

# CONSEQUENCES OF IMPORT SURGES

# 4

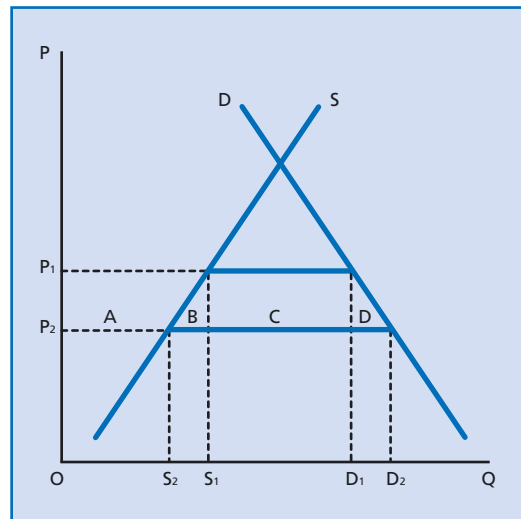
## 4.1 Assessment issues

Import surge can be viewed as a potential disturbance or a shock on the price and production for the import competing sector (commodity) but assessing its consequences poses a number of challenges for many reasons. First, the impacts of the surge may extend to other sectors, and may also last for an indefinite period of time. Second, causes other than import surge may lead to the same consequences and it remains difficult to determine the surge's share of responsibility. Third, the WTO legal framework often refers to injuries as the consequence of the import surges and to provide justification for some safeguards, but it lacks the specifics on whose injury the investigation should focus on. The term injury usually refers to income or profit losses for producers but some consumers who have marked preference for the domestically produced commodity may also feel injured by the collapse of the import competing sector. These difficulties indicate that the determination of the full impact of the import surge remains a daunting task and has to be confined to specific tangible indicators. This chapter attempts to show how the consequence of, i.e. both the loss and benefits from an import surge, can be identified and assessed.

## 4.2 Import surge in a small open economy and major consequences

Figure 4.1 illustrates the impact of import surge on a small but open country. The small open country is a price taker and cannot affect the world price  $P_1$ . At that price the country's producers supply an amount

**FIGURE 4.1**  
Import surge for a small open country



$OS_1$  while an amount  $S_1D_1$  is imported to satisfy consumer demand at that price. Following an event, for example, a bumper crop in a large exporting country, the world price will fall from  $P_1$  to  $P_2$  as these foreign producers have to lower the price to get rid of the excess supply and consumers pay less for more food. The fall in price takes effect in the small country because it is an open economy, and at the new prevailing price  $P_2$ , the local producers, because of their cost constraints and low incentives due to the low price, produce only an amount  $OS_2$  while its consumers demand more of the cheaper products

and increase consumption by  $D_1D_2$  which comes from imports. Total import now amounts to  $S_2D_2$  which is larger than the amount  $S_1D_1$  imported before. The immediate consequences are the following: loss for producers (loss of the area A, gain for consumers:  $(A+B+C+D)$ ). The overall outcome is a gain for the importing country. Import surge cannot always be seen as a loss alone because a loss to producers is a gain for consumers.

But such a simplified explanation hides other costs and benefits involved when import surge occurs. Costs may include various items such as unemployment costs (compensations to be paid, loss of investment in skills); volatility risks from the price shocks; and coverage of fixed costs when the domestic sector goes out of business. On the other hand, the gain may include the spillover effects on research and development (R&D) from the increased imports, the increase in product choices for consumers. These unaccounted costs and benefits are difficult to measure without appropriate data. Moreover, as a surge is supposed to be short-lived, the price and quantity may shift back close to their levels prior to the shock and such shifts may be associated with a different set of costs and benefits for the stakeholders. For the rest of this chapter, these theoretical considerations serve as a basis for the examination of the consequences of import surge.

### 4.3 Legal World Trade Organization (WTO) concepts of injury and threat of injury

In this section, the focus is on the injuries, i.e. the negative effects of the surge, inflicted to the producers and other actors in the sector. There are five concepts of injuries in the trade remedy measures:

- serious injury;
- threat of serious injury;
- material injury;
- threat of material injury;
- material retardation.

The first two are used in the ASG and the last three in the AD and Subsidies and Countervailing Measures (SCM) Agreements.

Article 4 of the ASG (“Determination of serious injury or threat thereof”) defines the concept as follows (Article 4.1):

- “*serious injury*” shall be understood to mean a significant overall impairment in the position of a domestic industry;
- “*threat of serious injury*” shall be understood to mean serious injury that is clearly imminent, in accordance with the provisions of paragraph 2 of the same article. A determination of the existence of a threat of serious injury shall be based on facts and not merely on allegation, conjecture or remote possibility.

Paragraph 2 (a) of Article 4.1 requires competent authorities to evaluate all relevant factors of an objective and quantifiable nature having a bearing on the situation of that industry, in particular:

- rate and amount of the increase in imports of the product concerned in absolute and relative terms;
- share of the domestic market taken by increased imports;
- changes in the level of sales, production, productivity, capacity utilization, profits and losses and employment.

Paragraph 2 (b) of the same Article further puts a condition that the aforementioned determination shall not be made unless it is demonstrated that there exists a causal link between increased imports and serious injury or threat thereof. The next paragraph of the Article states the non-attribution requirement, i.e. it is also required that when factors other than increased imports are causing injury to the domestic industry at the same time, such injury shall not be attributed to increased imports.

#### 4.3.1 Serious injury

Like GATT Article XIX and the ASG, ABs have not attempted to define “serious injury” with any precision. The focus of the AB has been primarily on the text of Article 4.2, i.e. evaluation of all relevant factors including the three factors mentioned as being “in particular”. The AB has stated that the text requires that all of the listed factors be “evaluated” in every case, and it has

found safeguard measures under WTO law whenever a member failed to discuss one or more of these factors in its official report on safeguard action.

The AB has also indicated that the obligation to evaluate “all relevant factors” may extend to factors not raised by any of the parties to the safeguards investigation (e.g. in United States–Wheat gluten). The AB insisted that serious injury represents “significant overall impairment” but it has often refrained from giving detailed commentary on the reasoning behind findings of “serious injury” by national authorities. One notable exception is the case of United States–Lamb. In this case, the USITC had found lamb prices in the United States to be “depressed” even though they were generally higher than four or five years earlier. It had also found a threat of serious injury even though prices had risen toward the end of the period of investigation. The AB held that these findings were insufficient to support the USITC determination.

Nevertheless, while examination of all relevant factors is needed, it is not necessary that every “relevant factor” reflects an industrial decline. Thus, on the whole, the AB has provided relatively little guidance on the meaning of “serious injury,” a situation that is perhaps understandable given the vagueness of the pertinent textual obligations. Beyond a requirement that all factors listed in the Safeguards Agreement (SA) be “evaluated” in each case, it remains unclear what conditions will support a finding of serious injury or threat, and what degree of deference on the matter will be afforded to national authorities.

#### 4.3.2 Threat of serious injury

Here also, the ASG itself contains no explicit guidance on any specific methodology that a competent national authority must employ when establishing threat of serious injury. The relevant factors to take into account are the same as for serious injury, in ASG Article 4.2(a). However, in this case, the key word is “imminent”, or “impending” or “soon to happen”. In the United States–Lamb case, the Panel itself drew some inferences on how to conduct a threat analysis, as follows:

- (i) the determination of a ‘threat’ needs to be based on an analysis of objective and verifiable data from the recent past;

- (ii) the recent past data need to be complemented by fact-based projections concerning developments in the industry’s condition, and concerning imports, in the imminent future;
- (iii) the analysis needs to determine whether injury of a serious degree will actually occur in the near future unless safeguard action is taken.

