The Pass Through of Countervailable Subsidies to the Export Price *

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I. INTRODUCTION AND OVERVIEW

A recent change in U.S. trade law has affected the calculation of antidumping ("AD") and countervailing duties ("CVD") when the AD law and CVD law are simultaneously applied to imports from non-market economy countries ("NMEs"). The changes are meant to avoid a double remedy when the countervailable subsidy lowers the subject product's export price and that export price is used in the calculation of the dumping margin. Prior to this change, the duties on dumped and subsidized imports were additive with the exception of countervailing duties based on export subsidies. After the recent change, if it is established that a domestic subsidy in a NME has lowered the U.S. price of imports from the NME, the AD duty is reduced to avoid a double remedy. The purpose of this paper is to identify the factors that affect the pass through of the subsidy rate to the export price (and thus the import price) and to show how the interaction of these factors help determine the magnitude of the pass through, if any.

A. LEGAL BACKGROUND: ELIMINATING DOUBLE COUNTING

When the Department of Commerce ("Commerce") first decided in 2007 to apply the U.S. CVD law to China, Chinese producers defending such actions immediately complained that the simultaneous application of the CVD law and the NME AD methodology to imports from China would result in a "double remedy." They argued that the effects of domestic subsidies in China – that is, subsidies that are not export subsidies – are reflected both in the calculation of the CVD rate and in the calculation of the dumping margin for imports from China. Under Commerce's CVD methodology, the existence and magnitude of some domestic subsidies is determined by evaluating the extent to which the domestic producer has obtained inputs at a price that is lower than a "benchmark price."[1] The Chinese companies argued that such subsidies are passed through to the export price.[2] They claimed that a double remedy does not occur when the CVD law and the AD law are simultaneously applied to countries that are market economies because Commerce uses the market price in the exporting country as the normal value to which the export price is compared and this normal value, like the export price, is lowered by the subsidy. They assert that the outcome is different, however, when Commerce's NME AD methodology is applied to imports from China. Under this methodology, the market price in the exporting country is disregarded and the normal value of the subject merchandise is calculated by using factor values for the same inputs from certain countries that are deemed comparable to the NME. Thus, the normal value of the exports may not be lowered by the subsidy.[3] Thus, the

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[1] In this paper, the term "domestic producer" refers to the producer in the NME country.

[2] In this paper, the terms "export price" and "import price" are used interchangeably. While the two prices are not conceptually identical, for purposes of the analysis presented in this paper, they are functionally the same.

[3] This paper does not address the possible effects of domestic subsidies on normal value. As discussed below, the U.S. law that was recently enacted to address the double remedy issue makes clear that the existence of a double remedy is to be evaluated by analyzing the effects of the subsidy on import prices.

Chinese companies assert that because the export price is reduced by the subsidy, the subsidy is embedded in both the CVD rate and the dumping margin.

Commerce acknowledged that the simultaneous application of the CVD law and the NME AD methodology created the theoretical potential for a double remedy. However, Commerce stated that the burden was on the Chinese respondents to demonstrate that there was, in fact, a double remedy.

In a case involving off-the-road tires, *GPX Int'l Tire Corp. v. United States*, the Chinese respondents appealed an adverse ruling on this issue to the U.S. Court of International Trade ("CIT"). The CIT upheld respondents' claim, and instructed Commerce to either develop a methodology that effectively addressed the double remedy issue or to cease applying the CVD law to China.[4] Commerce subsequently issued a remand decision that was not satisfactory to the CIT and the CIT ordered Commerce not to apply the CVD law to the imports at issue in that case.[5]

Commerce and domestic producers appealed this decision to the U.S. Court of Appeals for the Federal Circuit ("Federal Circuit"). In the decision that it issued in late 2011, the Federal Circuit did not reach the double remedy issue, instead finding that Congress did not intend that the CVD law be applied at all to NMEs like China.[6]

In March 2012, Congress stepped in and passed a law, with retroactive effect, making clear that the CVD law does, in fact, apply to China.[7] As part of the same law, Congress also amended the law to make clear that Commerce should adjust the dumping margin to avoid a double remedy if respondents demonstrate that subsidies are having an effect on the price of the imported products. Congress deemed this necessary because the Appellate Body of the World Trade Organization ("WTO") had issued a decision in March 2011 that found that the simultaneous application of the CVD law and the NME AD methodology by Commerce in certain cases, including the case that was at issue in the U.S. court litigation, was inconsistent with the WTO obligations of the United States because Commerce did not act to avoid a double remedy.[8]

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4 *GPX Int'l Tiire Corp. v. United States*, 645 F. Supp. 1231, 1240 (Ct. Int'l Trade 2009).

