

WTO dispute settlement continues to be the subject of extensive scrutiny by both trade practitioners and academics. Not surprisingly, most of this analysis is legal in nature, touching upon the various arguments that have been put forward by parties to disputes and the legal foundations upon which these disputes are adjudicated. While legal and procedural issues remain the domain of trade lawyers, economists are being called upon with increased frequency on matters that call for economic interpretation or quantification. This should hardly be surprising given that multilateral trade rules reflect key economic principles such as comparative advantage, and that many of the terms in WTO Agreements, which are important in the resolution of disputes, have an economic basis. It may also have to do with the fact that increasing numbers of disputes are reaching the implementation phase, in which arbitrators need to quantify the allowable level of retaliation, as will be further explained below.

The literature on economics and dispute settlement is rather limited. A range of studies try to measure the performance to date of the WTO dispute settlement mechanism in one way or another. These include studies on the incentives/disincentives faced by WTO Members to avail themselves of the WTO dispute settlement mechanism and to conform to rulings, as well as more descriptive analyses of the frequency and pattern of recourse to dispute settlement.¹ Other contributions have sought to elucidate, from a purely theoretical point of view, the application of WTO rules on authorized countermeasures, in particular the identification of the maximum allowable level of such countermeasures, or the level of concessions, where a party losing a dispute has failed to implement the rulings and recommendations of the Dispute Settlement Body. Although the economic questions to be dealt with may be similar, these two studies

Indeed, certain WTO disciplines, for example in the Agreement on Subsidies and Countervailing Measures (SCM), provide for action based on the effects of subsidies. This essay concentrates on instances where a quantification of trade effects, as well as other economic conditions such as the competitive relationship within a given market, has come into play during panel/Appellate Body proceedings. In addition, as mentioned above, once a dispute has reached the implementation stage, the issue of countermeasures has been found in some cases to require an estimate of the effects that the offending measures have on trade.

The main objective of this Section is to examine the way in which quantitative economic analysis has been used during WTO dispute settlement proceedings. To that end, WTO cases that have proceeded at least to the Appellate Body stage have been reviewed and principal illustrative examples of the use of quantitative economic analysis at any stage of the adjudication process identified.³ For the purposes of this essay, “quantitative economics” shall simply refer to attempts to measure the relationship between economic variables, including trade flows. Quantifying the effects that one variable has on another, and isolating these effects from other influences, is usually based implicitly on some form of theoretical economic model and requires a minimum of relevant data and reliable parameter estimates. In that sense, “quantitative economics” shall be understood to go beyond simple accounting operations or the use of descriptive statistics in order to characterize economic phenomena.

The essay contains four more Sections. The next Section (Section 2) identifies some questions common to disputes where quantitative economic analysis has occurred. The third Section explains briefly basic economic techniques to address such questions. The fourth Section illustrates the actual use of quantitative economics in selected WTO cases. The concluding Section summarizes observations on the possibilities and limitations of using quantitative economics in WTO dispute settlement.

2. THE CONTRIBUTION OF QUANTITATIVE ECONOMIC ANALYSIS TO LEGAL QUESTIONS IN WTO DISPUTE SETTLEMENT

A good starting point to examine the contribution that quantitative economics can make to WTO dispute settlement is to see when it has actually been used and why. So far, quantitative economic analysis seems to have been applied to find answers to two major questions implicit in a number of WTO provisions. The first concerns the effect of a policy measure (or its removal) on trade flows. Precise trade values may be required, or the trade impact of a more indirect measure may be assessed to see how, for example, the measure had affected world prices. This type of issue can arise either in the context of a determination by a panel and/or the Appellate Body whether a violation has occurred, or in the context of determining the level of authorized countermeasures, where a losing party has not implemented the dispute settlement findings. The second question concerns the effect of imports on competing domestic products or their producers. This type of issue may typically arise in the process of determining a violation. For example, in a discrimination case, the degree of competition between two products may be at issue and if it is not significant, the two products may be seen as not belonging to the same relevant market (and could, for instance, be regulated differently).⁴ Alternatively, as in a WTO challenge of a trade remedy measure, it may be necessary to review how the relevant national authorities separated the effect of imports on prices, profitability, sales and other indicators of the health of a domestic industry from the effects that other factors, such as developments in technology/