Thus, the key distinguishing aspect of a “threat” of injury, in contrast to only “injury” or current injury, is the almost exclusive reference to future developments in imports (i.e. future-oriented considerations). In Argentina–Footwear, the Panel held that an analysis of the threat of serious injury in the safeguards context is a separate matter from an analysis of actual serious injury, and so such an analysis must be explicitly undertaken. In United States–Lamb, for example, the USITC did not find present serious injury – “... we found that the United States–Lamb industry is not currently experiencing serious injury, but rather is threatened with serious injury.” The complainants (Australia and New Zealand) had argued that the USITC’s analysis of threat of serious injury is flawed because it was not “prospective”, i.e. it was rather based on past data, and should instead have been based on projections as to how the industry was likely to perform in the immediate future.

#### 4.3.3 Material injury and threat of material injury

These concepts are used in the Subsidies and Countervailing Measures (SCM) and AD agreements. In SCM Article 15.7, for establishing a threat of material injury, it is essential that the change in circumstances which would create a situation in which the subsidy would cause injury must be clearly foreseen and imminent. In determining the existence of a threat of material injury, the investigating authorities should consider, *inter alia*, such factors as:<sup>1</sup>

- (i) nature of the subsidy or subsidies in question and the likely trade effects;

<sup>1</sup> The following list is identical to that in the AD Agreement (Article 3.7) except that (i) is not relevant to AD.

- (ii) a significant rate of increase of subsidized imports into the domestic market indicating the likelihood of substantially increased importation;
- (iii) sufficient freely disposable, or an imminent, substantial increase in, capacity of the exporter indicating the likelihood of an increased subsidized exports to the importing member's market, taking into account the availability of other export markets to absorb any additional exports;
- (iv) whether imports are entering at prices that will have a significant depressing or suppressing effect on domestic prices, and would likely increase demand for further imports; and
- (v) inventories of the product being investigated (with the exporter).

It is also said that no single factor by itself can necessarily give decisive guidance but the totality of the factors considered must lead to the conclusion that further subsidized exports are imminent and that, unless protective action is taken, material injury would occur. Thus, the determination of the ultimate judgement is left to a panel or the AB.

The characterization of injury is similar in the AD Agreement. In Article 3.4, it is said that the examination of the impact of the dumped imports on the domestic industry concerned shall include an evaluation of all relevant economic factors and indices having a bearing on the state of the industry, including:

- actual and potential decline in sales, profits, output, market share, productivity, return on investments, or utilization of capacity;
- factors affecting domestic prices;
- the magnitude of the margin of dumping;
- actual and potential negative effects on cash flow, inventories, employment, wages, growth, ability to raise capital or investments.

It is said that this list is not exhaustive, nor can one or several of these factors necessarily give decisive guidance.

#### 4.4 A standard analytical approach to an injury investigation

There is nothing unique about the approach and methods that ought to be used for investigating the impact of import surges. In a way, this analysis is not

much different from the vast number of studies in the literature on the socio-economic impact of policy changes. What distinguishes an investigation on import surges from others is that the causal factor or the source of the impact in this case is the surge, rather than, for example, a change in some border or domestic policy (e.g. tariff), or a shock like a spike in the price of oil. In this sense, there is much to learn and draw upon from the approaches followed in other studies.

One strand of literature from which there is much to learn and borrow for the surge case studies is the burgeoning literature on the impact of trade liberalization on markets, poverty and food security. These are mostly model-based assessments of the impact of trade policy changes, in recent years mainly focused on the WTO Agreements. Most of these model-based studies are *ex ante* in nature, i.e. models are constructed and a number of “what-if” type simulations are run to assess the impacts. These can be partial equilibrium or general equilibrium models.

But *ex post* studies are much more complicated in this case because here one needs to separate the impact of the policy measure being investigated (e.g. tariff, import surge) from other sources of change (e.g. weather, exchange rate). There is no easier way as it is exceedingly difficult to isolate the effect of one or more causal factors in observed impact indicators. Besides this distinction between *ex ante* and *ex post* approaches, the other distinguishing characteristic of these studies is the level at which the impacts are assessed. Perhaps a majority of these studies has focused on the impact at the level of market or country (e.g. what is the impact of a surge on domestic price level or production or consumption). However, there is now a growing literature on these studies that goes beyond the level of the market to assessing impacts at the level of households, e.g. rural poor versus urban poor, small versus large farmers, and so on. The availability of large-scale survey data, notably the Living Standards Measurement Surveys, has made this extension possible. Other studies have supplemented this analysis by bringing in a spatial dimension (e.g. various rural areas in a country) and the issue of whether markets are spatially integrated or segmented. Therefore, analytical methods for the new import surge case studies can be enriched considerably by borrowing and learning from this strand of literature.

In the WTO context of the issues of import surges, it would make sense to follow the approach taken in the investigation of the WTO trade remedy measures for the purpose of disputes. But the SSG of the AoA does not require injury tests, and therefore, this framework is not relevant for a study whose focus is on the impact of a surge. Moreover, investigations on the three WTO general trade remedy measures (i.e. AD, countervailing and emergency safeguards) require an injury test and so the approach taken and analytical standards set in these agreements are more relevant for the surge case studies. Of the three, the SA is most relevant because there is no need or requirement to relate surges to dumping or export subsidies. The standards set in the SA are high. Perhaps they are too high, because not a single safeguard measure taken by members since 1995 has been found to be consistent with the agreement. Nevertheless, this is the standard that one may strive to meet to the extent possible.

At the cost of simplification, a thorough investigation of a safeguard case involves the following four elements, i.e. the case has to be justified for each stage.<sup>2</sup>

- surge – a proof that a surge has occurred and is occurring;
- injury – the domestic industry (properly defined) is injured on the basis of several indicators listed in the SA (as well as other indicators as relevant);
- causation – there has to be a causal link between imports and injury; and
- non-attribution – the injury caused by other factors (other than imports) have to be properly identified and accounted for.

Although it is obviously a daunting task to go through all these stages and to justify a safeguard measure,<sup>3</sup> these requirements make good sense, both from the logical and economic standpoints. For example, there has to be above all a surge, otherwise imports cannot be the cause of the injury. Second, there has to be injury because a surge may or may not cause an injury,

if there is no injury, the entire rationale of undertaking the investigation is lost. Third and fourth, imports have to be the cause of the injury, either on their own or in combination with other factors. Moreover, it needs to be demonstrated that the role played by other factors in causing or contributing to the injury is properly identified and the problems caused by other factors are not attributed to imports.

On causation particularly, it is important to check the causation between the injury, i.e. the indicators and the import surge. This requires a correlation analysis to identify the relationship between the movements in imports (volume and market share, etc.) and the movements in injury factors (e.g. sales, production, productivity, capacity utilization, profits and losses and employment). Additional insights and analyses are needed to determine whether the conditions of competition between the imported and domestic product as analysed demonstrate the existence of the causal link between the imports and any injury. Even in the absence of the expected negative correlation, the case needs not be dismissed but more and stronger evidence must be produced to argue why imports have caused injury despite the positive correlation.

#### 4.5 Determining which product is really affected: product eligibility, like and competitive products

Safeguards disputes require a definition of “like” or “competitive products” in order to establish the relationship with imports and thus to define the domestic industry that is affected by the import of such “like” or “competitive products.” The concept of “like” or “competitive products” is found in all trade remedy agreements and in GATT, especially in Article III on national treatment. The key concepts are as follows (Figure 4.2):

- like products;
- directly competitive products;
- directly competitive or substitutable products.