5 *GPX Int'l Tire Corp. v. United States*, Slip op. 08-00285 (Ct. Int'l Trade Oct. 1, 2010).

6 *GPX Int'l Tire Corp. v. United States*, 666 F.3d 732 (Fed. Cir. 2011).

7 *See* 19 U.S.C. § 1677f-1(f)(1).

8 Appellate Body Report, *United States – Definitive Anti-Dumping and Countervailing Duties on Certain Products from China*, ¶ 611(d), WT/DS379/AB/R (Mar. 11, 2011).

The Appellate Body's decision stated that Commerce's analysis was defective because Commerce had not performed an adequate analysis of whether the domestic subsidies at issue in those cases resulted in a reduction in import prices.

B. ECONOMIC BACKGROUND: DETERMINING THE PASS-THROUGH RATE

The intersection of trade policy, trade law, and international economics has a long history dating back to when countries first gained control of their borders and when the tax revenue garnered by tariffs was as important as their role in protecting industries from foreign competition. The study of trade policies – tariffs, quotas, subsidies and other border measures – accelerated during the mercantilist era. The modern era of commercial policy, the branch of international economics dealing with border measures and other government policies affecting trade, is usually traced to David Ricardo and his analysis of the Corn Laws in 1815. Economists have continued extending and refining Ricardo's insights for nearly two centuries. Thus, while research continues in both analyzing and measuring the effects of commercial policies, the general consensus approach to the analysis of tariffs, quotas and subsidies adopted by the economics profession can be found in any undergraduate international economics textbook.

The standard textbook analysis of the effect of a subsidy on the export price is threefold. First, a subsidy can only affect the output or price of the subsidized good if the subsidy lowers the marginal cost of production. In a more common vernacular, only subsidies that increase supply can ultimately have an effect on the export price. Second, the extent to which subsidies that affect marginal costs affect the export price depends on the supply and demand conditions in the home market, i.e., the exporting country. Typically, the less sensitive home market quantity supplied and quantity demanded are to price, the less the subsidy is passed through to the export price. Finally, the more elastic the world demand facing the subsidized industry the lower the pass through to export prices. Indeed, in a case involving a "small country assumption," the pass through is zero.

Subsidies that do not affect marginal costs over the relevant period, such as lump-sum subsidies, do not increase supply, do not change the profit maximizing level of production, and, consequently, do not change the export price. Since these subsidies do not change the export price, no analysis of pass through is necessary.

In contrast, subsidies that change the marginal cost of production include input subsidies, production subsidies, and export subsidies. Each of these subsidies increases export supply by lowering the cost of the marginal unit of production: in essence, the benefit of the subsidy is tied to the production or exportation of the marginal unit. In this case, a further analysis is necessary to determine the extent, if any, to which the subsidy is passed through to the export price.

Assuming that the subsidy affects marginal costs, one key determinant of the pass through to export price is the supply elasticity of the subsidized firms. This is because industries whose output is relatively more sensitive to changes in price show a relatively greater increase in export supply for a given subsidy.