³ Evidently, every case in which a violation is found, whether appealed or not, eventually is adopted by the Dispute Settlement Body (DSB) – by the reverse consensus rule – and thus creates a requirement that the losing party implement the DSB’s rulings and recommendations. The review of cases for the purposes of this essay was “artificially” limited to those in which appeals took place in order to keep the task within manageable dimensions. This undertaking is modest in nature confining itself to a simple study of the cases. 16.3(7)-32.3k7.7(p)29(h2)3.4(e)5c5f12c416.4t45 wgt12(m)15.16.4(t)36.9(oT)-7(h)fmt24.46.4(5.2(e3037)311-0.0my62.5(h

productivity or changes in demand, may have had on those variables. This last question is not unrelated to the preceding one, but the focus is less on the degree of competition from imports and more on the need to ensure that other influences have not been falsely attributed to imports.

(a) Effect of policy measures on trade

Qualitative explanations of the existence of an effect of a measure, where this is necessary to show a violation of trade rules, may often be sufficient to resolve a dispute. Why, then, has it sometimes been seen as advantageous by parties to inform economic insights through quantifiable information? And why have arbitrators in certain cases employed quantitative trade models to estimate the allowable level of suspension of concessions? In arbitration cases under Article 22.6 of the Dispute Settlement Understanding (DSU), a quantification of counterfactual trade effects has been a key device for some arbitrators to fulfil their mandate – namely, to determine the level of nullification or impairment of benefits suffered by a complaining Member, which the requested suspension of concessions or other obligations must not exceed. Some parties have provided quantitative economics or were solicited by arbitrators to do so, which the latter used to varying degrees in their own analysis. Examples also include the areas of prohibited and actionable subsidies, where arbitrators have faced the special mandate under the SCM Agreement to decide whether the countermeasures proposed are, respectively, “appropriate” or “commensurate” with the adverse effects found. Arbitrations may occur in relation to any WTO Agreement and, potentially pose challenging questions, for instance, in regard to the quantification of non-tariff measures and their effects.



The elasticity of substitution is closely related to the concept of cross-price elasticity. It has its origins in the theory of the firm characterizing firms' demand for different combinations of production factors ("inputs") to obtain a given output, subject to the technology used and cost structure of the firm. The elasticity of substitution (often denoted as σ ("sigma")) has a slightly different mathematical form than the above elasticity types, measuring how the ratio of two inputs responds to a change in the relative price of those two inputs (Varian, 1984). If the response is positive, substitution becomes more important the larger it is. If it is negative, the two goods are said to be complements. When there are more than two factors of production, one also needs to ask how those vary if relative prices change. For simplicity, total production is often considered to consist of production activities of several branches. Hence, elasticities of substitution often reflect the substitution effects within a branch, holding branch output constant (Keller, 1980). Elasticities of substitution are also used in the context of final

(6) $\frac{dI}{dP} = \frac{dI}{dP} \cdot \frac{dP}{dP}$

The demand for imports is derived from the excess of domestic demand over domestic supply. The import demand elasticity usually takes the form of an own-price elasticity that indicates by how much import volumes adjust if import prices increase, e.g. due to a tariff hike. Imperfect substitutability between imports and domestic products is normally presumed to exist.²⁰ Apart from price, import demand functions used for estimation normally include other variables, such as income, prices of other domestic goods and domestic supply factors, such as resource endowments that may influence the result.²¹ Some studies have estimated in similar ways export supply elasticities or income elasticities of both imports and exports to make predictions

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subsidies, i.e. adverse effects suffered in variously-defined markets, due to subsidies. Then examples from disputes will be highlighted, where the relationship between imports and domestic products/producers was analysed economically. One example deals with disputes in regard to alleged tax discrimination and one with disputes involving the application of trade remedies. Here, relevant legal concepts that have given rise to the presentation of quantitative economic analysis in the context of WTO dispute settlement are whether the domestic and imported products at issue are directly competitive and substitutable, and whether causation/non-attribution of injury in the context of trade remedy investigations has been properly performed.