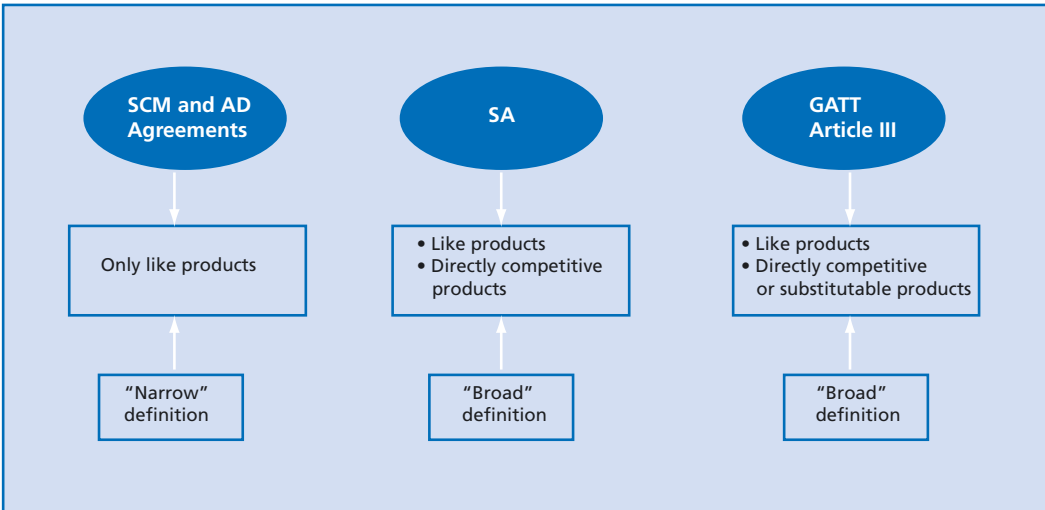
##### 4.5.1 Like products

Although this term appears 16 times in GATT 1994 itself, it is deliberately not formally defined. According

<sup>2</sup> See Mosoti and Sharma (2005) for details on the approach taken in a typical Safeguards investigation.

<sup>3</sup> Note that in contrast, the SSG (and most probably the SSM) is required to pass only the first test.

**FIGURE 4.2**  
**Like, competitive and substitutable products in GATT/WTO legal texts**



Source Mosoti and Sharma (2005)

to GATT Analytical Index, lengthy discussions have taken place in GATT since 1947, including in working parties, to determine the desirability of a formal definition. This was never done. The 1970 Report of the Working Party on Border Tax Adjustments set out the basic approach for interpreting “like or similar products” generally in the various provisions of the GATT 1947. It stated that an assessment of “likeness” should be conducted on a case-by-case basis:

The interpretation of the term should be examined on a case-by-case basis. This would allow a fair assessment in each case of the different elements that constitute a “similar” product. Some criteria were suggested for determining, on a case-by-case basis, whether a product is “similar”: the product’s end-uses in a given market; consumers’ tastes and habits, which change from country to country; the product’s properties, nature and quality.<sup>4</sup>

The case-by-case basis interpretation, which would allow a fair assessment in each case of the different elements that constitute a “similar” product, was

followed in almost all panel reports subsequent to the Border Tax Adjustments report.

The SG does not define the term, nor is the phrase “directly competitive” defined. The AD and SCM Agreements, however, define like products formally and identically, as follows:

Throughout this Agreement the term “like product” shall be interpreted to mean a product which is identical, i.e. alike in all respects to the product under consideration, or in the absence of such a product, another product which, although not alike in all respects, has characteristics closely resembling those of the product under consideration.<sup>5</sup>

Under GATT, the determination of whether two items are “like products” is often analysed under two distinct frameworks: the Border Tax Adjustments Test

<sup>4</sup> Report of the Working Party on Border Tax Adjustments, BISD 18S/97.

<sup>5</sup> SCM Agreement Article 15, foot note 46; and Para 2.6 of AD Agreement.

(“BTA”) and the “Aim and Effect” test. The former approach has been followed and developed by many panels and ABs. The BTA framework consists of the following criteria:

- the properties, nature and quality of the products;
- the end-uses of the products;
- consumers’ tastes and habits; and
- the tariff classification of the products.

However, the AB has cautioned that these criteria are to be applied on a case-by-case basis, and are “neither treaty mandated nor a closed list.” In Japan–Alcoholic Beverages II, the AB emphasized that: “... there can be no one precise and absolute definition of what is “like”. The concept of “likeness” is a relative one that evokes the image of an accordion. The accordion of “likeness” stretches and squeezes in different places as different provisions of the WTO Agreement are applied.” Most panels have focused on the more objectively ascertainable criteria of product properties, end-uses and tariff classifications, and less so on the more subjective criteria of consumer habits.

Some clarification was made in the European Union–Asbestos case, in which the AB concluded that the greater the similarities of two products in the marketplace, the higher the probability that they will be deemed “like products.” As market competitiveness and substitutability are most reflected in the end-uses and consumer tastes criteria, the AB found that market substitutability is a necessary and sufficient condition for finding likeness.

This concept has also been discussed in a number of recent cases involving agricultural products. In the United States–Lamb case, the Panel concluded that live lamb cannot be a like product of the imported lamb, in view of different physical characteristics and other considerations. In Canada–Beef, an identical argument was made, that cattle cannot be a like product to imported beef. Similarly, in United States–Wine and Grapes, it was held that grapes cannot be a like product to wine. In Chile–Agricultural Products, domestic rapeseed was not said to be the like product of imported vegetable oils, and in Korea–Dairy, domestic fresh milk was held not to be a like product of imported milk powder.

#### 4.5.2 Directly competitive products

It is puzzling why the interpretation of the phrase “directly competitive products” in ASG Article 4.1(c) has not been addressed by any panel to date. Indeed, GATT Article III is the only context in which the concept of directly competitive products has been addressed in GATT/WTO dispute settlement practice. For example, in United States–Lamb, the Panel did not get into the issue of directly competitive products because the USITC did not do so, limiting the arguments to like products only in defining domestic industry. Although two of the USITC Commissioners had stated their view that domestically produced live sheep were “directly competitive” with imported lamb meat, the USITC did not rely on this concept, and so the Panel did not get into the matter.

#### 4.5.3 Directly competitive or substitutable products in GATT Article III

The phrase “directly competitive or substitutable products” is found not in trade remedy agreements but in GATT 1994 Article III:2, in the context of national treatment. GATT Article III:2 is concerned with two different factual situations: Article III:2, first sentence, is concerned with the treatment of like products, whereas Article III:2, second sentence, is concerned with the treatment of directly competitive or substitutable products, meaning, products other than like products. Article III:2 further clarifies the distinction between these two sets of products, and hence two distinct obligations in Article III:2.

Many disputes involving this phrase have taken place in the context of differential domestic taxes on alcoholic products. For example in Japan–Alcoholic Beverages, the question asked was whether various imported products (like whisky, brandy, gin, rum and liqueurs) are directly competitive or substitutable with sochu, the Japanese product. Similar investigations were conducted: in Korea–Alcoholic Beverages, imported western alcoholic beverages versus the Korean soju; and in the Chile–Alcoholic Beverages case, imported western alcoholic beverages versus the Chilean pisco.

The Panels have always held that directly competitive or substitutable products should be interpreted more broadly than the term “like products”. In all three



disputes, the Panels went through in depth evidence on elasticity of substitution, and held that these elasticities are valuable and should be examined as part of the evidence. In the Japan-Alcoholic Beverages case, the Panel concluded that imported liquors were directly competitive or substitutable with shochu, for the following reasons:

- the products concerned are all distilled spirits;
- the previous GATT case of 1987, Japan–Alcohol Panel report had made similar findings;
- the evidence demonstrates that there is a “significant elasticity of substitution” among the products; and
- there is evidence that whisky and shochu are “essentially competing for the same market.”

Also relevant for agricultural products is the EEC-Animal Feed Proteins case of 1978. The issue was whether the EEC measure that favoured the use of domestic denatured SMP as a protein source for use in animal feedstuff came at the cost of other protein feedstuffs. The Panel concluded that other protein products in dispute could not be considered as like products with denatured SMP because the basic characteristics are very different. However, both parties to the dispute had agreed that most products in question were substitutable under certain conditions. It was also noted that in contrast to the technical nature of the word substitutable, the interpretation of the word competitive is based on economic reasoning, from the demand or consumer side. In the case, the Panel found that the EEC measure in question did tilt the demand in favour of milk powder and, by virtue of this measure, made the product directly competitive with other protein feeds.