Finally, the price sensitivity of demand for the subsidized exports also plays a role in the pass-through rate. In the limiting case, with perfectly elastic export demand, pass through will be zero. In what is commonly known as the "small country case," producers of the subsidized good are price takers on the world market. Thus, even in the case of an export subsidy, subsidized producers have no incentive to lower their export price or pass through any of the

subsidy. This is because in the "small country case" they are so small on the world market they can pocket the subsidy and sell all of their output at the existing world price.[9]

II. DOMESTIC SUBSIDIES AND EXPORT PRICES

A. THE ECONOMIC FOUNDATIONS OF SUBSIDY ANALYSIS

In this section, we present a standard partial equilibrium analysis of the effects of domestic subsidies on export prices. By focusing exclusively on the subsidy and the conditions of competition in the domestic and export market and domestic market conditions, we are able to focus solely on the effect of the subsidy on price. Conceptually, in this section we draw a distinction between the level of a domestic subsidy, and the resulting change in price relative to the undistorted price we would observe in the absence of the subsidy. By observed change, we mean the impact on price in the export market. The extent to which prices reflect the subsidy is by definition the pass through of the subsidy to export prices.

B. THREE CASES OF PASS THROUGH

1. The General Case

Figure 1 shows how a subsidy affects supply in the home market and export supply in the world market. In the figure, we have represented a supplier/industry in the exporting country with a marginal cost schedule indicated by the line S. This line shows that the marginal costs of production increase with the level of output and that a domestic producer's unit costs will depend on the level of that output.

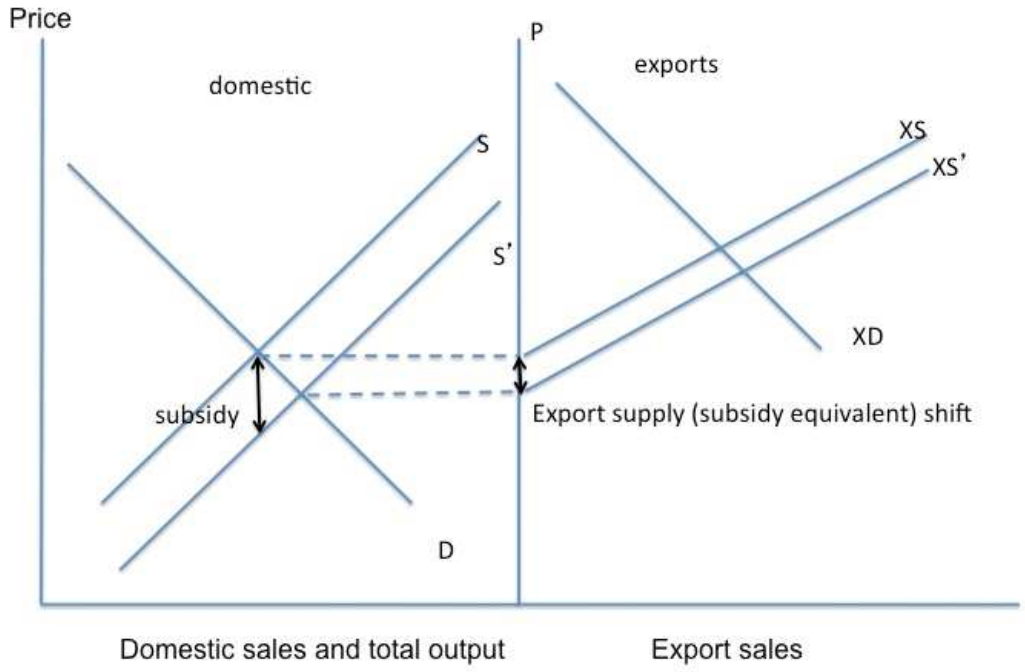
The conventional upward slope indicates that there are potential supply constraints for the firm and the industry, and the more the supplier produces, the more binding these constraints become and the higher the cost for additional sales. We have included the possibility that the supplier can sell its product either in the home market or on the export market. The line D represents domestic demand. This schedule maps domestic sales to price. The conventional downward slope reflects the fact that consumers require lower prices to increase their purchases and the supplier's inability to increase sales in the domestic market without lowering prices. Export supply is then determined by the difference between what the industry is willing to sell at a given price (from the S line) and what domestic purchasers are willing to buy at that same given price (from the D line). By definition, the difference between domestic supply and

[9] The economic models presented in this paper are standard models that assume profit -maximizing behavior by firms. However, to the extent that there is evidence that the NME industry is exhibiting non-profit maximizing behavior by, for example, having employment requirements, the model can be modified or extended to incorporate these features of the market.

demand is export supply or XS – the available supply above domestic sales at prices above the domestic price. To close the system, we have added demand in the export market, represented by the line XD. The intersection of the export supply and export demand curves yields the equilibrium export price as well as the export quantity.