(a) WTO-inconsistent measures and arbitration on proposed countermeasures under DSU Article 22.6: effect of policy measures on trade

Nine arbitrations pursuant to DSU Article 22.6 have taken place so far.²³ In certain of these cases, the arbitrators have opted to use quantitative economic analysis to carry out their mandated tasks. The arbitrations to date, which have involved requests for multi-million dollar awards, have been undertaken on the basis of one of two mandates.²⁴ The first is pursuant to DSU Article 22.7 (in connection with Articles 22.4 and 22.6), under which the arbitrators' principal duty is to ensure that the retaliation sought by a complaining Member is equivalent to the level of nullification or impairment that has arisen from the breach of WTO obligations.²⁵ The key challenge for arbitrators usually lies in determining what trade flows would have been *but for* the unlawful measure. So far, this so-called "trade effects approach" that equates nullification or impairment with the value of trade foregone has been the principal tool used to determine the final arbitration award. In so doing, arbitrators can either agree with the requested amount, or disagree and establish another level.²⁶

The second mandate under which arbitration has been conducted to date is that covering prohibited export subsidies. Here, the relevant standard (Subsidies and Countervailing Measures (SCM) Agreement Articles 4.10 and 4.11) requires arbitrators to assess whether proposed countermeasures are "appropriate" as a response to the initial wrongful act and (according to footnotes 9 and 10) "not disproportionate" in light of the fact that the subsidies are prohibited.²⁷ In all three cases that have been adjudicated under Article 4.11 of the SCM Agreement, reference has always been made to the standard of "nullification or impairment" as stated in Article 22.4 of the DSU and its inapplicability to cases under SCM Article 4.10. It has also been stated that where trade concepts are explicitly contemplated they are defined in other parts of the Agreement.²⁸ The lack of precision arising from the term "appropriate" has implications for the consistency of the standard to be used by arbitrators across cases. This point is recognised by the Arbitrator in the Foreign Sales Corporations (FSCs) case who states that "countermeasures should be adapted to the particular case at hand".²⁹ The Arbitrator goes further by stating that "there is an element of flexibility, in the sense that there is thereby an

²³ A number of articles on the WTO arbitration process have been published, most of which focus on the need for arbitration to ensure a viable dispute settlement process and the unique nature of the WTO's approach compared to other arbitration procedures (Lawrence, 2003; Bagwell and Staiger, 2002). Again, despite a growing literature, the role of economics in the arbitration process has received much less attention than the economics of arbitration. A few articles on the latter issue that have stressed the difference between welfare analysis and trade analysis may also be relevant in relation to the use of economics in arbitration (Anderson, 2002; Bernstein and Skully, 2003).

²⁴ It should be noted that the key objective under both mandates is compliance with the original ruling. Arbitration is not supposed to result in "punitive" measures.

²⁵ Pursuant to DSU Article 3.8, there is a presumption that a breach of the rules has an adverse impact on other Members, i.e. to constitute a case of nullification or impairment.

²⁶ For either outcome, the basis for the decision needs to be explained, since the level of nullification and impairment a priori

eschewal of any rigid a priori quantitative formula". Despite this flexibility, the Arbitrator also recognised "an objective relationship which must be absolutely respected" (all three quotes *US-FSC (Article 22.6 – US)*: para. 5.12). While this concept does not specifically call for an examination of trade effects as a basis for determining "appropriateness", these effects were considered by the Arbitrator in the *US-FSC (Article 22.6 – US)* case.