#### 4.5.4 Mapping the industry/sector

Mapping is a valuable tool for understanding the points of market competition between products and its nature. It also helps identify market segments for the purpose of competition analysis.

#### 4.6 Non-attribution analysis

The non-attribution analysis is to ensure that all other relevant factors have been analysed and to establish

that injury caused by factors other than imports has not been attributed to imports. This analysis is part of the “causation” analysis, which implies an understanding of all other relevant factors potentially implicit in injury issues and the determination that injury caused by factors other than imports has not been attributed to imports.

Any analysis of a cause and effect type needs to take into account the effects of other causal factors, so that injury caused by other factors is not wrongly attributed to the causal factor under investigation. Many WTO disputes, or other studies, have failed or have been discredited because a country that put in place a safeguard measure failed to properly undertake the non-attribution analysis. The factors other than imports that could cause injury vary across commodities and countries. Some examples of such factors examined in the WTO disputes include credit constraints, high interest rates, exchange rate overvaluation, overall economic recession, rising labour costs, changing consumer tastes and high export demand that prompts imports of a good as an input into the production of the export products. Once the national analysts develop a good understanding of why and how identified industries may be suffering, these potential causal factors should be evident. These are the underlying factors which potentially underpin the competitiveness of a domestic industry.

#### 4.7 Impact indicators

Impacts can be seen at both micro and macrolevels depending on the severity of the import surge. The indicators may differ by sector (or commodity) and by the nature of the participation of the economic agent along the marketing chain. But a common feature of these impact indicators is that they are all related to the quantity and/or price of the product affected by the surge. When a WTO text often refers to ‘injury’ from import surge, it is not clear, injury to whom? the import surge may injure some groups of population but may benefit others.

Although the concept of injury and its indicators are widely known to specialists and non-specialists, these are also defined and listed in the WTO trade remedy measures.<sup>6</sup> The Subsidies Agreement in particular defines the concept of serious injury as a significant overall impairment in the position of a



domestic industry. Likewise, a threat of serious injury is understood to mean serious injury that is clearly imminent. The Agreement requires an evaluation of all relevant factors having a bearing on the situation of that industry and goes on to list the following indicators as being particularly required:

- rate and amount of the increase in imports of the product concerned in absolute and relative terms;
- share of the domestic market taken by increased imports;
- changes in:
  - the level of sales;
  - production;
  - productivity;
  - capacity utilization;
  - profits and losses; and
  - employment.

To this list, one may add prices (including wages) as the main indicators. Prices were not directly mentioned but prices are already implicit in most of these aforementioned indicators such as profits and sales. Also, prices alone can be a direct measure of the import surge's impact. The Antidumping Agreement in particular singles out impacts on domestic prices as a key injury indicator. Consequently, the market price is one key variable to be collected and analysed in any economic analysis. It is also noted that at the household level the impact can be examined through income and consumption levels. Similarly the levels as well as the variability (volatility) of all the aforementioned indicators could constitute additional and useful information.

## 4.8 Measuring the impacts

The challenge is on getting measurements of these impact indicators and on monitoring them. Some of the approaches and tools used to measure the impacts are discussed here.

Characterization of the nature of competition between import and domestic products

First, the nature of competition between imported and domestic products needs to be

identified, as well as the manifestation of injury and its indicators. Also, factors, other than imports, that affect the industry, positively or negatively, need to be analysed (the non-attribution analysis). Use of price elasticities of substitution, between the two competing products, will indicate how strongly the two are related: complement, substitute. An econometric approach based on cross-sectional or time series or panel data would be appropriate to estimate these elasticities.

### Identifying the domestic sector affected by IS

There is a need to clarify and define what the domestic sector or industry is as defined in the WTO Agreement. According to Article 4.1(c) of the ASG, in determining injury or threat thereof, a "domestic industry" shall be understood to mean "the producers as a whole, of the like or directly competitive products operating within the territory of a member, or those whose collective output of the like or directly competitive products constitutes a major proportion of the total domestic production of those products." Thus, for example, if the product in question is imported milk powder, the corresponding domestic industry would be milk production in the country (in the wider sense of the "competitive product") and "milk processors" (in the sense of narrower "like products").

But this definition is fraught with challenges. In the United States–Lamb case, the AB found that in an investigation in which the relevant "like product" was defined as lamb meat, the term "domestic industry" could not be interpreted as including growers and feeders of live lambs. The AB stated that in determining the scope of the domestic industry, the first step should be the identification of the products which are "like or directly competitive" with the imported product. It further asserted that "only when those products have been identified is it possible then to identify the "producers" of those products."<sup>7</sup>

Hence, in Unites States–Lamb Meat, first the AB considered the definition of "domestic industry" with reference to products:

<sup>6</sup> See Mosoti and Sharma (2005) background paper for details.

<sup>7</sup> United States–Lamb Meat, Appellate Body Report, paragraph 87.

A safeguard measure is imposed on a specific “product”, namely, the imported product. The measure may only be imposed if that specific product (“such product”) is having the stated effects upon the “domestic industry that produces like or directly competitive products” (emphasis added). The conditions in Article 2.1, therefore, relate in several important respects to specific products. In particular, according to Article 2.1, the legal basis for imposing a safeguard measure exists only when imports of a specific product have prejudicial effects on domestic producers of products that are “like or directly competitive” with that imported product. In our view, it would be a clear departure from the text of Article 2.1 if a safeguard measure could be imposed because of the prejudicial effects that an imported product has on domestic producers of products that are not “like or directly competitive products” in relation to the imported product.<sup>8</sup>

Once the definition of “domestic industry” had been analysed with respect to products, it was then examined with respect to producers as follows:

As the Panel indicated, “producers” are those who grow or manufacture an article; “producers” are those who bring a thing into existence. This meaning of “producers” is, however, qualified by the second element in the definition of “domestic industry”. This element identifies the particular products that must be produced by the domestic “producers” in order to qualify for inclusion in the “domestic industry”. According to the clear and express wording of the text of Article 4.1(c), the term “domestic industry” extends solely to the “producers ... of the like or directly competitive products” (emphasis added). The definition, therefore, focuses exclusively on the producers of a very specific group of products. Producers of products that are not “like or directly competitive products” do not, according to the text of the treaty, form part of the domestic industry.<sup>9</sup>

Finally, in concluding that the United States were following a definition of “domestic industry” that was too broad, the AB upheld the Panel findings in the following words:

There is no dispute that in this case the “like product” is “lamb meat”, which is the imported product with which the safeguard investigation was concerned. The USITC considered that the “domestic industry” producing the “like product”, lamb meat, includes the growers and feeders of live lambs. The term “directly competitive products” is not, however, at issue in this dispute as the USITC did not find that there were any such products in this case. In this respect, we are not persuaded that the words “as a whole” in Article 4.1(c), appearing in the phrase “producers as a whole”, offer support to the United States position. These words do not alter the requirement that the “domestic industry” extends only to producers of “like or directly competitive products”. The words “as a whole” apply to “producers” and, when read together with the terms “collective output” and “major proportion” which follow, clearly address the number and the representative nature of producers making up the domestic industry. The words “as a whole” do not imply that producers of other products, which are not like or directly competitive with the imported product, can be included in the definition of domestic industry. Like the Panel, we see the words “as a whole” as no more than “a quantitative benchmark for the proportion of producers ... which a safeguards investigation has to cover.”<sup>10</sup>

According to the AB, the degree of integration of the production process should not impact on the eventual determination of the “domestic industry.”<sup>11</sup> The AB also considered the phrase “those whose collective output...constitutes a major proportion” and the question of data coverage as follows:

<sup>8</sup> Idem, para. 86 of the AB report.

<sup>9</sup> Idem, para. 84 of the AB report.

<sup>10</sup> Idem, para. 91 of the AB report.

<sup>11</sup> Idem, para. 94 of the AB report.