Note for the purposes of our exposition we do not include additional export markets, additional export suppliers, or third countries. These extensions can be incorporated into the general framework. However, to understand the key elements of pass through we focus on the basic case outlined above and represented in Figure 1.

Figure 1: The impact of an input subsidy on observed export prices



In Figure 1, we have introduced a per-unit input subsidy on the left side of the graph represented by the length of the line labeled "subsidy." This has the effect of shifting down the marginal unit cost line from S to S'. At any given level of output, the unit cost for additional output is lower by this amount. The shift in domestic supply, in turn shifts out the export supply curve on the right side of the graph. Recall that export supply is defined as the difference between what firms are willing to produce at a given price, and how much of that can be sold at home. In Figure 1, export supply, XS, is the horizontal difference between S and D. The residual is then export supply.

With the framework in place, we can compare the shift in the domestic supply curve caused by the subsidy to the shift in the export supply curve. The key result of the analysis of the general case is that the shift in the export supply curve is less than the shift in the domestic

supply curve caused by the subsidy. Thus, while the export supply line XS shifts downward due to the subsidy, *it shifts less than the amount of the subsidy itself*. This is because, when the subsidy lowers input costs, the firm finds it can also expand sales at home. The end result is that some of the increased supply is sold to domestic buyers. This would, of course, limit the impact of the subsidy on export prices. In Figure 1, the shift in the export supply schedule, resulting from the input subsidy, is again the difference between total supply and the scope for domestic sales expressed by the domestic demand curve, D. The export supply line XS shifts to XS'. However, this shift is smaller than the total amount of the input subsidy. In addition, the effect of the subsidy is further reduced when the outward shift in the export supply curve interacts with the downward sloping export demand curve as shown on the right side of the graph. The logic is similar to what occurs in the home market. In this case, as the subsidy lowers costs, the domestic firm finds it can expand sales abroad. The increased quantity demanded abroad serves to limit the effect of the subsidy on export prices beyond the incomplete pass through to export supply. The difference between the per-unit subsidy and the decline in export price depends on a number of factors, and we will discuss these later in the paper. Thus, with conventionally sloping supply and demand curves, pass through will be less than complete.

The partial pass through just described is illustrated in greater detail in Figure 2. First, the subsidy shifts the domestic supply curve in the left side of the graph from S to S'. The per unit value of the subsidy is equal to the distance $\overline{13}$ measured on the vertical price axis. This, in turn, shifts out the export supply curve from XS to XS' causing the price in the export market to decline from 2 to 3 as shown by the dotted lines on the right side of the graph.[10] Plainly, the decline in export price is less than the per unit subsidy. In the pictured example, it is about a third as much.

[10] Note that the subsidy is not fully passed through in the home market on the left side of the graph and the pass though is further diminished by the downward sloping export demand curve on the right hand side of the graph.

