Chapter 4

The Research Approach

In the following section, the methodology to analyse the potential for trade-related effects to arise because of graduation from LDC status is described. The data required are:

- trade data disaggregated at the lowest level into major end markets (mirror data are preferable), over at least a three-year average (representing the yearly average based on at least a three-year period);
- trade data, as above, for competitors whose market share within the preference-driven end market is more than 5 per cent;
- tariff information for major competitors and the percentage point difference pre- and post graduation, e.g. between MFN, GSP and LDC rates (other GSP rates could also be explored, if LDCs seek to pursue this avenue post graduation).

4.1 Methodology

When a country graduates from LDC status it faces an increase in tariffs. While there are a number of ways to broadly examine the trade effect of a tariff change, the approach adopted in this handbook is as follows:

- Step one: follow a standard import demand model, where imports depend on relative prices and the budget available, assuming a unit price elasticity (a 10 per cent tariff and price change will lead to a 10 per cent change in import volumes and export receipts);
- Step two: as above, but estimate how competitors within the market may increase their market share.

If we assume the price elasticity of demand to be unit elastic and equal to 1, this means that any increase in price because of changes in graduation thresholds that increase tariffs results in an equal reduction in the quantity demanded (assuming unitary price elasticity). This constitutes the first step towards estimating the potential trade effects of graduation from LDC status.

The second step in estimating the trade effects of graduation assumes that there are competitors in all products. This means that it is possible to calculate the potential increase in demand for goods exported by the non-graduates, namely through estimating by how much other competitor countries might increase their exports, taking the place of the graduated country proportional to their market share (assuming a constant unit cross price elasticity of demand).

4.1.1 Step one

The simplest way to estimate the trade effects of the removal or granting of a given preference typically includes analysing the resultant differences in relative prices: the unit price received by a preference recipient for a particular product relative to that received by MFN exporters, as a result of eligibility for a given preferential regime (Equation 4.1):[1]

$$P_k^i = P_k^w(1 + m_k^i) \quad \text{or} \quad m_k^i = \frac{P_k^i}{P_k^w} - 1 \tag{4.1}$$

where P_k^i is the unit price received by exporter i for product k, and P_k^w is the world (or MFN) unit price for k. This static approach implicitly assumes that markets are perfectly competitive and there is no product differentiation within each category k. The equation can be expressed as the difference between the MFN tariff and the preferential rate received by a given beneficiary in a particular market through dropping the product-specific parameter k (Equation 4.2), or as a margin, given by Equation 4.3:

$$P_i = P^w(1 + T_{MFN} - T_i) \tag{4.2}$$

$$m_i = T_{MFN} - T_i \tag{4.3}$$

where T_{MFN} is the *ad valorem* MFN tariff for a particular product and Ti is the export-weighted average preferential tariff faced by exporter i in a given market. The percentage change in the value of exports as a result of a change in the export price is given by:

$$\frac{\Delta X}{X} = \frac{X_2 - X_1}{X_1} = \frac{\Delta P}{P} + \varepsilon\frac{\Delta P}{P}\left[\frac{\Delta P}{P} + 1\right] \tag{4.4}$$

where X is the value of exports and ε is equal to: $(\Delta Q/Q)/(\Delta P/P)$. Implicit in the approach is that the loss of export revenues is larger than the percentage reduction in the preference margin (i.e. the larger the original margin, the larger the elasticity of export supply). This formula can be adapted in line with changes in preferential regimes, such as graduation thresholds, which result in some exporters facing a higher tariff than others, in order to calculate the resultant effect on export revenues as follows:

$$\frac{\Delta X}{X} = \mu_i \frac{m_i}{1 + m_i} + \varepsilon_i\left[\mu_i \frac{m_i}{1 + m_i}\right]\left(\mu_i \frac{m_i}{1 + m_i} + 1\right) \tag{4.4a}$$

where $\mu_i = \Delta m_i / m_i$ indicates the percentage change in the given preference margin of country i. The first component of Equation 4.4a calculates the difference in unit values as a result of the change in preference margin, and

the latter component gives the impact on export revenues of the response of (export) volumes to a given price change.

Essentially, Equation 4.4a calculates the cross elasticity of demand. This is the percentage change in quantity for a given change in price. It implies that the loss of export revenue is larger than the percentage reduction in the preference margin (i.e. the larger the original margin, the larger the elasticity of export supply). However, it is unable to shed much light on what extent other non-graduates may benefit through a substitution effect, which would also depend on their export supply elasticity.