“The Agreement expressly envisages that, in certain circumstances, the “domestic industry” may consist of those domestic producers “whose collective output of the like or directly competitive products constitutes a major proportion of the total domestic production of those products”. This implies that complete data coverage may not always be possible and is not required. While the fullest possible data coverage is required in order to maximize the accuracy of the investigation, there may be circumstances in a particular case which do not allow an investigating authority to obtain such coverage.”

## 4.9 Price analysis

Measuring the impacts of import surge on prices (including wages) is important as it is still one of the best tangible indicators that inform of the extent of the impact on the economic agent. This section is based on the analysis provided in Westlake (2005). Traditionally economists have analysed the impact of imports and exports using partial equilibrium models where, at any point in time, there is just one national market price. These models assume a single national market for a homogeneous good that embraces all national sales and purchases and in which the good is sold directly by producers to final consumers.<sup>12</sup> The market is assumed to be distinct from other markets, subject to a supply of imports and a demand for exports that are both perfectly price elastic. This allows foreign trade to be introduced simply through changes in the domestic supply and demand functions. Supply becomes perfectly price elastic at the import price and demand perfectly price elastic at the export price.

Within such a model, the national market can be in one of the following cases: (i) self-sufficient; (ii) partly; or (iii) fully supplied by imports. It could be also that (iv) a fraction of or (v) the entire national production can be exported. Here the two states of most practical relevance to import surges are discussed: the initially self-sufficient market and the market that is partially supplied by imports.

<sup>12</sup> For convenience, we use “goods” to refer to both commodities and the products derived from them, other than where it is necessary for a distinction to be made.

### 4.9.1 For self-sufficient markets

Self-sufficient markets clear without exports or imports. Such a state is possible because the transport and other costs of selling into a market or exporting from it mean that there is a price range within which both exporting and importing are loss-making. Above the upper boundary of this range, importing becomes profitable and below the lower boundary exporting becomes profitable.

For imports to occur in a previously self-sufficient market, there must be an inward shift in the supply function (i.e. less is supplied at each price), an outward shift in the demand function (i.e. more is demanded at each price), a fall in the import price, or some combination of these. Once the market-clearing price is above the import price as a result of one or more of these three changes, importing becomes profitable. This induces imports, which push the market price down to the import price. The market price remains at this level until there is another shift in domestic supply, demand or the import price. Within this model, imports are the additional supply necessary to reduce the domestic equilibrium price to the import price.

The size of the imports necessary to re-establish equilibrium is a function of:

- the pre-import difference between the notional import price and the actual domestic equilibrium price;
- the sizes of the causative shifts in the domestic supply and/or demand functions and/or the import price;
- the price elasticities of supply and/or demand in the domestic market.

These are the variables that determine whether imports are large enough to be considered a “surge”.

### 4.9.2 For markets supplied by imports

Where a country is already an importer, an increase in the amount imported is also caused by a fall in the import price and/or shifts in the supply and/or demand functions. However, unlike in the case of self-sufficiency, the domestic equilibrium price only changes when the increase in imports is caused

by a fall in the import price. In this case, the size of the additional imports necessary to re-establish equilibrium is a function of the size of the price fall and the price elasticities of supply and demand. For a shift in the supply or demand functions, the size of the resulting imports is a function of the size of the shift and, respectively, the price elasticities of demand or supply.

### 4.9.3 Implications

Thus, the impact of increased imports on domestic producers and consumers depends on a combination of (a) the source of the change that causes the increase; and (b) whether the country is initially self-sufficient or already an importer. This gives the six possible scenarios shown in Table 4.1, which lead to five different outcomes.

In each case, the fundamental cause of the increase in national imports is a rise or an anticipated rise in the profitability of exporting to and selling the good in the domestic market of the country in question. As exporting enterprises usually have the opportunity also to sell in their home country and/or into a third country, the rise in profitability must be relative to profitability in these alternative markets. This suggests that most import surges are likely to be generated, in one way or another, by changes in conditions specific to the importing country in question, either at its border or within its domestic market.

A necessary condition for an import surge is that exporters have knowledge of the changed conditions within the importing country. Exporting to that country will also be easier if exporters have pre-existing relationships with importers. Both these facts suggest that surges are most likely to take the form of increases in existing trade flows rather than new flows.

When analysing an import surge, a necessary initial requirement is to determine the source of the causative change. For each of the three types of change, the source can be external or internal.

For example, the import price might change as a result of (a) a bumper crop in a major exporting country; (b) a rise in subsidies in one or a set of exporting countries; (c) a revaluation of the importing country's currency against those of major exporting countries; or (d) a reduction in an import tariff or an administrative impediment to importing. In the case of an agricultural good, domestic supply is most likely to shift inwards as a result of adverse weather conditions or an increased incidence of attack by pests and diseases, but it could also shift inwards as a result of an increase in international fertilizer prices or a sharp rise in international prices of an export crop that competes for land and other resources. Domestic demand could shift as a result of the failure of the domestic production of a substitute good or as a consequence of an external change, such as an increase in the world price of a domestically produced mineral that raises domestic incomes.

**TABLE 4.1**  
**The impact of increased imports on domestic producers and consumers**

Type of change	If initially self-sufficient	If already an importer
Reduction in the import price	Producers sell less at a lower price.	Producers sell less at a lower price.
	Consumers buy more at a lower price.	Consumers buy more at a lower price.
Shift in the supply function	Producers supply less but at a higher price.	Producers sell less at the same price.
	Consumers buy less at a higher price.	Consumers buy the same amount at the same price.
	The imports moderate the extent of the price rise.	No change in the domestic price, which stays at the import price.
Shift in the demand function	Producers supply more at a higher price.	Producers sell the same amount at the same price.
	Consumers buy more but at a higher price.	Consumers buy more at the same price.
		No change in the domestic price, which stays at the import price.

While the causes of particular import surges may in most instances appear to be obvious, it is important that case studies nevertheless commence with a systematic examination of possible causes within the framework shown in Table 4.1. This requires assembling for the imported good (a) time series of quantities of domestic production, consumption and imports; and (b) time series of producer, consumer and CIF import prices expressed in the national currency. Having isolated, for example, that a fall in the CIF price is a major cause of the import surge, the next step is to determine the reasons for the fall. This requires examining the time series of the United States Dollar indicator prices for the commodity and of the exchange rate of the national currency against the United States Dollar and also determining whether there have been significant changes to import tariffs, import charges or other factors that affect the unit costs of importing. Analysts will similarly need to establish the causes of identified shifts in supply and demand.

For all three types of change, it will be important to determine whether the change was, or is likely to be, temporary or permanent. If temporary, an important aspect of the case study will be to determine the extent to which impacts of the surge are also reversible.

#### 4.10 Price transmission mechanisms

In line with the previous section on the importance of price analysis, there is a need to examine price transmission because price is the central mechanism by which markets are linked. This section draws entirely from Conforti and Rapsomamilis (2005). There is indeed a need to analyse how the price shocks from the import surge are transmitted to various stakeholders especially the producers. Spatial price determination models postulate that spatial arbitrage ensures that equilibrium domestic and world prices of a commodity that is sold in competitive foreign and domestic markets will differ only by transfer costs, when converted to a common currency. Therefore, the extent to which price signals are transmitted from the world to the domestic market affects the trade pattern. Transaction costs, border measures and other factors may hinder price transmission, affect trade and weaken the integration of domestic with the international market giving rise to conditions

that may result in different trade patterns, possibly including an increased likelihood of import surges.

Studies on the transmission of price signals are loosely founded on concepts related to competitive pricing behaviour,<sup>13</sup> being ostensibly an empirical exercise that aims at testing the predictions of economic theory. This empirical work provides important insights as to how changes in one market are transmitted to another, thus reflecting the extent of market integration, as well as the extent to which markets function efficiently.

In this section, the aim is to provide the basis for discussing the relation between empirical price transmission studies and the likelihood of import surges. Can incomplete price transmission affect the likelihood of a surge in imports and under what conditions? Can we gain insights on the likelihood of import surges by considering the nature of price transmission? Which are the appropriate analytical tools and data that we should use?

