The Welfare Impact of Apparel Price Increases:
Who Get Hurt More, the Poor or the Rich?

Consumers' welfare losses due to price increases in apparel were estimated across different levels of income using the Hicksian equivalent variations, which were computed as percentages of consumer utility generated from apparel consumption. Using a combined data set of the 1980-1992 Consumer Expenditure Survey, the 1980-1992 Consumer Price Index and the 1990 ACCRA Cost of Living Index, it was found that the welfare loss was higher for poor households than for richer households.

Jessie X. Fan, University of Utah[1]
Jinkook Lee, University of Tennessee[2]
Sherman Hanna, The Ohio State University[3]

Introduction

Hufbauer and Elliott (1994) estimated that tariffs and quantitative import restrictions in place in 1990 costed American consumers about $70 billion, more than 1 percent of GDP. More than a third, $24 billion, of these consumer costs were attributable to textiles and apparel alone. Since the Multi-Fiber Arrangement, textiles and apparel industry has received more comprehensive and persistent protection than any other industrial sector (Cline, 1990). And this trend still continues, despite the general trend toward trade liberalization: Vosko (1993) examined the extent of trade liberalization between Canada and the U.S. in the textiles and apparel goods chapter of the NAFTA and found that while moderate liberalization was achieved in textile trade, protectionism was increased in apparel trade. Also, recently, the U.S. Committee for Textiles and Apparel (CITA) notified the Dominican Republic, Columbia, Costa Rica, El Salvador, Honduras, Thailand, Turkey, and Jamaica that it plans to limit their exports of apparel (Turck, 1995).

Restriction of the supply of imports tends to raise their prices, and as import prices rise, the prices of competing domestic goods tend to rise in response (Cline, 1990; Dardis, 1988). Chen (1994) estimated the potential effects of a bilateral free trade agreement in textiles and apparel between the Colombia and the U.S. and concluded that such an agreement will lower consumer prices and raise consumer income by $373 million. Consumer welfare loss due to apparel price increases, which often caused by trade restriction, is the focus of this study.

Since consumers with different levels of income respond to price changes in Apparel differently, with lower-income consumers being more own-price elastic than higher-income households (Fan, Lee & Hanna, 1996), consumer welfare loss due to apparel price increases can also vary across the different income levels.

Furthermore, trade restriction often raises prices at different rate depending of the value of apparel products (Christerson, 1994; Christerson & Appelbaum, 1995). For low-value apparel products which tend to compete on price, the impact of trade restriction has a greater impact on consumers with low income, who are the buyers of low-value apparel products. Also, the major exporters of low-value apparel products are developing countries who are more subject to changes in quotas and other trade restrictions. For high-value apparel products, which tend to compete on quality and fashion, tariffs and quotas affect the price of imported goods less significantly than low-value products, since these high-value apparel products are primarily exported by developed nations. Also, high income consumers who are the buyers of these high-value products may be less sensitive to price changes, since they care more about quality and fashion than price.

Therefore, considering that imports of low-value apparel products are more subject to the changes in trade restriction, and the competitive advantage of low-value apparel products is price, there is a possibility of uneven distribution of consumer welfare loss by trade restriction across consumers at different levels of income. The purpose of this study is to investigate consumer welfare loss due to price increases across different levels of income. Although there have been criticisms concerning the usefulness of the concept of consumer surplus, it is of great use as a heuristic device for illustrating the social benefits or costs of policy decisions, and there is no alternative computable measure of the welfare loss

(Currie, Murphy & Schmitz, 1971; Maddala & Miller, 1989; Morey, 1984). Based on consumer welfare loss, the social benefits or costs of apparel trade policy decisions are discussed.

Literature Review

Studying the direct impact of trade restriction on American consumers, Bergsten (1972) summarized that consumers suffer from trade restrictions by having to face higher market prices for apparel and textile goods due to tariffs and quotas and by having to face limited choices for low-priced products. He suggested that low-income consumers generally suffer most because low-price goods from abroad are the primary target of U.S. import restriction.

Previous studies in the area of quantitatively assessing consumer welfare loss due to trade restriction in apparel industry mostly researched this issue from a macro-economic perspective. Dardis (1986) estimated the total cost of U.S. trade restriction as $13.113 billion for U.S. consumer loss, $10.374 billion for U.S. producer/distributor gain, and $2.003 billion for U.S. tariff revenue, resulting in a total welfare loss of $0.736 billion for the whole U.S. economy (All numbers are in 1984 dollars). The estimates were based on partial equilibrium models of supply and demand for apparel products. Tarr (1989) estimated the consumer welfare loss, measured in Hicksian Equivalent Variations, of removing importation quotas as $13.06 billion for the United States, using a general equilibrium trade model. Tarr (1989) also found that the apparel price in the U.S. was 47% higher than the price with no quota system existed.

