



Short Communication

Incentives for Levying Countervailing Duties on Foreign Competitive Goods

Yu-Ter Wang^{1*}

¹Department of Economics and Finance, Ming Chuan University, Taiwan Region, China

*Correspondence to: Yu-Ter Wang, PhD, Professor, Department of Economics and Finance, Ming Chuan University, 5 De Ming Rd., Gwei Shan, Taoyuan 333, Taiwan Region, China; E-mail: ytwang@mail.mcu.edu.tw

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Abstract

Objective: The relationships between firm profits, foreign export subsidy, and countervailing duties (CVDs) have not been discussed sufficiently in the existing related literature. The purpose of the present study is to analyze the effects of CVDs and formulate policy advice regarding CVDs to fill this knowledge gap.

Methods: A game theoretic model with oligopolistic market structure is adopted.

Results: The proposed model indicates that when a foreign country provides an export subsidy to a foreign final good, a domestic country has an incentive to levy a CVD whose value exceeds that of the foreign export subsidy on the foreign final good because domestic intermediate- and final-good firms might benefit from the CVD.

Conclusions: A CVD whose value equals that of a foreign export subsidy is enough to counter the subsidy's negative effects on the profits made by domestic intermediate- and final-good firms.

Keywords: countervailing duties, export subsidies, oligopoly, vertically related industries

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1 INTRODUCTION

The World Trade Organization (WTO) Agreement on Subsidies and Countervailing Measures specifies rules for implementing government subsidies and addressing the negative commercial effects of subsidized trade. One method for addressing the aforementioned negative effects involves a WTO member country unilaterally imposing a countervailing duty (CVD) on specific exports.

Collie^[1] presented a case in which the United States levied a CVD of over 100% on subsidized steel imports

from the European Union; this case indicates the possibility of CVDs exceeding foreign export subsidies in real-world scenarios. Qiu^[2] tried to explain why CVDs cannot stop foreign countries to subsidize their exports by using an oligopoly theoretical model. Marvel and Ray^[3] contended that CVDs are often more detrimental than the subsidies that they are aimed at countering. These authors questioned whether CVDs are protectionist measures or measures for reducing trade distortions. Carter et al.^[4] indicated that in 1985, rent-seeking activities resulted in the United States imposing a CVD on hog imports from Canada. Wang^[5]

analyzed the relationship between import tariffs, CVDs and foreign export subsidies. Zhu et al.^[6] found that CVDs in the United States on imports of coated free-sheet paper from China caused a decline in Chinese printing production; US imports of Chinese paper also decreased. The United States saw increases in producer revenues, consumer expenditures, and value added; however, these increases were marginal relative to those of Canada. Brown^[7] found that temporary trade barriers such as CVDs are becoming a South-South phenomenon. Rovegno^[8] studied the impact of US CVDs on domestic producers' price-cost margins and accounted for potential endogeneity in CVDs and the intensity of the protection granted. Kelly^[9] explored the subsidy pass-through effect and found that nations generally set CVDs to be equal to the subsidy granted to the exporter. However, they disregarded the potential influence of subsidies on import prices. Chandra^[10] studied the impact of the US CVDs on Chinese exports and found that it has raised the exports from China to other countries. Lo^[11] argued that the WTO allows members to levy CVDs on subsidized imports that may harm the related domestic industries. Kuang and Xiang^[12] indicated that CVDs have a limited remedial effect on the PV industry in the US. They used a computable partial equilibrium model to demonstrate that the US incurred a welfare loss from its CVDs. Nizovtsev and Skiba^[13] investigated the pass-through effect of CVDs on US import prices, and their empirical results supported the theory. Frering^[14] focused on the US CVDs on ripe olives imported from Spain and analyzed the impact on domestic ripe olives industry by considering factors including volume, price effects and the state of domestic producers.