##### 4.10.1 The nature of price transmission and import surges

Several authors have studied price transmission within the context of the Law of One Price (inter alia Ardeni, 1989; Baffes, 1991) or within the context of market integration (Ravallion, 1986; Sexton, et al., 1991; Palaskas and Harriss 1993; Zaniias, 1993; Gardner and Brooks, 1994; Blanch, 1997). In theory, spatial price determination models suggest that, if two markets are linked by trade in a free market regime, excess demand or supply shocks in one market will have an equal impact on the price in both markets. In practice, domestic markets can be totally or partly insulated by several factors:

- in developing countries, poor infrastructure, transport and communication services give rise to large marketing margins due to high costs of delivering the locally produced commodity to the border for export or the imported commodity

<sup>13</sup>Fackler and Goodwin (2002) provide a comprehensive review of market integration concepts and of the corresponding economic models of price determination. A review is also available in Rapsomanikis, et al. (2003).

to the domestic market for consumption. High transfer costs and marketing margins hinder the transmission of price signals, as they may prohibit arbitrage (Sexton, et al., 1991; Badiane and Shively, 1998). As a consequence, changes in world market prices are not fully transmitted to domestic prices, resulting in economic agents adjusting, if at all, partly to shifts in world supply and demand;

- the implementation of an ad valorem import tariff, in general, will allow international price changes to be fully transmitted to domestic markets in relative terms. However, if the tariff is specific, or its level is prohibitively high, or if other policy tools are implemented (such as tariff rate quotas or other non-tariff barriers), international price changes may not be transmitted to domestic prices;
- non-competitive behaviour such as that considered in pricing-to-market models (Krugman, 1986; Dornbusch, 1987; Froot and Klemperer, 1989) can hinder market integration. Alternatively, oligopolistic behaviour and collusion among domestic traders may retain price differences between international and domestic prices in levels higher than those determined by transfer costs.

A starting point for examining price transmission is provided by the Law of One Price and the Enke-Samuelson-Takayama-Judge model.<sup>14</sup> Given prices for a commodity in two spatially separated markets  $p_{1t}$  and  $p_{2t}$ , these models postulate that at all points of time, allowing for transfer costs  $c$ , for transporting the commodity from market 1 to market 2, the relationship between the prices is as follows:

$$p_{1t} = p_{2t} + c \quad (4.1)$$

If a relationship between two prices such as (4.1) holds, the markets can be considered to be integrated. However, this extreme case may be unlikely to occur, especially in the short run. At the other end of the spectrum, if the joint distribution of two prices were found to be completely independent, then one might feel comfortable saying that there is no market integration and no price transmission. In general,

spatial arbitrage is expected to ensure that prices of a commodity will differ by an amount that is at most equal to the transfer costs with the relationship between the prices being identified as the following inequality:

$$p_{2t} - p_{1t} \leq c \quad (4.2)$$

Fackler and Goodwin (2002) refer to the aforementioned relationship as the spatial arbitrage condition, and postulate that it identifies a weak form of the Law of One Price, the strong form being characterized by equality (4.1). They also emphasize that relationship (4.2) represents an equilibrium condition. Observed prices may diverge from relationship (4.1), but spatial arbitrage will cause the difference between the two prices to move towards the transfer cost.

Depending on market characteristics, or the distortions to which markets are subject to, the two price series may behave in a plethora of ways, with prices adjusting less than completely, or slowly rather than instantaneously, and according to various dynamic structures, or being related in a non-linear manner. Against this background, price transmission can be summarized into three notions, or components (Prakash, 1999; Balcombe and Morrison, 2002), which are:

- co-movement and completeness of adjustment which implies that changes in prices in one market are fully transmitted to the other at all points of time;
- dynamics and speed of adjustment which implies the process by, and rate at which, changes in prices in one market are filtered to the other market or levels; and,
- asymmetry of response which implies that upward and downward movements in the price, or movements above and below a certain threshold in one market are symmetrically or asymmetrically transmitted to the other.

Complete price transmission between two spatially separated markets is defined as a situation where changes in one price are completely and instantaneously transmitted to the other price, as postulated by the Law of One Price presented by relationship (4.1). In

<sup>14</sup>Enke (1951), Samuelson (1952), and Takayama and Judge (1971).

this case, spatially separated markets are integrated. In addition, this definition implies that if price changes are not passed-through instantaneously, but after some time, price transmission is incomplete in the short run, but complete in the long run, as implied by the spatial arbitrage condition.

Asymmetric response of one price to another implies non-linear adjustment and deserves some further discussion.

Many researchers have worked on the issue of asymmetric price responses (Granger and Lee, 1989) or threshold cointegration models (Enders and Granger, 1998; Abdulai 2000; Scherer and Ross, 1990). Both policies and market power are often cited as a source of asymmetries. Industry concentration and imperfectly competitive behaviour beyond the farm-gate implies that wholesalers, or middlepersons with power over price, may exercise pricing strategies that result in a slow and incomplete pass-through of increases in the international price and a fast and complete transmission of decreases in the international price to prices upstream, as their margins are squeezed.

Is it possible to establish a formal relation between the nature of price transmission and the likelihood of import surges? Theoretical models of spatial price determination often contain either assumptions that are not met empirically, or they contain "identification" of causal relationships which cannot be established by examining price series data alone. For instance, a wedge between domestic and international prices is likely to be explained as being driven by the costs of transfer, marketing and distribution, but also by the existence of monopolies and so forth. However, such models do not yield explicitly testable hypotheses of the existence of prohibiting transaction costs or of monopoly pricing. In a similar vein, a relation between the nature of price transmission and the likelihood of import surges is entirely empirical, whilst no a priori explicit theoretical predictions can be made on the impact of progressively less complete price transmission on the behaviour of imports.

Increased openness to trade may result in an increase in the stability of a domestic market price, if domestic output fluctuations are absorbed by imports. Nevertheless, increased market integration and an improved transmission of price signals from the world market may bring about larger swings in

trade flows, therefore adding to the likelihood of sudden import increases in a domestic market, but not to that of surges when these are defined relatively to domestic production. At the same time greater integration with the world market may result in a smooth upward trend in imports and not necessarily in a sudden increase or surge. Much depends upon the characteristics of the specific markets and on the way price signals are transmitted.

In general, integration with large-sized markets of relatively homogenous commodities appear more likely to bring about increased price stability in the domestic markets of countries that are characterized by unstable domestic production, for instance where production is heavily dependent upon the rainfall pattern. At the same time, it should be stressed that the occurrence of import surges is independent, at least in principle, from the stability of the market *per se*. If importers expect a given degree of instability, they may be prepared to cope with it, while worries about surges are referred to unexpected large variations in imports. It is rather the nature of price transmission and the manner to which markets are integrated that can affect the trade pattern and the likelihood of observing import surges. This is particularly the case where markets are characterized by peculiar cycles that are not synchronized with those of other major markets, and/or where markets are characterized by prohibitively, at times, transaction costs and/or high adjustments costs that give rise to thresholds and non-linearities. A condition such as asymmetric response of domestic prices to the international market prices appears of particular relevance to address countries' concerns on unexpected swings in imports.

Supposing that trade between two markets A and B is intermittent, as B is characterized by high transaction costs, arising e.g. from poor infrastructure and a transport services system. Such transaction costs would make trade profitable only when the price in market A would fall sufficiently low to reduce the price difference between the two markets, say by 25 percent, offsetting transaction costs and allowing spatial arbitrage. A downward shock in the price in A would be transmitted to the price in B only if it results in a decrease in the margin larger than 25 percent. If a 30 percent price decrease occurs in the margin between A and B due to e.g. weak demand, B may experience a sudden and unexpected increase in



imports. In this case, the presence of a high threshold, that arises from high transaction costs, increases the likelihood of import surges, with the transmission of price signals between the two markets taking place only if the margin between the different market prices  $A$  falls below a certain threshold.