4.1.2 Step two

Obviously, the export supply capacity of exporters will vary. More competitive producers will tend to have lower average unit prices, which means that any change in tariffs will lead to different percentage reductions in exporters' margins because of these characteristics. To try to account for these aspects, this second step in the analysis takes account of the trade performances of competitors.

The second step in estimating the trade effects of changes in graduation thresholds assumes that the reduction in imports from the graduates will be compensated for by increases in imports from other sources, based on their market share. There are competitors in all products. We thus calculate the resultant potential increase in demand for goods exported by non-graduates. We do this using a market share approach to estimate how other countries might increase their exports, proportionally (we assume a constant unit cross elasticity of demand of 1). Where there is more than one graduate for a given product, we assume that all graduated countries lose market share towards the non-graduates.

4.2 Country example: step one – how might demand respond to the price increase?

Table 4.1 presents a worked through example of such an analysis in the EU market. This analysis should focus on top competitors. These can be defined as significant exporters to the EU market: those that constitute 5 per cent or more of the total imports from extra-regional partners (in value terms). The graduating country is highlighted. The hypothetical tariff rate faced is 0 per cent. However, upon graduation, the rate will increase to 12 per cent *ad valorem*.

The product analysed is frozen shrimp, at the eight-digit level. Because GVC trade has become so fragmented in recent years, the lowest level of disaggregation should be used for the analysis in order to obtain the most accurate results.

Table 4.1 Estimating the potential for a trade shift

Main competitors (i.e. 5% plus share of total from extra)	Tariff		Average value (US$ million)	Share	3-year average unit value (US$/kg)	% of graduate's unit value
	Current	GSP				
All suppliers			1,452.2		4.9	91.3%
Ecuador	3.6%		290.7	20.0%	4.2	78.6%
Graduate	**0.0%**	**12%**	155.4	10.7%	5.7	105.7%
India	4.2%		152.4	10.5%	4.9	91.6%
Thailand	4.2%		128.8	8.9%	4.7	87.8%
Cambodia	0		119.3	8.2%	5.3	97.5%
Vietnam	12%		115.1	7.9%	5.4	100.0%
Madagascar	0		74.3	5.1%	8.4	155.4%
China	12%		28.4	2.0%	4.9	91.8%
Graduate	155.4	12.0%	−18.65			

Assuming that the price elasticity of demand is equal to 1, this means that any increase in price because of changes in graduation thresholds that increase tariffs results in an equal reduction in the quantity demanded (assuming unitary price elasticity).

The responsiveness of demand to the price increase induced by the 12 per cent increase in tariffs is calculated as follows:

=SUM (−1*155.4*12).

This results in a potential decline in demand of approximately US$19 million (US$18.65 million). However, this is derived from an assumed price responsiveness of demand. Changing the elasticity will obviously derive less of an effect. Nonetheless, the objective of this exercise is to alert policy-makers to the potential for a trade shift. In the following subsections, the competitiveness effects potentially induced by graduation are explored further, through the use of the market share approach.

Country example: step two – how might competitors' supplies increase?

This example refers to Ecuador, which is listed in the top row of Table 4.1. As can be seen from Table 4.1, Ecuador has a 20 per cent market share of the product being analysed: it accounts for 20 per cent of all EU imports of this product (frozen shrimp). It can also be seen that Ecuador exports a far larger value of this product than the hypothetical LDC graduate.

In order to estimate how the reduction of imports into the EU market from the LDC graduate might be distributed among other major players, we assume that the reduction is made up by imports from other sources,

Table 4.2 Taking account of market shares

Main competitors (i.e. 5% plus share of total from extra)	Tariff		Average value (US$ million)	Share	3-year average unit value 2008–10 (US$/kg)	% of graduate's unit value
	Current	GSP				
All suppliers			1,452.2		4.9	91.3%
Ecuador	3.6%		290.7	20.0 %	4.2	78.6%
Graduate	**0.0%**	**12%**	155.4	10.7 %	5.7	105.7%
Ecuador	**0.224**	4.181				

based on their market share. We thus calculate the resultant potential increase in demand for goods exported by non-graduates. We do this using a market share approach to estimate how other countries might increase their exports, proportionally (we assume a constant unit cross elasticity of demand of 1).