Table 1
Arbitration cases in the WTO, 1995-2004

Full Case Title and Citation	Agreements/GATT provisions infringed	Requested level (by complainant)	Counter-level (by defendant)	Award by the arbitrators
Trade-restrictive measures				
European Communities – Regime for the Importation, Sale and Distribution of Bananas – Recourse to Arbitration by the European Communities under DSU Article 22.6, WT/DS27/ARB, 9 April 1999	GATT Art. XIII	\$520 million (US)	-- (EC)	\$191.4 million
European Communities – Regime for the Importation, Sale and Distribution of Bananas – Recourse to Arbitration by the European Communities under DSU Article 22.6, WT/DS27/ARB/ECU, 24 March 2000	GATT Art. XIII	450 million (Ecuador)	-- (EC)	\$201.6 million
European Communities – Measures Concerning Meat and Meat Products (Hormones) – Original Complaint by Canada – Recourse to Arbitration by the European Communities under DSU Article 22.6, WT/DS48/ARB, 12 July 1999	SPS Agreement	C\$75 million (Canada)	C\$3.537 million (EC)	C\$11.3 million
European Communities – Measures Concerning Meat and Meat Products (Hormones) – Original Complaint by the United States – Recourse to Arbitration by the European Communities under DSU Article 22.6, WT/DS26/ARB, 12 July 1999	SPS Agreement	\$202 million (US)	\$53.301 million (EC)	\$116.8 million
United States - 1916 United States - Anti-Dumping Act of 1916 - Recourse to Arbitration by the United States under DSU Article 22.6, WT/DS136/ARB, 24 February 2004	GATT Art. VI, Anti-dumping Agreement	"Mirror" legislation (EC)	-- (US)	Monetary value of amounts payable
Government transfers				
United States – C/EGT/17/1. 37 TD0.t B 282G.WT/DS105/0037/12/01/06/26. 4m6D-0.01Cg Su4(n6e)-14.3(\$2)18.6(i)-115(i)-9d.4(0).310:32renils Sc -18(a)2 S M m mæo9-11.4(u)32(n)T74.3.6(s)-17.4(i)-1.1. \$t(h)-1.4(a)-5.6(t)-3.7(t)1.(u)-5(i)(E)42(G)-1.(E)0(o)820.2(a)6TJF3 (E)00680)1800.2(10)5TJF3 (E)92648(E)45.7(8)97).0503306(1)559224.827)79(5)-1U.6(2)-8.7(5)1.(u)19(-4B 282G TD814.50)27.1(4.-20.3(a)86.4(m)19(-4B 282G TD816(15-9T5(3)45a.8(g)2(x)T547)137.94)-13.78)45a.8(m)19(-/)-6m.8(b)e1	UH(7)54na6(f)-14(7)64a-S37-9E(s-p)81x-7(9)510(p)8(6-2)(7)S)8387-A539#7-2be.2(4)-5(t(7)-3J S47 G6(t)75u			

A few issues are noteworthy in terms of the methodology applied: first, Arbitrators were faced with the unusual situation that at least four counterfactual situations could be conceived. Arbitrators did not report how it was decided which counterfactual would best serve their mandate, why they chose not to follow any of the four scenarios they had initially proposed, how the trade values in these scenarios were arrived at and why these values were so much higher than their final award. Second, the methodology of establishing the counterfactual on the basis of quota limits is convenient,³⁴ but clearly not universally applicable. Finally, overall quantities were not at issue and so prices between the actual and counterfactual scenario remained the same

Finally, in *US-1916 Act (EC) (Article 22.6 – US)*, Arbitrators had to deal with the fact that the 1916 Act allowed for the imposition of treble damages, fines or imprisonment rather than tariffs in response to dumped imports. In that particular case, it was not possible to estimate the counterfactual trade effects of a removal of the measure, since it had never been implemented and, hence, no data on prices and import volumes in the presence of the measure were available.³⁶ Arbitrators had to make a qualitative award. The request by the EC had not involved a specific value, but was to implement legislation that would “mirror” the offending measure. Arbitrators declined the request for a mirror regulation, which potentially could apply to an unlimited amount of US exports to the EC. Such a situation would not ensure that the level of suspension was equivalent to the level of nullification or impairment. Instead, Arbitrators allowed the EC to determine the level of nullification or impairment it might suffer in the future itself and suspend concessions on the basis of verifiable information on the monetary value of court judgements and settlement awards under the 1916 Act against EC entities. If such cases were to occur, a calculation of trade effects would not be needed. The nullification or impairment would arise from the imposition of fines or of threefold damages, as foreseen in the 1916 Act. It is these amounts of money to be paid by the EC that would violate WTO rules on anti-dumping, where only measures in the form of duties are foreseen to counteract dumping.

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Government transfers may have an impact on trade depending on how receiving firms use the additional funds (the so-called “pass-through” effect). To date, four such cases have gone to arbitration. Three of these dealt with prohibited subsidies as defined by SCM Article 3, i.e. subsidies contingent on export performance or on the use of domestic over imported goods. Two of those cases (*Brazil-Aircraft (Article 22.6 – Brazil)* and *Canada-Aircraft Credits and Guarantees (Article 22.6 – Canada)*) involved a single company producing aircraft. The third case (*US-FSC (Article 22.6 – US)*) involved an across-the-board subsidy. Finally, in *US-Offset Act (Byrd Amendment) (EC) (Article 22.6 – US)*, the remittance to petitioning firms of anti-dumping and countervailing duties collected was at issue. The panel and Appellate Body found a violation by concluding that the Offset Act payments constituted a nonsua