By the same token, market integration can be concealed by the presence of non-stationary transaction costs, that prevent the transmission of price signals (Barrett, 2001; Fackler and Goodwin, 2002; Barrett and Li, 2002). As a consequence, the international and domestic prices may completely drift apart, thus limiting the information content that prices convey to producers, although price signals are still transmitted from one market to another. Also in this case a large enough shock in the world market may provoke an unexpected swing in imports into a particular country. In a similar manner, if production is characterized by high fixed costs of adjustment, markets may be subject to import surges if the import prices fall sufficiently low, as producers are prevented from adjusting over a certain threshold.

#### 4.10.2 Application methodology

Some techniques for the measurement of market integration and price transmission are presented and discussed here so that they can be employed to gain insights about the possibility of observing import surges. The presence of such non-linearities and thresholds in price adjustment lends itself to a cointegration/error correction empirical interpretation.

Most of the studies which have considered the transmission of price signals as an indicator of market integration use time series econometric analysis techniques that test for the co-movement of prices. However, the extent of price transmission lacks a direct and unambiguous empirical counterpart in the form of single formal testing. More often, time series techniques are employed to address each of the components of price transmission. Such applications include tests for non-cointegration, and Granger causality, the estimation of Error Correction Models (ECMs) and tests for asymmetric response.<sup>15</sup> Each of the aforementioned tests is taken to present evidence on the components of transmission, thus providing particular insights into its nature. For the sake of completeness, a brief overview of these tests is provided below, before concentrating

on applications of Threshold Error Correction Models (TECM) that can be more useful in assessing the likelihood of import surges.

The concept of cointegration (Granger, 1981) and the methods for estimating a cointegrated relation or system (inter alia Engle and Granger, 1987; Johansen, 1988, 1991, 1995) provides a framework for estimating and testing for long run equilibrium relationships between non-stationary integrated variables.<sup>16</sup> If two prices in spatially separated markets (or different levels of the supply chain)  $p_{1t}$  and  $p_{2t}$  contain stochastic trends and are integrated of the same order, say  $I(d)$ , the prices are said to be cointegrated if:

$$p_{1t} - \beta p_{2t} = \mu t \quad (4.3)$$

<sup>15</sup> This is also referred as the Granger and Sims causality which refers to Granger (1981) and Sims (1980).

<sup>16</sup> Statistical properties of series can be summarized by the concept of stationarity. A stationary series has a constant mean and a constant finite covariance structure. Such a series does not vary systematically with time, but tends to return frequently to its mean value and to fluctuate around it within a more or less constant range. Alternatively, a non-stationary series has time dependent statistical properties. Non-stationary series may contain stochastic or deterministic trends. Variables that contain stochastic trends are called 'integrated' and exhibit systematic, but unpredictable variation, as compared with series that contain deterministic trends and display completely predictable variation. A stochastic trend in a series can be removed by differencing. The differenced series has statistical properties which are invariant with respect to time, whilst inferences about the similarity of the statistical properties of different economic series can be made by comparing the number of times the series have to be differenced in order to achieve stationarity. More formally, a variable is integrated of order  $d$ , written  $I(d)$ , if it must be differenced  $d$  times to achieve stationarity.

<sup>17</sup> The parameter  $\beta t$  has sometimes been interpreted as the 'elasticity of price transmission', when the price series are converted into logarithms. However, this parameter does not identify this elasticity, or in other words, the completeness of transmission, particularly well, as recognized by Balcombe and Morrison (2002) and Barrett and Li (2002). For example, if prices in spatially separated markets have a common stochastic trend reflecting inflation, the cointegrating parameter will be equal to one mirroring a proportionality of unity and implying that price transmission is complete. Nevertheless, failure to reject the null of non-cointegration implies that the two prices drift apart in the long run, as they are driven by stochastic trends that are not proportional.

is  $I(0)$ .<sup>17</sup>  $\beta$  is referred to as the cointegrating vector (in the case of two variables a scalar), whilst equation (4.3) is said to be the cointegrating regression. Cointegration implies that these prices move closely together in the long run, although in the short run they may drift apart, and thus is consistent with the concept of market integration.<sup>18</sup>

According to the Granger Representation Theorem (Engle and Granger, 1987), if two trending, say  $I(1)$ , variables are cointegrated, their relationship may be validly described by an ECM, and vice versa. In the case that prices from two spatially separated markets,  $p_{1t}$  and  $p_{2t}$ , are cointegrated, the Vector Error Correction Model (or VECM) representation is as follows:

$$\begin{pmatrix} \Delta p_{1t} \\ \Delta p_{2t} \end{pmatrix} = \begin{pmatrix} \mu_1 \\ \mu_2 \end{pmatrix} + \begin{pmatrix} \alpha_1 \\ \alpha_2 \end{pmatrix} (p_{1t-1} - \beta p_{2t-1}) + A_2 \begin{pmatrix} \Delta p_{1t-1} \\ \Delta p_{2t-1} \end{pmatrix} + \dots + A_k \begin{pmatrix} \Delta p_{1t-k} \\ \Delta p_{2t-k} \end{pmatrix} + \begin{pmatrix} v_{1t} \\ v_{2t} \end{pmatrix} \quad (4.4)$$

where  $v_{1t}$  and  $v_{2t}$  are iid disturbances with zero mean and constant finite variance, whilst the operator  $\Delta$  denotes that the  $I(1)$  variables have been differenced in order to achieve stationarity. Parameters contained in matrices  $A_2 \dots A_k$ , measure the short run effects, while  $\beta$  is the cointegrating parameter that characterizes the long run equilibrium relationship between the two prices. The levels of the variables enter the ECM combined as the single entity  $(p_{1t-1} - \beta p_{2t-1})$  which reflects the errors or any divergence from this equilibrium, and corresponds to the lagged error term of equation (4.3). The vector  $(\alpha_1, \alpha_2)'$  contains parameters, usually  $0 < |\alpha_i| < 1$ ,  $i=1,2$ , commonly called error correction coefficients, that measure the extent of corrections of the errors that the market initiates by adjusting  $p_{1t}$  and  $p_{2t}$  towards restoring the long run equilibrium relationship. The speed with which the market returns to its equilibrium depends on the proximity of  $\alpha_i$  to one.

Another important implication of cointegration and the error correction representation is that cointegration between two variables implies the existence of causality (in the Granger sense) between them in at least one direction (Granger, 1988).<sup>19</sup> If two markets are integrated, the price in one market,  $p_1$ , would commonly be found to Granger-cause the price in the other market,  $p_2$  and/or vice versa. Granger (1988) proposed a test for long run Granger causality within the context of the error correction representation of a cointegrated system of variables. The presence and direction of Granger causality in the long run can be assessed by testing the null that the error correction coefficients  $\alpha_1$  and  $\alpha_2$  in the VECM presented by (4.3) are equal to zero.

It is important to note that although cointegration between two price series implies Granger causality in at least one direction, the opposite is not necessarily true. In this case, as noted previously in the discussion on cointegration, lack of cointegration between the two trending price series may indicate that market integration is absent, as other factors such as transaction costs determine the movements of one of the price series. However, Granger causality may exist, indicating that, although the two price series drift apart due to other factors such as non-stationary transaction costs, some price signals are passing through from one market to another. On the other hand, lack of Granger causality may not imply an absence of transmission, as price signals may be transmitted instantaneously under special circumstances.