Although the popular believe has been that low-income consumers will suffer more than high-income consumers with high apparel prices caused by trade restriction on textile and apparel, no study has directly estimated the size of welfare loss due to trade restriction suffered by consumers with different levels of income. It was the purpose of this study to use household-level data and analyze to estimated consumer demand for apparel, taking household income, household demographic characteristics, and market prices into consideration. Based on the estimated demand functions, welfare loss for consumers with different levels of income were estimated and analyzed.

Theoretical Background

The neoclassical consumer demand theory provides a theoretical framework for the analysis of consumer demand by formulating expenditure functions for goods and services. Given a budget constraint and a utility function representing consumer preferences, the bundles of commodities that maximize consumer utility subject to the budget constraint can be expressed as a function of relative prices of goods, household income and household preferences.

The basic idea of consumer welfare change is to attach a monetary value to the change in welfare resulting from a change in prices (Deaton & Muellbauer, 1980). Two commonly used consumer welfare measurements are Hicksian Compensation Variation (CV) and Hicksian Equivalent Variation (EV). The CV is defined to be the amount of money that has to be compensated to a household in the new situation with the price increase in order to leave it as well off as in the original situation, whereas the EV is defined as the amount of money that can be taken away from the household's initial income in order to give the household the same utility level as after the price increase (Broadway & Bruce, 1983). Mathematically, with a single price change, CV and EV can be formulated as:

$$CV = e(p^0, u^0) - e(p^1, u^0),$$
$$EV = e(p^0, u^1) - e(p^1, u^1) \quad (1)$$

where p^0 are initial prices, p^1 are new prices, u^0 is the original utility level, and u^1 is the utility level after the price change.

Data and Descriptive Statistics

The three major data sources used in this study were the 1980-1992 Consumer Expenditure Survey (CES), the 1980-1992 Consumer Price Index (CPI), both collected by the Bureau of Labor Statistics (BLS), and the 1990 ACCRA Cost of Living Index (ACCRA), published by the American Chamber of Commerce Researchers Association. For this study, only households that completed the interview for an entire calendar year were selected in the CES data set. The price data coming from the CPI were compatible and consistent with the CES, since the CPI data used expenditure weights obtained from the CES data. While the CPI provided price data over time, the ACCRA data published price differences among standard metropolitan statistical areas (SMSA's) for major expenditure categories and were used as a supplement to the CPI price data in this study.

Since household decisions on expenditures on different commodity categories were interdependent, in order to study household expenditure on Apparel, it was important to take households expenditures on other commodity categories into consideration. Considering

data availability and computational feasibility, besides Apparel and Upkeep, twelve other mutually exclusive categories of summary expenditures were selected for this study: Food at Home; Food away from Home; Shelter; Fuel and Utilities; Household Operation, Household Equipment and Furnishing; Entertainment; Transportation; Education; Health Care; Alcoholic Beverages; Tobacco and Tobacco-Related Products; and Personal Care. For a detailed description of data construction used in this study, see Fan (1996).

The total sample size was 10,400 households who were interviewed for a whole calendar year during 1980 to 1992. During the 13-year sample period, household income, expenditures and budget shares, and market prices have experienced many changes. Generally speaking, prices have increased over time, but the rate of increase for different commodity categories was different. Among thirteen expenditure categories, Apparel had the second lowest price increase (45%) over the 13-year sample period, second only to Household Equipment and Operation (37%). Although prices of Apparel have rise more slowly than general inflation despite trade protection, there is every reason to believe that inflation in Apparel would have been even lower in the absence of protection (Cline, 1990).

There were also significant price differences among regions and cities. The average price increase in Apparel over the thirteen year sample period was greater for the South (57.1%), compared to Northeast (40.5%), Midwest (42.3%), and West (36.0%). However, Northeast cities with a population of more than 1.2 million still has the highest price of Apparel among all areas in 1992.

For all households in the sample, while the mean unadjusted dollar amount of permanent income has increased from $10,989 in 1980 to $22,915 in 1992, a 109% increase during the 13 years, the simultaneous inflation canceled out most of the income growth. During the thirteen year sample period, the budget share for Apparel was fairly stable. The lowest was 4.99% in 1980, and the highest was 6.06% in 1986.