As we know, there are a lot of papers focused on empirical studies. Only few theoretical studies are presented such as those of Collie^[1], Qiu^[2], and Wang^[5] which examined CVDs and foreign export subsidies in a non-vertically related industry characterized by oligopoly. Moreover, most industries are connected to other industries upstream or downstream because of the nature of the supply chain. Export subsidization is implemented to increase domestic firm profits, whereas CVDs are implemented on subsidized imports to protect domestic firms. Consequently, anti-subsidy accusations typically originate from importing firms in vertically related industries. The relationships between firm profits, foreign export subsidy, and CVDs have not been discussed sufficiently. The purpose of the present study is to analyze the effects of CVDs and formulate policy advice regarding CVDs in a vertical related industry for filling this knowledge gap.

The rest of this paper is structured as follows. Section II describes the method for analysis. Section III presents the results and discussion concerning the relationships between firm profits, foreign export subsidies, and CVDs in a vertically related industry. Finally, Section IV provides the conclusions of this study.

2 METHODS

The proposed model is based on the assumption that one foreign firm and one domestic firm supply a homogeneous final good in a downstream industry and a different foreign firm and domestic firm supply a homogeneous intermediate good in an upstream industry. These firms operate as Cournot competitors in the intermediate- and final-good markets. The proposed model also assumes that the adopted production technology requires one intermediate good (in combination with other production factors) to produce one final good. In this model, the variables corresponding to the foreign firm are denoted by the subscript *. The price of the intermediate good is denoted by γ , and the fixed marginal cost of the other inputs adopted to produce the final good is denoted by v . The final good's inverse demand function can be expressed as follows: $P = \kappa - Z$, where $Z = X + X_*$ and P denote the total output and price of the final good, respectively. Moreover, the parameters σ^1 and σ^2 represent the ad valorem export subsidy and ad valorem CVD for the final good, respectively. The market-clearing price is the cost of the intermediate good; this price satisfies the equilibrium condition of the domestic intermediate-good market. This condition is determined by the production technology used and is expressed as follows: $X = Y + Y_*$, where Y is the intermediate good manufactured at a fixed marginal cost c . The parameters ρ^1 and ρ^2 represent the ad valorem export subsidy and ad valorem CVD for the intermediate good, respectively. The profits made by the domestic and foreign final-good firms are expressed as follows:

$$\pi = (p - \gamma - v)X \quad (1)$$

$$\pi_* = [(1 + \sigma^1 - \sigma^2)p - \gamma_* - v_*]X_* \quad (2)$$

Moreover, the profits made by the domestic and foreign intermediate-good firms are expressed as follows:

$$\Pi = (Y - c)Y \quad (3)$$

$$\Pi_* = [(1 + \rho^1 - \rho^2)\gamma_* - c_*]Y_* \quad (4)$$

A sequential game comprising two decision-making stages for the involved firms will be taken into account. In the first stage, the domestic and foreign intermediate-good firms determine the quantity of intermediate goods to be supplied to the domestic market. In the second stage, these firms consider the price of the intermediate good to determine their optimal levels of final good output. The firms consider the foreign export subsidy and CVD as fixed factors in their decision-making process.

3 RESULTS AND DISCUSSION

The derivation process is as follows. Given the level for foreign export subsidies and CVDs on the intermediate good and the final good (i.e., σ^1 , σ^2 , ρ^1 and ρ^2), in the second

stage the Cournot equilibrium outputs for the domestic and the foreign final-good firms are obtained by maximizing their own profits (i.e., Equations (1) and (2)) respectively:

$$x = 2[\kappa + (1 + \sigma^1 - \sigma^2)^{-1}(\gamma_* + v_*) - c - (1 + \rho^1 - \rho^2)^{-1}c_* - 2v]/9 \quad (5)$$

$$x_* = [2c + 2(1 + \rho^1 - \rho^2)^{-1}c_* + 4v + 7\kappa - 11(1 + \sigma^1 - \sigma^2)^{-1}(\gamma_* + v_*)]/18 \quad (6)$$

Substituting Equations (5) and (6) into the final good's inverse demand function gives the equilibrium price of the final good:

$$p = [2c + 2(1 + \rho^1 - \rho^2)^{-1}c_* + 4v + 7\kappa + 7(1 + \sigma^1 - \sigma^2)^{-1}(\gamma_* + v_*)]/18 \quad (7)$$