As a result of graduation from LDC status, the difference in tariffs faced between the graduate and Ecuador is 8.4 percentage points. We assume that the loss in competitiveness because of the tariff increase experienced by the LDC graduate is evenly distributed among competitors based on their market share. This means that we first:

- Subtract 20 per cent (market share of Ecuador) from (**1**–10.7 per cent (market share of the graduate)).

This gives us the figure of **0.224.** This figure is derived from the loss of market share by the graduate, because of the reduction in demand induced by the tariff rent loss, which is then made up by Ecuador.

We then distribute the estimated loss of US$18.65 million resulting from reduced demand (as obtained in Step 1) from the graduate to Ecuador, based on the market share approach. This means that demand for Ecuador's exports increase. The following steps are undertaken:

- multiply –US$18.65 million by 0.224
- the result is US$4.20 million.

This is the anticipated potential for imports from Ecuador to increase of the specific product analysed. Ecuador's exports are expected to increase by US$4.2 million because of the loss in competitiveness induced by graduation and loss of the tariff rent.

4.3 Points to remember

The advantage of this approach is its simplicity, and the information gained in this way already provides more detailed information than computable

general equilibrium (CGE) modelling studies, which may not cover the detail of product and country pairs. A potential drawback, however, is that the formula assumes constant import price elasticities, that is, that if the price of a given product declines all producers will adapt to this reduction in the same way, regardless of the different ways in which the goods have been produced.

This means that the approach is unable to account for circumstances in which a small increase in prices and the resultant trade effects could prompt the closure of an industry in one country, or for situations in which the structure of production within a country may afford a greater degree of flexibility to absorb price increases. Moreover, the approach assumes that the goods exported are homogeneous, rather than differentiated. It is precisely for these reasons that this information must be supplemented with an in-country assessment and consultation with actors in the sector.

The literature on empirical estimates of trade elasticities, as opposed to those derived using econometrics, suggests that the magnitude of these estimates can vary widely and in some cases the signs reported (positive or negative) can be contrary to theory.[2] These sorts of results can throw doubt on the whole procedure, although reliable estimates of export and import demand elasticities are required to determine quantity and price changes for products affected by changes in preferential trade regimes. For example, the findings of Goldstein and Khan (1978), who treated export demand and export supply elasticities separately, were challenged by Riedel (1988), who found high price elasticities and insignificant income elasticities, with market share and export growth being determined mainly by supply-side factors.

Broda et al. (2006) found that larger countries face less elastic export supply curves, which indicates that, on average, they have more market power than smaller countries, and that the higher a country's share in world imports in a particular product, the smaller the export supply elasticity it tends to face. Therefore, it is argued that an alternative approach to the analysis of trade elasticities from economically small countries is to invert the demand function and instead to consider the export supply function.[3] Such approaches could indeed be pursued, as soon as sensitive products have been identified.

The research approach advocated in this handbook is relatively straightforward and intuitive, and the data required are accessible. Therefore, it provides a good first step towards the identification and analysis of potential trade-related effects induced through graduation from LDC status. The potential trade effects that may arise from changes in graduation thresholds are transmitted via three pathways:

1. price effects arising from an increase in the price of goods caused by graduation, which increases tariffs;

2. this results in the potential substitution between exports from graduates and non-graduates;
3. dependent on market share elasticities and therefore the extent of price sensitivity.

However, a mixed methodology that also integrates the buyer's perspective must supplement this type of analysis in order to fully understand the value chain structure. Moreover, researchers must pay careful attention to the specific role of compound duties and changes in other rules, such as rules of origin, as a result of movement out of the LDC trade regime.

Notes

1 The following was adapted from Alexandraki and Lankes (2004).
2 For example, Blonigen and Wilson (1999) used a varying coefficient model and found variations of elasticities among sectors due to some home bias and the presence of foreign-owned affiliates.
3 Imbs and Mejean (2010) estimated both export and import elasticities using a constant elasticity of substitution (CES) demand system. The price elasticity of imports was used to estimate the degree of competition between domestic and foreign producers in the face of an adjustment in demand; the export elasticity was calculated as the response of trade quantities to an exogenous shift in relative prices. These authors argued that the aggregate effect of these is a trade elasticity that derives from the supply side of an economy, i.e. regardless of whether or not firms then decide to enter a given market.

References

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