On Estimating the Static Effects of Preferential Tariffs*

Dennis G. Beckmann

INTRODUCTION

Since Baldwin and Murray [2] published their article regarding the effects of MFN tariff cuts on beneficiaries of the Generalized System of Preferences (GSP), Ahmad [1] and Pomfret [8, 10] have claimed that trade diversion effects of the GSP are much larger than those estimated by Baldwin and Murray. In particular, the magnitude of trade diversion plays a crucial role in the Baldwin-Murray conclusion [2, 44] that "the developing countries stand more to gain from MFN tariff cuts than they will lose from the simultaneous erosion of their GSP preferential tariff margins . . . .", a conclusion that both Ahmad and Pomfret challenge. In this paper I will show that the Baldwin-Murray methodology incorporates biases that have, in fact, overestimated trade diversion for two reasons not recognized by the aforementioned authors.

II. THE MODEL

Suppose that the donor country's economy is initially in equilibrium. In describing this equilibrium, allow \( Q \) to be the total quantity of a particular product group consumed within the country. As such, \( Q \) equals the quantity imported by the donor plus its own domestic production, or

\[
\begin{align*}
1.1 & \quad Q = Q_d + Q_t \\
1.2 & \quad Q_t = Q_n + Q_e
\end{align*}
\]

where

- \( Q_d \) is the total quantity imported by the donor,
- \( Q_t \) is the quantity imported from beneficiaries,
- \( Q_n \) is the quantity imported from nonbeneficiaries, and
- \( Q_e \) is the quantity produced in the donor country.

It is assumed that \( Q_d, Q_t, \) and \( Q_e \) are differentiated products, and hence, their equilibrium prices (\( P_d, P_t, \) and \( P_e \) respectively) may differ. Thus, in determining the total expenditures by consumers in the donor country on the product group, it is inappropriate to multiply \( Q \) by \( P_d, P_t, \) or \( P_e \) but instead one must multiply \( Q \) by an index, \( P \), so that;

\[
\begin{align*}
2.1 & \quad PQ = P_d Q_d + P_t Q_t \\
2.2 & \quad = P_n Q_n + P_e Q_e
\end{align*}
\]

Accordingly, the demand for the product group can be written as a function of the product group's price index where

\[
3.1 \quad P = \frac{Q_d}{Q} P_d + \left( \frac{Q_t}{Q} \right) P_t + \left( \frac{Q_e}{Q} \right) P_e
\]
so that

$$\text{TD}^A = -\frac{M_d}{V} \cdot dV^A - \frac{M_d}{V} \cdot dC$$

$$\text{TD}^M = -\frac{M_d}{V} \cdot dC$$

where $\text{TD}^M$ would be the estimate of trade diversion under the BM scenario. Their failure to recognize $dC > 0$ thus implies that

$$\text{TD}^M > \text{TD}^A.$$ 

7.3

However, BM also err in calculating the percent change in price and in their use of import data in calculating $\text{M}_d$ and $\text{M}_d$. They used the value as received by the exporting country (i.e., f.o.b.) rather than the actual value paid by consumers in the donor country. Hence, the BM calculation of $\text{M}_d$ and $\text{M}_d$ understates, while $\text{dp}_u$, overstates, the required values by some fraction, say $k_1$ and $k_2$, respectively. Upon multiplying the first occurrence of $\text{M}_d$ in equation 6.2 by $k_1/k_2$ one has

8.1

$$dV^A = \left(\frac{1}{k_1}\right) dV^M - dC$$

8.2

$$dV^A = \left(\frac{1}{k_1}\right) dV^M - \left(\frac{1}{k_2}\right) dV^M - dC,$$

where the right-hand side of 8.2 may be positive or negative. In a similar fashion, 7.2 becomes

8.3

$$\text{TD}^A = \text{TD}^M - \left(\frac{1}{k_1}\right) \text{TD}^M - \left(\frac{1}{k_2}\right) \text{TD}^M - [\frac{M_d}{V}] \cdot dC$$

which again implies that $\text{TD}^M$ may be biased in either direction.

V. IMPLICIT OWN- AND CROSS-PRICE ELASTICITIES

The above methodology can also be used to estimate the implicit values of $\text{E}_p$ and $\text{E}_p$. To see this, multiply equations 5.1 and 5.3 by $-Y\phi_0$. The results are

9.1

$$dV^A = \text{M}_d \cdot \text{E}_p - \frac{\text{E}_p}{V} \cdot d\phi_0$$

9.2

$$\text{TD}^A = -\text{M}_d \cdot \text{E}_p \cdot d\phi_0$$

and

9.3

$$\text{TD}^A = \text{M}_d \cdot \text{E}_p - \frac{\text{E}_p}{V} \cdot d\phi_0.$$ 

Equation 7.1 implies that

9.4

$$\text{TD}^A = \left(\frac{M_d}{V}\right) dV^A$$

which in conjunction with equations 9.1-9.3 leads to:

10.1

$$\text{E}_p - \text{E}_p - \left(\frac{B}{M_d/V}\right) \cdot \text{E}_p$$

10.2

$$\text{E}_p - \left(\frac{B}{M_d/V}\right) \text{E}_p + \left(\frac{1}{k_2}\right) \text{E}_p$$

where

$$B = \left(1 - \frac{\text{E}_p}{\text{E}_p}\right) \text{and} \ 0 < B < 1.$$ 

Also, the traditional substitution elasticity between beneficiary and nonbeneficiary goods is

equation 10.1 minus equation 10.2 which leads to:

11.3

$$\text{E}_p = \left[1 + B\left(\frac{M_d}{V}\right)\right] \text{E}_p$$

where $\text{M}_d$ is the total value of the donor country imports of the ith product group.