After the outputs for the domestic and the foreign final-good firms have been determined in the second stage, in the first stage the Cournot equilibrium outputs for the domestic and the foreign intermediate-good firms are gotten by maximizing their own profits (i.e., Equations (3) and (4)) respectively:

$$\gamma = [\kappa + (1 + \sigma^1 - \sigma^2)^{-1}(\gamma_* + v_*) + 2(1 + \rho^1 - \rho^2)^{-1}c_* - 2\gamma - 4c]/9 \quad (8)$$

$$\gamma_* = [\kappa + (1 + \sigma^1 - \sigma^2)^{-1}(\gamma_* + v_*) + 2c - 2v - 4(1 + \rho^1 - \rho^2)^{-1}c_*]/9 \quad (9)$$

The equilibrium condition for the supply and demand quantity being equal in the intermediate-good market yields the equilibrium price of the intermediate good:

$$\gamma = [\kappa + (1 + \sigma^1 - \sigma^2)^{-1}(\gamma_* + v_*) + 2c + 2(1 + \rho^1 - \rho^2)^{-1}c_* - 2v]/6 \quad (10)$$

Here $\pi^1(\pi_*^1)$ and $\Pi^1(\Pi_*^1)$ denote the profits made by the final- and intermediate-good domestic (foreign) firms, respectively, under the existence of an export subsidy for the foreign intermediate good, foreign final good, or both goods. The following equations are derived from Equations (1)-(10):

$$\pi^1 = [\kappa + (1 + \sigma^1 - \sigma^2)^{-1}(\gamma_* + v_*) + 2(1 + \rho^1 - \rho^2)^{-1}c_* - 2v - 4c]^2/54 \quad (11)$$

$$\Pi^1 = 4[\kappa + (1 + \sigma^1 - \sigma^2)^{-1}(\gamma_* + v_*) - (1 + \rho^1 - \rho^2)^{-1}c_* - c - 2v]^2/81 \quad (12)$$

$$\pi_*^1 = (1 + \rho^1 - \rho^2)[\kappa + (1 + \sigma^1 - \sigma^2)^{-1}(\gamma_* + v_*) + 2c - 2v - 4(1 + \rho^1 - \rho^2)^{-1}c_*]^2/54 \quad (13)$$

$$\Pi_*^1 = (1 + \sigma^1 - \sigma^2)[2(1 + \sigma^1 - \sigma^2)^{-1}c_* + 2c + 4v + 7\kappa - 11(1 + \sigma^1 - \sigma^2)^{-1}(\gamma_* + v_*)]^2/324 \quad (14)$$

Substituting $\rho^2=0$ and $\sigma^2=0$ into Equations (11)-(14) gives the domestic and foreign firms' profit for intermediate good and final good which are denoted in turn by π^2 , π_*^2 , Π^2 , and Π_*^2 , when the foreign government doesn't subsidize its intermediate good or final good (i.e., $\rho^1=\sigma^1=0$).

By the calculation of Equations (11)-(14) and using the definitions stated above, the main results can be derived as follows:

- (1) If $\sigma^1=\sigma^2$ and $\rho^1<\rho^2$, then $\Pi^2<\Pi^1$, $\pi^2>\pi^1$, $\Pi_*^2>\Pi_*^1$, $\pi_*^2<\pi_*^1$.
- (2) If $\sigma^1<\sigma^2$ and $\rho^1=\rho^2$, then $\Pi^2<\Pi^1$, $\pi^2<\pi^1$, $\Pi_*^2<\Pi_*^1$, $\pi_*^2<\pi_*^1$.
- (3) If $\sigma^1<\sigma^2$ and $\rho^1<\rho^2$, then $\Pi^2<\Pi^1$, $\pi^2<\pi^1$, $\Pi_*^2<\Pi_*^1$, $\pi_*^2<\pi_*^1$.
- (4) If $\sigma^1=\sigma^2$ and $\rho^1=\rho^2$, then $\Pi^2=\Pi^1$, $\pi^2=\pi^1$, $\Pi_*^2=\Pi_*^1$, $\pi_*^2=\pi_*^1$.