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While these differences are large, the general approach by the Arbitrator to his mandate was not to estimate the exact value of the subsidy, but only to ensure that the requested level of suspensions was appropriate and not disproportionate. Accordingly, since the requested amount of \$4,034 million was between the two estimated disbursement amounts, the Arbitrator concluded that it was not disproportionate if the value of the subsidy was to be used as the basis of granting the countermeasures. With this understanding of the mandate, trade effects need not be known. Nevertheless, in *US-FSC (Article 22.6 – US)*, although not necessary, some analysis of trade effect was carried out. It played a supporting role, but only insofar as

assessment of the proposed models was more rigorous.³⁹ As in the Bananas case, the *US–Offset Act (Byrd Amendment) (EC) (Article 22.6 – US)* Arbitrator noted that he had the option of rejecting the proposed models in favour of their own approach, which they did. They rejected the Armington model due to lack of data and expressed concerns about the aggregate model proposed by the EC due to the fact that the disbursements arising from the Offset Act scheme were concentrated in a few industries only. The inter-industry impact of across-the-board measures, such as the Continued Dumping and Subsidy Offset Act and the Foreign Sales Corporation Act, is an important issue for economic modelling. Since measures such as these are available economy-wide, it is tempting to use economy-wide variables. In reality, however,

By looking into the trade effects of government transfers, the arbitrators, in both cases, also focused on the so-called “pass-through”, i.e. the degree to which funds given to domestic firms affect the international market.⁴¹ The Arbitrator in *US–FSC (Article 22.6 – US)* was of the view that since FSCs benefits were tied to exporting, at a minimum this ruled out a possible zero value for the pass-through effect. With this as a lower bound estimate, they were also guided by a study of a programme similar to that of the FSCs – the Domestic International Sales Corporation Act – for which a pass-through value of 75 per cent had been found by US authorities. In response to this finding, the US argued that the pass-through value had probably decreased since then for at least two reasons based on the evidence of the types of firms taking advantage of the FSCs programme. One key argument was that if firms in an industry had market power, they would not necessarily have an incentive to lower prices. Thus, the pass-through effect would be lower the less competitive the market. Upon examination of the evidence provided by parties on the nature of competition in international markets, the Arbitrator concluded that competition had increased in the past 30 years⁴² and, therefore, remained inclined towards 75 per cent as a reasonable pass-through value.

In *US–FSC (Article 22.6 – US)*, the US had originally argued that the Arbitrator could use the value of the subsidy as a “proxy” for the trade effects of the subsidy. By making this argument, the US implicitly had assumed that a \$1 subsidy to an exporter would result in a \$1 increase in exports, i.e. a 100 per cent pass-through. Interestingly, in *US–Offset Act (Byrd Amendment) (EC) (Article 22.6 – US)*, it was the complaining parties who were of the view that the total value of disbursed revenues met the standard of DSU Article 22.4. The United States, as the defending party, unlike in *US–FSC (Article 22.6 – US)*, opposed this view arguing that the amount disbursed did not bear any relation to the level of nullification or impairment, i.e. the trade effect of the measure. The US also contended that pass-through was zero and hence the trade effects of the disbursements would be zero. The Arbitrator accepted the US argument that the trade effects of the measure was the appropriate measure of nullification or impairment, but opined that pass-through would be neither zero nor 100 per cent because “as a basic rationale of economics, firms are expected to use their money efficiently, and at least some will use that money to lower their prices” (*US–Offset Act (Byrd Amendment) (EC) (Article 22.6 – US)*: para. 3.141).

Since in *US–Offset Act (Byrd Amendment) (EC) (Article 22.6 – US)* the measure in question was the annual disbursement of tariff revenue, which depended upon a number of factors, the requesting parties were of the view that the level of suspensions should not be static, but should vary according to the level of disbursements. This view was accepted by the Arbitrator, who did not see a conflict between a varying level of suspensions and the use of trade effects to proxy nullification or

The size of the effect on trade is of secondary importance. First and foremost, a complaining country needs to show that its trade flows are affected, for instance, because prices it obtained previously or could be expected to receive have been suppressed due to subsidization. There have only been three serious prejudice disputes to date, and in only one of them, the recent *US–Upland Cotton* case, has any party relied on economic modelling in presenting its claims and arguments. In that case, cotton subsidies by the United States were claimed to cause serious prejudice to the interests of Brazil (pursuant to SCM Articles 5(c) and 6.3(c) and (d)).