Figure 2: A domestic input subsidy and observed export prices

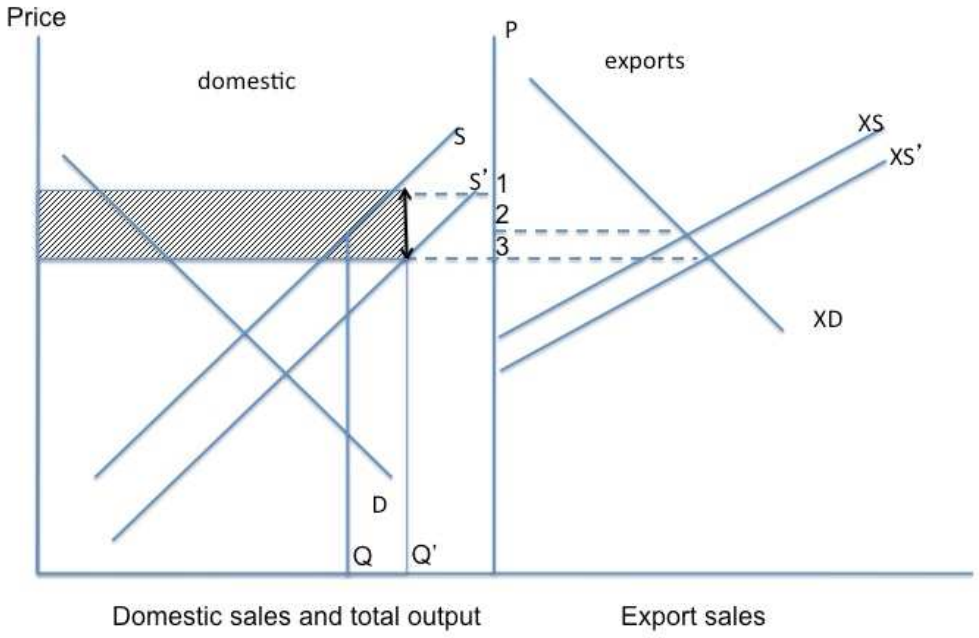


Figure 2 is also useful in examining the effect of a subsidy on the shipments of the domestic industry. Total sales prior to the subsidy are Q, the intersection of the unsubsidized domestic supply curve S with the unsubsidized equilibrium export price, 2. With the subsidy in place, output expands to Q', the intersection of the subsidized domestic supply curve, S', and the equilibrium subsidized export price 3. It is important to note that in the general case, a subsidy causes *both domestic and export shipments to increase*. The shaded area represents total subsidies received by the industry which is equal to the per unit subsidy of $\overline{13}$ multiplied by the total quantity of sales, Q'.

2. The Case of No Pass Through

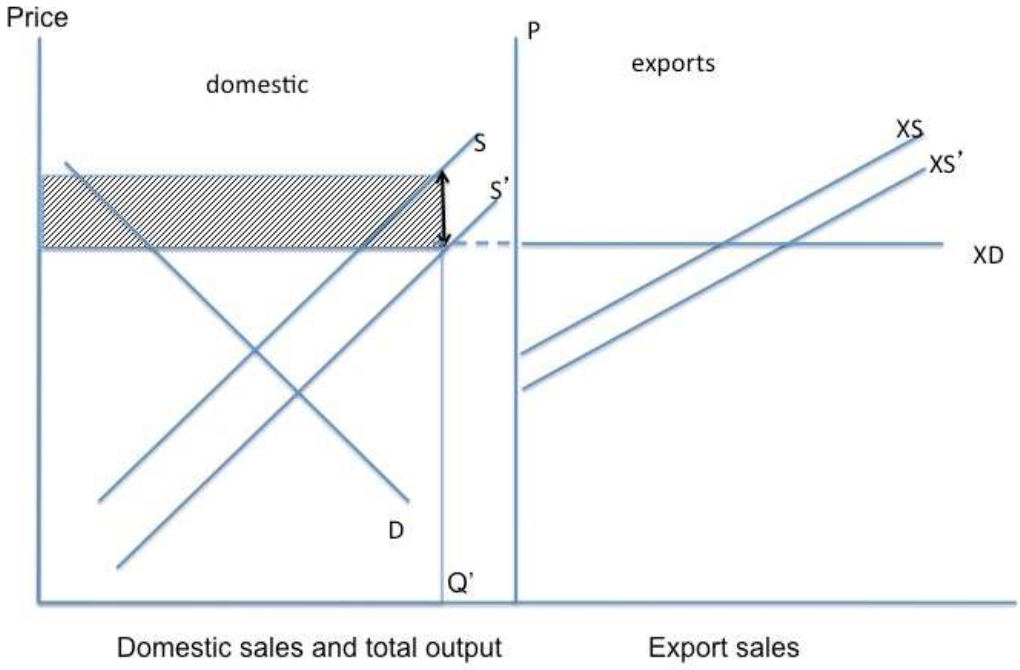
We turn next to the case of zero pass-through from domestic subsidies to export prices. As a threshold matter, subsidies that do not affect marginal cost or domestic supply cannot affect export prices and, thus, have a pass-through rate of zero. Lump-sum subsidies, grants, and other one-time transfers fall into this category as do capital subsidies. Because capital subsidies do not affect the marginal cost of production in the short run, they do not affect the export price in the short run. Hence, it is unclear whether it can be shown in any particular case that a capital subsidy has decreased the export price in a manner that could justify an adjustment to the AD duty under the new law.