IV. ESTIMATION

Equations 9 and 10 require estimates of $\text{E}_p$ which are generally available, and the product group's own-price elasticity of demand, $\text{E}_p^M$, which are generally not known. Baldwin-Murray and Rousslang-Parker [10] overcome this latter difficulty by implicitly assuming that $\text{E}_p^M$ is zero. In this instance 8 equals one and the ratio of 11.1 to 11.2 becomes

$$\text{E}_p^M/\text{E}_p^M = \frac{-\text{M}_d}{\text{M}_d + V}$$

which is the Rousslang-Parker outcome. Further, the simple substitution elasticity becomes

$$\text{S}_M = 1 + \frac{\text{M}_d}{V} \cdot \text{E}_p$$

which has been criticized by Pomfret [8] and defended by Baldwin-Murray [3].

However, the assumption that the product group own-price elasticity is zero is extremely restrictive. In particular, it is often assumed that utility is separable with independence across product groups. This implies that expenditures are constant, i.e. that $\text{E}_p^M$ is unit elastic. However, when $\text{E}_p$ is inelastic, an adjustment to the value of $\text{E}_p^M$ is necessitated by the constraint $|\text{E}_p| > |\text{E}_p^M|$. Rather than address this problem, 31 observations, for which $|\text{E}_p| > 1$, were deleted from the data set.

The components of trade expansion were estimated on an annual 1976 trade flow basis using data on 5-digit product categories as defined in the Tariff Schedules of the United States (TSUS). The sample of products covers 90 percent of U.S. imports of GSP-eligible products from all beneficiary countries combined. Estimates are provided for those goods which qualify for GSP tariff treatment; the value of beneficiary imports used in this study is reduced by the amount of trade depriving GSP duty-free treatment under the "competitive need" limits. The import demand elasticities are the same as those used by Baldwin-Murray. Also, I have estimated the erosion of GSP benefits by using the actual import reductions resulting from the Tokyo Round. Observe Tables I and II.

Table I reports the results of the Baldwin-Murray methodology whereas Table II reports the results when both of the previously discussed biases are acknowledged. Comparison of total TC under the two methodologies shows that the incorrect use of import data by BM has led them to overestimate total TC by 9%. And, the overestimation of $\text{E}_p$ by BM has led to an overestimation of total TD by some 57%. When both biases are combined, TC is overestimated by 15%. These results are especially noteworthy when the total erosion calculated from the BM methodology is 54% higher than that calculated from the corrected methodology.
TABLE 3

Elasticities for Two Digit TSUS... Corrected Methodology (absolute values)

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rather than $f_b$ values. To ascertain the effect on the export countries, one need only deflate the estimated components of $T_B$ by the appropriate ad valorem equivalent insurance and freight costs.

Finally, if one is concerned about the validity of the $T_B$ conclusion and their estimates of $T_C$ and $T_D$, my findings concur with BMI that $T_B$ continues to exceed $T_D$ by a multiple in excess of one. The contentsions of Ahmad and Powfret that $T_D$ should be much larger relative to $T_C$ is not supported by this examination of the BMI methodology.

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REFERENCES


FOOTNOTES

*Department of Economics, University of Arkansas, Fayetteville, AR 72701.*

1. A utility function expressing a consumer's preferences over $Q$ and $Q_i$, i.e., $U(Q, Q_i)$, is weakly separable. See Clague [4-5].

2. A detailed mathematical derivation of these equations is available from the author.

3. "If we assume that donor consumers simply substitute one for the other and do not change their expenditure on other goods or services," p. 33.

4. "MFN state that their empirical results estimated the benefits received by the beneficiary countries. Thus, their data refer to $T_B$ values and, therefore, do not reflect prices actually paid by consumers in the donor country.*

5. Since tariffs are assessed on the $T_B$ value of a product the percentage change in price to consumers in the donor country must incorporate transportation costs in the base value from which the percentage change is calculated. This is in contrast to the BMI methodology where $dP_i = -dQ_i / (Q_i + 1)$.

6. Since goods are valued at prices observed by consumers in the donor country, $TE$ includes insurance and freight. If one is interested in the increase in export earnings actually received by the beneficiary exporting countries, $T_B$ must be adjusted downward to equivalent $f_b$ values.

7. In assessing the welfare effects, the traditional concept of trade creation is the value of domestic displacement plus the change in consumption, i.e., $DC = T_C - T_D = DC + DC$.

8. In effect, $T_B$ domestic displacement equal to trade creation, i.e., $DC = T_C - T_D = DC + DC$.

9. However, the value of $T_B$ reported by BMI is biased due to their incorrect use of $f_b$ values for $M_B$ as well as the incorrect percent change in $P_B$.


11. Again, this bias ignores the incorrect percent change in price and $f_b$ values versus consumer value data problems of the BMI methodology.

12. When taking into account both problems, these equations equal $1/(1+5)$. Within the context of my model, the Rostow-Parker assumption that the incomes shares spent on the components of the product group are small leads to the Baldwin-Murray assumption, equation 8.1.3.


14. The extent of this overstatement is in agreement with MacPherson's [6] generalization.