Time series analysis has been widely criticized for its unreliability (Blauch, 1997; Barrett and Li, 2002) with recent research focussing on switching regime models that incorporate data on prices, volumes traded and transaction costs. Another potential shortcoming of cointegration in testing for market integration is the implicit assumption that transfer costs are stationary (Fackler and Goodwin, 2002; Barret and Li, 2002). In essence, the linear tests for market integration and price transmission described above, are thought of as crude and inappropriate (Blauch, 1997; McNew, 1996; McNew and Fackler, 1997; Fackler and Goodwin, 2002 and Barrett and Li, 2002). Non-linearities in market relationships that arise from arbitrage conditions, unsynchronized price cycles, discontinuous trade and non-stationary or

<sup>18</sup> Engle and Granger test the null of no cointegration by applying unit root tests on  $\hat{u}_t$ . Johansen derived the distribution of two test statistics for the null of non-cointegration referred to as the Trace and the Eigenvalue tests. Comprehensive presentations of both Engle and Granger, and Johansen tests can be found in Hamilton (1994).

<sup>19</sup> Granger (1969) proposed an empirical definition of causality based only on its forecasting content: if  $x_t$  causes  $y_t$  then  $y_{t+1}$  is better forecast if the information in  $x_t$  is used, as there will be a smaller variance of forecast error.

high transfer costs are thought of rendering linear representations and models not useful and inaccurate.

The ECM representation, however, also provides a framework for testing for asymmetric and non-linear adjustment to a long run equilibrium and could offer useful insights on the likelihood of import surges. Granger and Lee (1989) proposed an Asymmetric ECM (AECM) where the speed of the adjustment of the endogenous variable depends on whether the deviation from the long run equilibrium is positive or negative. The single asymmetric ECM is specified as follows:

$$\Delta p_{1t} = \mu_1 + \alpha_1^+(p_{1t-1} - \beta p_{2t-1})^+ + \alpha_1^-(p_{1t-1} - \beta p_{2t-1})^- + \sum_{i=0}^k \delta_i \Delta p_{2t-i} + \sum_{i=1}^n \gamma_i \Delta p_{1t-i} + v_{1t} \tag{4.5}$$

The errors or divergences from this equilibrium are decomposed in two parts,  $(p_{1t-1} - \beta p_{2t-1})^+$  and  $(p_{1t-1} - \beta p_{2t-1})^-$  reflecting positive and negative disequilibria respectively. Asymmetry occurs in the event when positive and negative divergences from the long run equilibrium between  $p_{1t}$  and  $p_{2t}$  result in changes in  $p_{1t}$  that have different magnitude. Therefore, asymmetric transmission implies that  $\alpha^+$  is not equal to  $\alpha^-$ . The null of symmetry against the alternative hypothesis that adjustment is asymmetric is tested by imposing the equality restriction  $\alpha^+ = \alpha^-$ . Short run asymmetric transmission can also be tested by decomposing  $\Delta p_{2t}$  in two parts reflecting price rises and price falls, and testing for equality of the corresponding short run coefficients.

Asymmetric transmission can be considered as a particular case of a threshold cointegration model, in which the threshold is set at zero. In more general terms, the transmission of price signals can take place to a different extent in bands defined by one or more thresholds that may be estimated rather than set by the practitioner. Models of this type were introduced by Enders and Silkos (1999), and widely applied to agricultural price series (Goodwin and Piggott, 2001; Thompson and Bohl, 1999; Goodwin and Harper, 2000; Mainardi, 2001; Abdulai, 2002; Meyer, 2002; Sephton, 2003).

A TECM representation can be written to include two separate coefficients like in the asymmetric case, as follows:

$$\Delta p_{1t} = \mu_1 + I_t \alpha_1^+(p_{1t-1} - \beta p_{2t-1}) + (1 - I_t) \alpha_1^-(p_{1t-1} - \beta p_{2t-1}) + \sum_{i=0}^k \delta_i \Delta p_{2t-i} + \sum_{i=1}^n \gamma_i \Delta p_{1t-i} + v_{1t} \tag{4.6}$$

with

$$I_t = 1 \quad \text{if } (p_{1t-1} - \beta p_{2t-1}) \geq c$$

$$I_t = 0 \quad \text{if } (p_{1t-1} - \beta p_{2t-1}) < c$$

and where  $c$  is the threshold. Here the divergences from the long run equilibrium are decomposed in two parts depending on their size, as defined by the threshold  $c$ . The restriction  $\alpha^+ = \alpha^-$  can be tested to ascertain the relevance of the threshold. If significantly different, the value of the two parameters can be interpreted, given the caveat reported above, as a measure of the speed of transmission below and above the threshold. In essence, the TECM reflects a discrete adjustment process that implies that movements towards a long run equilibrium may not take place at all points in time, but only when the divergence from this equilibrium exceeds a certain threshold.

In a less technical manner, TECMs may allow the practitioner to make statements such as the price in market A must be at least  $x$  percent different to the price in market B before there is transmission of price signals between A and B. A similar logic applies for the prices of two commodities that are close substitutes in consumption. In this case the price of commodity A must be at least  $x$  percent different to the price of commodity B before there is price transmission between A and B. A price transmission of such nature, duly supported by qualitative information on the characteristics of the markets under consideration, can contribute towards assessing the likelihood that downward shocks over a threshold may be suddenly and unexpectedly transmitted from one market to another, thus determining a swing in prices and trade consistent with the notion of import surge presented above.

### 14.10.3 Recommendations for applied analysis

This section addresses the issue of whether the nature of market integration and price transmission affects the likelihood of import surges. It is shown that under certain conditions, such as the presence of high transaction costs, or fixed costs of adjustment, asymmetric price adjustment, and more importantly adjustment that takes place over a certain threshold, may imply a high likelihood of experiencing import surges. Nevertheless, in a like manner with all time

series applications to price transmission, it was stressed that there is no a priori structural relation between import surges and the nature of market integration. Moreover, import surges may not be necessarily more likely to happen with a higher variability of trade.

Market integration in the Enke-Samuelsson-Takayama-Judgesense and complete price transmission can be formally tested in the long run. However, the extent to which price signals are transmitted from one market to another is an ambiguous concept. Thus, the concept of price transmission is decomposed into notions: co-movement and completeness, dynamics and speed of adjustment and asymmetric response. Asymmetric response implies non-linearities that are testable within a cointegration error correction model framework.

The application of time series econometric techniques requires data on domestic and international prices of a relatively high frequency, such as monthly price series covering a reasonable period such as ten to fifteen years. Annual data may not contain sufficient information to unfold the nature of price transmission and to detect the presence of thresholds. The test for non-cointegration and the estimation of ECMs is straightforward, given the availability of data. The most common method for testing the hypothesis for non cointegration and estimating a cointegrating relationship is based on Full Information Maximum Likelihood (FIML) methods, available in most of econometric programmes. Hansen and Seo (2002) proposed algorithms that can maximize a threshold likelihood function and test for threshold effects.

The presence of thresholds is due to a number of reasons. As previously stressed, high transaction or adjustment costs are likely candidates. However, thresholds may arise due to a number of factors such as tariffs, quotas, market structure and concentration. Therefore, interpretation of thresholds should be context specific, and the econometric analysis should be carried out in conjunction with a qualitative analysis of the market under consideration and a close scrutiny of trade volume and flow data. Markets can be separated spatially, temporally, or through commodity heterogeneity and the interpretation of econometric results should be conducted with care in order to allow more insights to be gained on the extent to which the connection between markets can be conducive to import surges.

## 4.11 Conclusion and discussions

This chapter describes the nature of the impacts of import surges and highlighted the need for and challenges in assessing these impacts. At the heart of the analysis was the distinction between the type of consequences with the emphasis on the importance of the causation and especially the non-attribution analyses. The various indicators (profit, sales, market shares, prices, etc.) that give insights of the direct harms or benefits from the import surges are useful but they only provide a partial account of the consequences for all the stakeholders involved. Study on price transmission has provided further insights but it remains an insufficient tool to track the consequences especially when markets are segmented, like in some commodities in some developing countries. A full *ex post* impact assessment at the household or at the sector levels is desirable but the resources and especially the data required to perform such analyses are enormous. For these reasons, the WTO guidelines on the analysis leading to these indicators remain the best approach, although such an approach needs to be improved and clarified further to give more precisions on the consequences of import surges in developing countries.

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