However, even when the domestic industry benefits from input, production, export or other subsidies that lower marginal cost, pass through may be zero. Typically, this occurs when the additional exports supplied by the subsidized industry are too small to affect prices in the export market. In such a case, the exporting firms face an infinitely elastic export demand curve and act as price takers in the export market. This is commonly referred to as the "small country case."

Note that the term "small country" does not mean that the country in question produces only a small amount of the product. It refers instead to cases where the country in question is a relatively small supplier of the product to the export market.

A graphical representation of the small country case is provided in Figure 3 below. As in the general case, the subsidy shifts out the domestic supply curve from S to S' on the right side of the graph. The vertical shift represents the value of the subsidy. As domestic supply shifts out, the domestic price falls by less than the subsidy if domestic demand slopes downward. Similarly, the export supply curve on the right side of the graph shifts downward by less than the subsidy rate. However, unlike the general case where the export price falls, prices in the export market remain unchanged along the infinitely elastic export demand curve, XD.

Figure 3: Small supplier on world markets

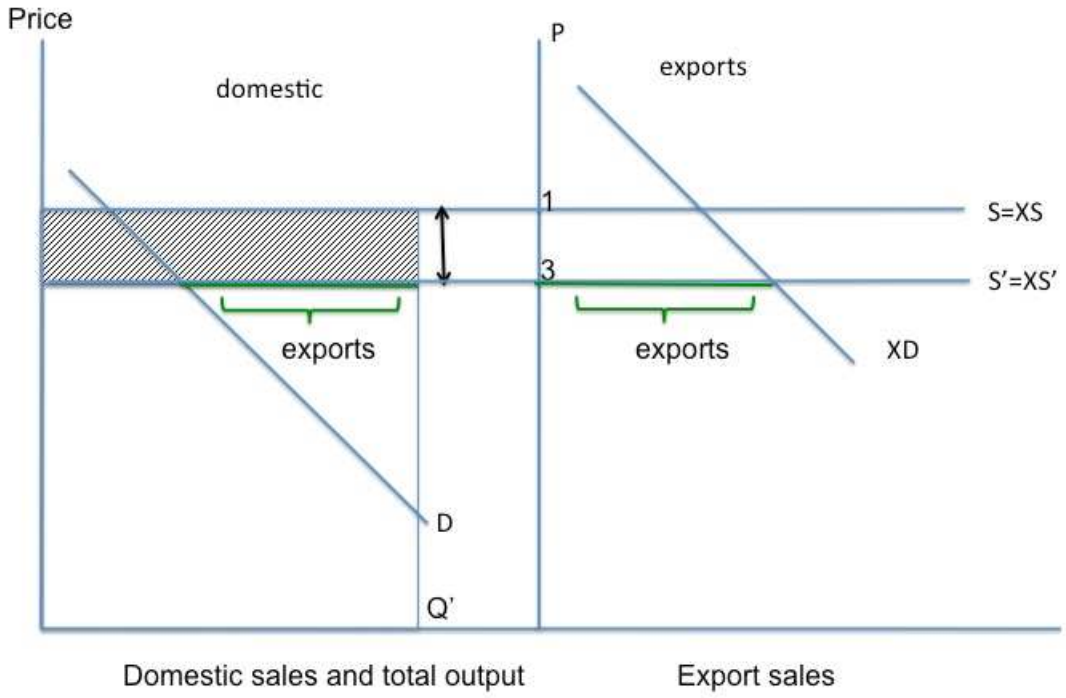


The shift in export supply is the same as in Figures 1 and 2. Note that the domestic industry increases shipments both domestically and abroad. However, despite the fact that the amount of the subsidy is the same as in the general case as represented by the grey area, none of the subsidy is passed through to the export price and the impact of the subsidy in the export is solely reflected in rising export volumes. This same result can occur even when the domestic industry has significant capacity but the great majority of that capacity is destined for the home market. Under these circumstances, the industry might still be small in the export market.

