Coefficient Range	Trade Reduction	Low	Lower-Middle	Upper-Middle	High	Trade Compression
<-10	4	0	3	0	1	0
(-10,-8)	0	0	2	0	0	0
(-8,-6)	4	2	8	0	0	0
(-6,-4)	4	0	4	2	2	0
(-4,-2)	14	3	10	2	6	0
(-2,0)	13	4	4	8	3	5
(0,2)	3	1	1	1	2	62
(2,4)	0	0	0	1	1	0
(4,6)	1	0	0	0	3	2
(6,8)	0	0	0	0	0	0
(8,10)	1	0	0	0	0	0
>10	1	0	1	0	0	0
All Coefficients						
Number	85	85	85	85	85	85
Average	-1.055	-0.682	-2.849	-0.690	-0.427	0.260
Significant Coefficients						
Share of Total	52.9%	11.8%	38.8%	16.5%	21.2%	81.2%
Average	-2.096	-2.509	-4.648	-1.567	-1.376	0.318

Table 3

Simulated Impact of a 1% Decrease in Tariffs, 2005

	Change in Imports	
Group	(Million $)	(Percent)
Preferential Low-Income	-3.4	-0.018
Non-Preferential Low-Income	1.0	0.029
Preferential Lower-Middle Income	-6.6	-0.011
Non-Preferential Lower-Middle Income	31.3	0.019
Preferential Upper-Middle Income	2.1	0.002
Non-Preferential Upper Middle Income	1.0	0.003
Preferential High Income	-2.0	-0.002
Non-Preferential High Income	23.0	0.008

Table 4

Simulated Change in Industry Imports from 1% Decrease in MFN Tariffs, 2005

	(dollars)		(Percent)
Industry	Actual Imports	Simulated Imports	Simulated Change in Imports
Grain milling (3112)	$3.3	$3.3	-0.013
Dairy products (3115)	3.5	3.2	-0.017
Bakery products(3118)	1.7	1.6	-0.017
Beverages (3121)	13.5	12.5	0.004
Tobacco (3122)	0.6	0.6	-0.002
Fiber and thread mills (3131)	0.9	0.9	-0.011
Fabric mills (3132)	6.3	6.2	0.008
Knitting mills (3151)	1.4	1.4	-0.061
Cut and sew apparel (3152)	70.0	65.4	-0.016
Wood products (3212)	6.2	6.0	-0.015
Papermill products (3221)	8.7	8.4	0.000
Paper products (3222)	6.3	5.7	0.010
Printing (3231)	5.4	5.1	0.001
Resin, rubber, etc.(3252)	14.1	11.5	0.003
Agriculture chemicals (3253)	7.1	5.5	-0.048
Pharmaceuticals (3254)	39.9	37.2	-0.007
Paint and adhesives (3255)	1.5	1.4	-0.021
Other chemicals (3259)	4.0	3.9	0.031
Plastics (3261)	16.0	14.3	-0.035
Rubber (3262)	10.2	8.7	-0.030
Clay (3271)	6.8	6.4	0.032
Glass (3272)	6.5	6.5	0.026
Other non-metallic minerals (3279)	6.5	5.6	0.045
Iron and steel mills (3311)	28.5	29.1	0.002
Handtools (3322)	3.5	3.2	0.076
Structural metals (3323)	2.6	2.2	-0.024
Shipping containers (3324)	2.0	1.9	-0.060
Hardware (3325)	5.4	4.9	0.036
Wire products (3326)	2.6	2.3	0.002

Continued on next page ...

Table 4–Continued

Industry	(dollars) Actual Imports	(dollars) Simulated Imports	(Percent) Simulated Change in Imports
Other fabricated metal (3329)	20.1	18.1	-0.008
Agriculture/construction machinery (3331)	47.8	42.6	0.007
Commercial industry machinery (3333)	12.3	10.9	0.040
Heating/refrigeration equipment (3334)	12.1	11.1	0.006
Metalworking machinery (3335)	9.4	8.6	0.042
Other machinery (3339)	12.1	18.8	0.002
Computer equipment (3341)	88.6	83.9	0.000
Communications equipment (3342)	43.9	37.9	0.003
Audio/video equipmnet (3343)	41.1	36.5	0.030
Electronic components (3344)	35.1	32.2	0.009
Instruments (3345)	25.9	24.7	0.004
Optical media (3346)	3.1	3.0	0.001
Other electrical equipment (3359)	8.7	7.7	0.049
Motor vehicle parts (3363)	43.6	42.0	0.032
Aerospace products (3364)	19.8	19.7	-0.002
Railroad stock (3365)	0.9	0.9	0.103
Ship building (3366)	1.5	1.6	-0.253
Other transportation equipment (3369)	5.6	5.2	0.171
Household furniture (3371)	22.0	20.2	0.000
Office furniture (3372)	3.2	2.9	0.013
Other furniture (3379)	0.8	0.7	-0.223
Medical equipment (3391)	15.8	15.0	0.011
Miscellaneous mfg. (3399)	65.3	59.8	0.018
Total	$832.8	$768.9	0.006