In support of its case, Brazil submitted the result of a simulation, and some elements thereof, performed by an external expert



In *Japan–Alcoholic Beverages II*, the defendant submitted evidence based on econometric analysis and in *Chile–Alcoholic Beverages* both parties did. In both cases the defendant’s tax system was accused of being in breach of GATT Article III, because it would put imported alcoholic beverages at a disadvantage compared to national alcoholic beverages, shochu in the case of Japan and pisco in the case of Chile. In both cases the econometric evidence presented focused on whisky as the imported alcoholic beverage.

In *Japan–Alcoholic Beverages II*, Japan submitted the result of econometric analysis using consumption data for 20 years based on household surveys by the Bureau of Statistics of the Japanese Management and Coordination Agency.⁴⁹ Using prices of shochu, whisky, beer, wine and sake, the household consumption expenditures, and the trend factor (i.e. a simple temporal indicator, capturing all sorts of evolutions in time, such as inflation, technological progress and growth) as seven explanatory variables, 16 different equations were developed in order to explain both shochu and whisky consumption. In *Chile–Alcoholic Beverages* the complainant, the EC, presented the results of a time series estimation carried out in 1995 using quarterly data for the period of 1985-1992 by the consultant firm Gemines (“Gemines 1995”). The defendant, Chile, presented the results of a time series estimation using annual data for 15 years. The output of Chile’s

is equal to the cross-price elasticity. Sometimes it is necessary to perform further computations. Whether or not this is necessary depends on the specification of the regression. As a technical matter, only if all of the variables appear in logarithmic form (in so-called "logs") does the estimated parameter directly correspond to the cross-price elasticity. This is not the case for the value of 0.1248 in Box 5 (*Chile–Alcoholic Beverages*, Panel Report: para. 4.230). The cross-price elasticity can, however, easily be computed from this value. Does a positive cross-price elasticity imply that two goods are "directly competitive or substitutable"? It probably needs to be positive *and* "relatively high". The latter "threshold", above which goods are considered to be directly competitive or substitutable, may depend on the specific products at hand and vary quite substantially across sectors.⁵⁰

The output in Box 5 also gives information as to whether the estimated parameter represents a purely coincidental relationship or a significant one. This information is contained in the column "t-statistic". As a rule of thumb, one can consider t-statistics above 1.65 or below -1.65 to indicate that the relationship is significant. These values imply that the probability of the estimated parameter being zero is lower than 10 per cent. The corresponding t-statistic is indeed far below 1.65 and, hence, the estimated parameter cannot be considered significant at the 10 per cent level. In *Chile–Alcoholic Beverages*, the study commissioned by the EC (Gemines 95) also finds a positive parameter, but the parameter is (according to a statement by Chile) not significant at the 5 per cent level.⁵¹ In *Japan–Alcoholic Beverages II* the whisky price turned out not to be significant for the consumption of shochu, whereas the price of beer was found to have a significant influence on shochu consumption.

Regression output like that presented in Box 5 also gives information on the way a regression has been specified. In particular it shows which variables have been included in the regression. In this particular case the price of pisco, whisky, wine and beer and the income of consumers have been taken into account. It is clear that a good's own price and consumers' income determine how much of a good is consumed. The inclusion of the price of wine and beer implies that these products are expected to have some kind of relationship with pisco, in this case they are probably expected to be substitutes. Japan, the defendant in *Japan–Alcoholic Beverages II*, includes seven explanatory variables in its regression that are supposed to have an influence on

for the conclusion that the consumption of shochu was affected by the price of whisky, unlike the price of beer, which was confirmed to exert significant influence on the consumption of shochu (*Japan–Alcoholic Beverages II*, Panel Report: para. 4.88). In *Chile–Alcoholic Beverages*, Chile only conducted two regressions in addition to the one presented in Box 5 above. Robustness of the results was checked by eliminating the insignificant variables, income and beer price, one after the other. The price of whisky was insignificant in all three specifications, whereas the price of wine became a significant determinant, once per capita income was eliminated from the regression (*Chile–Alcoholic Beverages*, Panel Report: paras. 4.226 and 4.227).