Methodology

Demand System

Given the large number of expenditure categories and demographic variables involved in the demand system, it was important to select a simple but flexible demand system to execute the analysis. The Almost Ideal Demand System (AIDS) and it's linear approximation form LA/AIDS was employed for analysis. Following Deaton and Muellbauer (1980), the LA/AIDS was defined by

$$W_i = \alpha_i + \sum_j \gamma_{ij} \log P_j + \beta_i \log(M/P^*) \quad (2)$$

where w, p and M were budget share, price and income, respectively, α, β and γ parameters, and I and j expenditure categories.

Alston, Forster and Greene (1994), and Pashardes (1993) criticized the LA/AIDS system for causing bias in price elasticity estimates by using Stone Index and proposed the corrected formulas for price elasticity estimates. This corrected formulas were used in this study to correct the estimation bias. To avoid statistical problems, the Stone index was created using mean budget shares for each region/city size combination, and thereby could be treated as exogenous.

Two statistical issues were addressed in this study. The first issue was the incorporation of demographic variables into the demand system. For this study, a form of demographic translating was employed (Blundell, Pashardes & Weber, 1993). This specification was realized by allowing the parameters α and β in the LA/AIDS demand system, and only these parameters, to vary with the demographic variables.

The second issue was the problem of limited dependent variables, which occurred due to zero expenditure on some commodities by some households during the sample period. After comparison of several available statistical procedures for handling this problem, the two-stage tobit procedure was selected for this study. Therefore, the LA/AIDS system with correction for limited dependent variable was then specified as:

$$W_i = \alpha_{i0} + \sum_{h=1}^{m} \alpha_{ih} D_h + \sum_j \gamma_{ij} \log P_j + (\beta_{i0} +$$
$$\sum_{h=1}^{m} \beta_{ih} D_h) \log(M/P^*) + \sigma_i [\phi_i - (1 - \Phi_i) \sum_{h=1}^{n} \tau_{ih} X_h] \quad (3)$$

For a more detailed description of the model development used in this study, see Fan (1996).

Variables

The income variable used in this study was annual permanent income defined by subtracting social security tax, cash contribution, life insurance payment, and net vehicle outlay from the Bureau of Labor Statistics defined total expenditure and was a sum of the 13 expenditure categories discussed in the data section. Since prices were included as explanatory variables, the permanent income did not need to be adjusted for the Consumer Price Index.

The following demographic variables were used in the model: (1) Characteristics of the reference person: ethnic dummies (Asian, Black, Hispanic, White(base)); gender dummy (female, male(base)); logarithm of age; education dummies (less than high school(base), high school graduate, some college, college graduate and more); employment status (full time, others(base)); and occupation (white collar, self-employed, others(base)); (2) Characteristics of the household: number of earners; family composition(number of members less than 6 years old, number of members between 6 and 17, number of members between 18 and 34, number of members between 35 and 64, number of members older than 65); housing tenure (renter(base), owner with mortgage, owner without mortgage); region (Northeast(base), Midwest, South, West); and (3) A continuous variable indicating the year of the interview.

Computation of Consumer Welfare Changes

In order to analyze the welfare impact of Apparel price change on households with different levels of permanent income, the 1992 sample was divided into four quantiles by their total household expenditure for simulation. For all variables in the model, the mean values were computed to form a representative household for each quantile.

For the simulation, all households were assumed to face the same beginning Apparel price, which was the average Apparel price index for 1992. For these four representative households, Marshallian consumer surplus losses were first computed at different levels of Apparel price changes, ranging from 5% to 100%. Then, Willig's (1976) approximation formulas for constant income elasticities were used to estimate the Hicksian equivalent variations.

Finally, in order to determine the relative sizes of utility losses for households with different levels of income, Hicksian equivalent variations were computed when the choke prices were reached for each household in the simulation. These numbers were used as estimates for total consumer utility generated from Apparel consumption at the initial price level. Welfare losses as percentages of total utility from Apparel consumption were then computed for each household in the simulation.

Results

The LA/AIDS demand system was estimated using an iterative seemingly unrelated regression (ITSUR) method. About eighteen percent of the variances of the budget share for Apparel were explained by the set of independent variables. For the whole system, the R^2s range from 0.10 to 0.47.

Since Apparel was income elastic, poorer households usually spent less of their budget on Apparel than richer households. The demand curve for the average poorer household was therefore always on the left-hand side of the demand curve for the average richer household, implying at any price, poorer households purchased less than richer households. Further, since poorer households were more own-price elastic than richer households, the demand curve for the average poor household was steeper than that for the average richer household. The shapes of the demand curves determined that, if Apparel price increased, the absolute value of consumer welfare loss was always higher for richer households than poor households.