3. The Case of Full Pass Through

Just as there are conditions that produce no pass through, we can also have cases of full pass through. This requires an infinitely elastic supply curve in the exporting country, such that the decline in marginal costs from a subsidy shifts both the domestic supply and the export supply curve equally. This is illustrated in Figure 4 below. The subsidy shifts down the domestic supply curve on the left graph and the export supply curve in the right graph by equal amounts and prices fall from 1 to 3, the value of the subsidy. The scope for domestic absorption of the subsidized product is irrelevant. What this means is that the industry must be able expand output, in the range of fair and subsidized output, without any impact on its input costs. This implies an industry that does not face supply constraints.

Figure 4: Full pass through



C. EXTENSIONS

The exposition presented in this paper follows the conventional partial equilibrium analysis adopted by trade economists for measuring the effects of border measures on a single product. The analysis can be modified or extended to change the focus of the analysis or incorporate features of the domestic or foreign markets. Many of these extensions will not change the rate of pass-through but will allow for a closer examination of the factors that affect the rate of pass-through. Below we give three examples.

General equilibrium analysis – General equilibrium models explicitly measure the effects of border measures on trade across all input and output markets. They are particularly useful for modeling gross changes to the trading regime such as the effects of entering into free trade agreements, modifying multi-national trade agreements, instituting national or international tax regimes (e.g., carbon taxes), or any changes in tax rates, tariff rates or quota allocations across many or all products. Popular computable general equilibrium models such as the model employed by the U.S. International Trade Commission or the Global Trade Analysis Project (GTAP) model are used by governments and international organizations to examine the effects of a trade agreement on the volume and composition of trade, changes in national welfare, changes in the composition sectoral employment, and other economic indicia. Partial equilibrium models like the one presented in this paper are typically used for single market analysis.

Upstream and downstream linkages -- Partial equilibrium models can be extended to explicitly accommodate upstream and downstream linkages if necessary. For example, the manufacturer may be forced by the production technology to use the subsidized input in fixed proportions with other inputs in the production process. Alternatively, the production technology may allow the producer to substitute among inputs. In the former case, an input subsidy would increase the use of the subsidized input proportionately to the increase in the production of the final product. In the latter case, an input subsidy would increase the use of the subsidized input more than proportionately relative to production of the final product as producers substitute towards the subsidized input and away from the non-subsidized input.

It may also be the case that the market price of a subsidized input is endogenous with respect to final product. In that case, the decline in the price of the input to the producer of the final product caused by the subsidy will be partially offset by the increase in the quantity demanded of the input. This would lower the amount of pass through to the export price. This could occur when the final product consumes a large share of the input, (e.g., hot-rolled steel is an input into cold-rolled steel.)

Multiple countries – Partial equilibrium models can be extended to more than two countries if needed. For example, the elasticity of export demand from the subject country increases with the availability of non-subject supply or product substitutes. All things equal, an increase in the elasticity of export demand will lower pass through. These linkages can be made explicit by increasing the number of countries and products in the model.

Imperfectly Competitive Markets and Non-profit Maximizing Behavior – Partial equilibrium models can be modified or extended to incorporate imperfectly competitive markets

where participants can exercise market power and behave strategically. Further, to the extent that there is evidence that the NME industry is exhibiting non-profit maximizing behavior by, for example, having employment requirements, the model can be modified or extended to incorporate these features of the market.

III. CONDUCTING A PASS-THROUGH ANALYSIS: OBSERVATIONS AND GUIDELINES

Finally, we turn to some suggestions for pass-through analysis. We start with summary observations on factors linked to the rate of pass through. This is followed by some basic, suggested rules of thumb. There will be cases where the rules of thumb can be applied in a relatively straightforward manner. In other cases, more information is likely to be required.