In the above statements, $<or>$ means both " $<$ " and " $>$ " are possible in the case.

Several key findings are entailed from the main results. First, when a domestic government levies an overfull CVD on a foreign intermediate good in response to a foreign export subsidy, the domestic intermediate-good firm exhibits increased profits, whereas the domestic final-good firm exhibits decreased profits. This outcome occurs because of the increased competitiveness and production costs of the domestic intermediate- and final-good firms, respectively. Second, when a domestic government levies an overfull CVD on a foreign final good, the market share and input purchases of the domestic final-good firm increase. Consequently, a foreign export subsidy results in increased profits for the domestic intermediate-good firm, domestic final-good firm, and foreign intermediate-good firm but losses for the foreign final-good firm. Third, when a domestic government levies an overfull CVD on a foreign intermediate good and final good, only the profits of the domestic intermediate-good firm are guaranteed to increase. The profits of the domestic final-good firm, foreign final-good firm, and foreign intermediate-good firm might decrease or increase under the aforementioned scenario. If a CVD exceeding 100% is levied on a foreign intermediate good, the foreign intermediate-good firm might be compelled to exit the domestic market. The levying of a CVD that equals the foreign export subsidy can counteract the effects of this subsidy on the profits of domestic intermediate- and final-good firms. This policy also results in increased profits for the foreign intermediate- and final-good firms, which eliminates the foreign government's incentive to provide a subsidy for its exports. Consequently, the price and output levels of the intermediate- and final-good firms return to their presubsidy levels.

The aforementioned analysis reveals that a domestic intermediate-good firm consistently benefits when the domestic government levies a CVD with a higher value than that of a foreign export subsidy. Overfull CVDs do not necessarily result in losses for foreign firms. For instance, the levying of an overfull CVD on a foreign final good results in increased profit for the foreign intermediate-good firm. Similarly, the levying of an overfull CVD on a foreign intermediate good results in increased profit for the foreign final-good firm. An overfull CVD must be levied exclusively on the foreign final good to ensure that a foreign export subsidy benefits both the domestic intermediate- and final-good firms.

An incentive exists for a domestic government to impose a CVD on a foreign final good, even if only the exported intermediate good is subsidized by the foreign government. This policy benefits the domestic intermediate- and final-good firms. However, if a foreign export subsidy is applied solely to the final good, the levying of a CVD on the foreign intermediate good results in an increase in the profits of the domestic intermediate-good firm but a decrease in the profits of the domestic final-good firm.

Under a foreign export subsidy for intermediate goods, final goods, or both types of goods, governments must understand how CVDs should be employed to protect domestic intermediate- and final-good. Governments should consider whether a CVD that exceeds a foreign export subsidy can benefit domestic firms. In some cases, a foreign government might impose an export subsidy on the intermediate and final goods from a domestic country. In response, the domestic government might levy a CVD solely on the final and intermediate goods from the foreign country.

4 CONCLUSION

This study examined firm profits, foreign export subsidies, and CVDs in vertically related markets under WTO regulations by using a game theoretic model. The key conclusions of this study are as follows. First, if the value of a CVD levied on a foreign final good exceeds that of the foreign export subsidy for this good, the profits of the domestic intermediate- and final-good firms increase. Thus, an incentive exists for a domestic government to levy a CVD on a foreign final good, even in the absence of a subsidy by the foreign government. Second, a CVD whose value equals that of a foreign export subsidy counters the subsidy's negative effects on the profits made by domestic intermediate- and final-good firms. Finally, under specific circumstances, the levying of a CVD exceeding 100% might benefit subsidized foreign intermediate- and final-good firms.

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Conflicts of Interest

The author declared no conflict of interest.

Author Contribution

Wang YT contributed to the manuscript and approved the final version.

Abbreviation List

CVD, Countervailing duty

WTO, World Trade Organization

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