The simulation results for the four representative households, presented in Table 1, confirmed this relationship. For a 5% increase in Apparel price, the average household in the bottom income quantile had an utility loss that is equivalent to $49.04, while the average household in the highest income quantile has an utility loss that is equivalent to $337.08, more than six times higher. However, when we computed the Hicksian equivalent variations as percentages of total consumer utility generated from Apparel consumption at the current price level, it was found that the percentage of welfare loss was actually

Table 1

Estimated Hicksian Equivalent Variation in Dollars (Percent of Total Utility from Apparel Consumption) by Quantiles of Permanent Income

Apparel Price Increase	Bottom quantile	Second quantile	Third quantile	Top quantile
5%	$ 49.0 (10%)	$105.4 (8%)	$169.4 (7.5%)	$337.1 (7%)
10%	$ 92.9 (18%)	$199.9 (15%)	$321.7 (14%)	$640.9 (13%)
20%	$167.7 (33%)	$362.4 (28%)	$584.2 (26%)	$1,166 (24%)
25%	$199.9 (40%)	$432.6 (33%)	$698.0 (31%)	$1,395 (28%)
50%	$322.7 (64%)	$705.1 (54%)	$1,142 (51%)	$2,295 (46%)
100%	$455.0 (90%)	$1,020 (79%)	$1,668 (74%)	$3,382 (68%)

higher for poor households than for richer households. For example, given a 5% Apparel price increase, a $49.04 utility loss for the average poor household was about 9.7% of its total utility generated from Apparel consumption at the current price level, whereas a $337.08 welfare loss to the average household in the highest income quantile was only 6.8% of its total utility generated from Apparel consumption, a 43% difference.

The same was true for every level of Apparel price increase simulated. Logically, consumer welfare loss was estimated to be larger for larger price increases. For example, for a representative household in the bottom income quantile, a 50% price increase in apparel would yield a utility loss that is equivalent to $322.67, more than six times higher than the utility loss this household would suffer with if the Apparel price increase is only 5%. Further, with a 50% price increase, this household will lose a little less than two-thirds (63.8%) of the total utility it enjoys at the current Apparel price level. For the average household in the upper quantile, a 50% price increase will yield a utility loss that is equivalent to $2295.20, which is more than six times higher than the utility loss with a 5% price increase. This household will lose about 46% of its total utility generated from apparel consumption at the current price level.

Since the prices of low-priced apparel products were affected more by trade-restriction, the price difference with or without trade restriction was higher for low-income consumers (Bergsten, 1972). For example, a low-come consumer might face a 100% price increase due to trade restriction, compared to a 25% price increase for high-income consumers. If that was the case, then the absolute level of consumer welfare loss could also be higher for low-income consumers than for high-income consumers. Further study is needed to explore the issue of apparel price increases for consumers with different levels of income.

Conclusion and Limitation

In this study, consumer welfare losses due to price changes in Apparel, measured with Hicksian equivalent variations, were estimated across different levels of income, based on demand estimates from a LA/AIDS model for households. It was found that if Apparel price changed, the absolute value of consumer welfare loss was higher for richer households than poor households. However, when the Hicksian equivalent variations were measured as percentages of total consumer utility generated from Apparel consumption at the current price level, the percentage of welfare loss was actually higher for poor households than for richer households.

Several limitations need to be kept in mind when interpreting the results of this study. First, due to data limitation, this study did not differentiate domestic Apparel products and imported Apparel products. Instead, Apparel was treated as one product. It was assumed that consumers living in the same area (region/city-size) in the same year faced the same apparel price. Apparently, this assumption had an impact on the accuracy of own-price elasticity for Apparel for low-income households. Low-income consumers might be even more own-price elastic than suggested in this study. In that case, the consumer welfare loss for low-income consumers were underestimated.

Second, this study only dealt with direct consumer welfare losses due to price increase in Apparel, which is only one aspect of the impact of trade restriction on Apparel. Producers' welfare change, and some consumers' wage gains were not taken into consideration.

Despite the limitation, this study still has an important policy implication. Apparel manufacturers and unions have been vigorously resist trade liberalization in the name of saving jobs (AFL-CIO, 1995). Although it has been well known that restriction of the supply of imports has had the effect of raising the U.S. consumer prices of apparel above levels they otherwise would have attained (Cline, 1990), previous research has not explicitly estimated the differential impacts on households of different income levels. The findings in this paper suggest that the poor are hurt relatively more than the rich by price increases. Thus, if we are interested in the welfare of lower income families, we should realize we are sacrificing lower income consumers' welfare proportionately more by resisting trade liberalization for the well-being of apparel manufacturers and unions.

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Endnotes
1. Assistant Professor, Department of Family & Consumer Studies.
2. Assistant Professor, Retail & Consumer Science.
3. Professor, Department of Consumer & Textile Science.