- Observation 1: The pass through of an input subsidy to export price is bound between zero and the input subsidy rate. (See the discussion around Figures 1,2).

- Observation 2: The pass through of an input subsidy to export price is smaller, the greater the share of production that is absorbed at home. This hinges, however, on the elasticity of costs (Observation 4) and world market share (Observation 3).

- Observation 3: The pass through of an input subsidy to export price is smaller, the more elastic the underlying export demand schedule.

- Observation 4: The pass through of an input subsidy to export price is larger, the more elastic the underlying cost schedule. In other words, more elastic supply means a greater rate of pass through.

Starting from these observations, and the formal analysis in the annex, the following guidelines (really just rules of thumb) can be followed to gauge the rate of pass through.

- Guideline 1: Where the subsidized industry has a small share on world markets, and so a negligible impact on world price, then the input subsidy rate can be assumed to be at or close to zero. This takes precedence over Guideline 2.

- Guideline 2: Where the supply conditions of the industry are infinitely elastic, then the input pass-through rate can be assumed to be at or close to 100 percent.

- Guideline 3: Where Guidelines 1 and 2 do not apply, then a more complex analysis is called for, factoring together market shares, supply conditions, and relative price sensitivity for export and domestic demand.

The formal derivation of the pass-through guidelines is found in the Appendix. The simple model solves for home and export market equilibrium and the pass-through rate as a function of home market sales share and supply and demand elasticities. The elasticities can be estimated directly if data are available. Alternatively, estimates of the range of the various elasticities used in the model can be made by Commerce based on analyses submitted by the parties. The model can also be modified to incorporate some of the extensions featured in the

paper. We plan to discuss the types of market information necessary to apply our model, extensions of our model, or similar models in a future paper.

IV. CONCLUSION

The recent amendment to U.S. trade law will require Commerce to analyze in all future cases in which CVD cases and AD cases are simultaneously brought against imports from China to evaluate whether and to the extent which domestic subsidies have lowered the price of those imports. While the law establishes clear boundaries for the inquiry to be performed by Commerce, the question posed by the statute is inherently an economic question and, therefore, requires careful economic analysis. Such an analysis is, however, perfectly feasible; indeed, it can be carried out by using long-established and uncontroversial tools that are routinely employed in the field of economics.

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APPENDIX

APPENDIX: ESTIMATING PASS-THROUGH RATES

In this appendix we derive a basic rule of thumb formulation for estimating the share of a subsidy passed through to export prices. Formally, we represent domestic supply Q^s and demand Q^d in the exporting market as functions of price (inclusive of subsidy $S=1+s$ where s equals the subsidy rate and $S<1$). To keep things simple we use constant elasticity functional forms.

(1) total supply : $Q_s = k_s(PS)^{\varepsilon s}$

(2) home demand : $Q_d = k_d(P)^{\varepsilon d}$

In equations (1) and (2), the terms εs and εd are supply and demand elasticities, while the k terms are constants. The term S is the subsidy expressed as a multiplier. The difference between supply and demand is export supply QX_s.

(3) export supply : $QX_s = Q_s - Q_d$

Export demand QX_d is defined as also being a function of price P.

(4) export demand : $QX_x = k_x P^{\varepsilon x}$

Market clearing conditions in the export market, which imply market clearing in the domestic market as well, can be specified as follows:

(5) $QX_s = QX_x$

(6) $\Rightarrow k_x P^{\varepsilon x} = k_s(PS)^{\varepsilon s} - k_d(P)^{\varepsilon d}$

To isolate the price impact of a subsidy, we need to differentiate equation (6). With some manipulation, this yields the price elasticity with respect to a change in subsidy, evaluated with respect to an undistorted (i.e. S=1) equilibrium.

(7) $\phi = \dfrac{dP/P}{dS/S} = -\varepsilon s\left(\varepsilon s - (1-\theta)\varepsilon x - \theta\varepsilon d\right)^{-1}$

where θ is home market sales share, $S = 1 + s$ and $dS/S \approx s$ around S=1

Equation (7) defines a multiplier that can be used to estimate the rate of passthrough.