In both *Japan–Alcoholic Beverages II* and *Chile–Alcoholic Beverages*, the panel referred to the econometric

At the outset, the special standard of review in anti-dumping cases will briefly be explained. It will also be pointed out that trade remedy investigations, albeit often of a data-intensive nature, appear to require financial analysts and industry specialists rather than economists, and some of the quantitative methods frequently used by domestic investigating authorities, but not normally considered by WTO adjudicating bodies, will be mentioned. Perhaps most prominently, economists working in the field of contingency protection may be involved in inquiring into the existence of a causal link between rising imports – or dumped or subsidized imports – and injury to a domestic industry. In any of these types of investigations, economists might be called

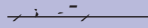
absence of multilateral rules requiring, or even directly applying to, the use of such analytical tools, however, there is little scope for dispute settlement over their use or non-use as such in investigations. Box 6 describes a number of analytical techniques that are sometimes used by national authorities in their trade remedy investigations. As noted, however, these normally would not need to be considered or replicated by WTO adjudicating bodies in order to resolve the dispute before them.

Box 6: Analytical tools in trade remedy investigations

A number of analytical, financial and statistical tools have been used in trade remedy investigations. These include shift-share, variance analysis, income statements and Granger-causality regressions. Some of these are more familiar to financial analysts and corporate planners than to economists.



This is a basic financial tool to show whether a firm is earning profits or incurring losses from its operation.



Shift share analysis is used to split change in an industry into its different components. For instance, suppose that the performance of an industry depends on overall growth in the national economy and on the strength of international competition. Thus, the change experienced by an industry between two periods in time (initial and current period) can be decomposed into the contributions made by each of these factors. This decomposition is carried out by establishing a counterfactual where the industry is assumed to grow at the same rate as the national economy, with the share of imports keeping pace. The difference between the current share of imports in the industry and its share in the counterfactual then gives an indication of the importance of import competition to the industry's performance. It is a method that may be applied in safeguard investigations. Its principal advantage is its simplicity and economy in data requirements. However, while it can suggest connections between events, it does not establish statistical correlation (given a sample size of two) and it certainly does not prove causality.



Customarily part of a financial or management analyst's toolkit, variance analysis identifies what material factors contributed to a difference between a firm's planned and actual budgets. Companies normally prepare a budget on which they base their projections about



Box 7: A simple analytical framework on causation

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APPENDIX TABLES

Appendix Table 1
WTO cases referenced in this essay

Short Title	Full Case Title and Citation
<i>Argentina–Footwear (EC)</i>	Appellate Body Report, <i>Argentina – Safeguard Measures on Imports of Footwear</i> , WT/DS121/AB/R, adopted 12 January 2000, DSR 2000:I, 515
<i>Argentina–Footwear (EC)</i>	Panel Report, <i>Argentina – Safeguard Measures on Imports of Footwear</i> , WT/DS121/R, adopted 12 January 2000, as modified by the Appellate Body Report, WT/DS121/AB/R, DSR 2000:II, 575
<i>Brazil–Aircraft</i> (Article 22.6 – Brazil)	

Short Title	Full Case Title and Citation
US-Lamb	Appellate Body Report, <i>United States – Safeguard Measures on Imports of Fresh, Chilled or Frozen Lamb Meat from New Zealand and Australia</i> , WT/DS177/AB/R, WT/DS178/AB/R, adopted 16 May 2001, DSR 2001:IX, 4051
US-Lamb	Panel Report, <i>United States – Safeguard Measures on Imports of Fresh, Chilled or Frozen Lamb Meat from New Zealand and Australia</i> , WT/DS177/R, WT/DS178/R, adopted 16 May 2001, as modified by the Appellate Body Report, WT/DS177/AB/R, WT/DS178/AB/R, DSR 2001:IX, 4107
US-Line Pipe	Appellate Body Report, <i>United States – Definitive Safeguard Measures on Imports of Circular Welded Carbon Quality Line Pipe from Korea</i> , WT/DS202/AB/R, adopted 8 March 2002
US-Line Pipe	Panel Report, <i>United States – Definitive Safeguard Measures on Imports of Circular Welded Carbon Quality Line Pipe from Korea</i> , WT/DS202/R, adopted 8 March 2002, as modified by the Appellate Body Report, WT/DS202/AB/R
US-Offset Act (Byrd Amendment) (Brazil) (Article 22.6 – US)	Decision by the Arbitrator, <i>United States – Continued Dumping and Subsidy Offset Act of 2000, Original Complaint by Brazil – Recourse to Arbitration by the United States under Article 22.5-10.6ec4()e 10(c)e Ar9TS/in/Dgil(a)976.9(5)JT.6(s)A(6)31 1 41(,)BBoSS5 BSdr6(4 Tf-18.9 -2.26)JT718240.0061 Tc</i> (Article 22.6 – US)