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Trade Liberalization Indexes and the Evaluation of Preferential Trade Agreements. A Note on Ruiz Estrada

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Abstract

The author critically evaluates the proposal for a new analytical model aimed at evaluating *ex ante* the conditions to form free trade areas among groups of countries (the Trade Liberalization Evaluation –TLE- Methodology, see Ruiz Estrada, 2004) and points to a number of serious weaknesses. These are related to the regional dimension in the methodology, the economic sense and coherence of it, and to the mathematical and technical soundness of the proposal.

Trade Liberalization Indexes and the Evaluation of Preferential Trade Agreements. A Note on Ruiz Estrada

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1. Introduction

In a recent article by Ruiz Estrada (2004), the author proposes a new analytical tool (the Trade Liberalization Evaluation (TLE) Methodology) "to evaluate the possibility to start possible negotiations with future partners in the same region or different region […] [to] generate alternative programs and policies to improving the negotiation of FTAs among different countries" (Ruiz, 2004:1018). The tool pretends to go beyond mere cost/benefit analysis and "is oriented to monitoring the behavior of Free Trade Agreements from a new perspective. […] [i]t is based on the application of a group of indexes and graphs […] [these] can show the trend and stages of any Free Trade Area. […] It applies dynamic and general equilibrium analysis to show the past and present situations in the trade liberalization process of any country based on a set of indexes and graphs" (Ruiz, 2004:1018).

In this note, I would like to point to a number of weaknesses of the TLE methodology. My comments focus on three issues: section 2 investigates to what extent the methodology which is presented in the article displays a regional dimension; section 3 deals with the economic sense and coherence of the methodology; and section 4 deals with the mathematical and technical soundness of the proposal. Section 5 concludes.

2. The regional dimension in the analysis

According to the author, a regionalism approach is used in this paper (Ruiz, 2004:1016).[2] It is not clear what is meant by this. It is not clear why 'multilateralism' and 'regionalism' (old and new) are considered as different 'analytical approaches' at all, instead of (just) 'phenomena' or 'levels of analysis'. And, it should be justified why one of both approaches is preferred. References to the literature are needed in order to give substance to a conceptual framework constructed around the concept of regionalism.

[2] Although on p. 1018 it is said that "[t]he Trade Liberalization Evaluation Methodology is a measuring tool for studying regional integration from a global perspective".

From a trade angle, in the discussion on the relationships between globalization and regionalization, references to the building blocks-stumbling-blocks controversy are needed (see e.g. Bhagwati, 1993; Bhagwati and Panagariya, 1996; etc.).

From a broader (multi-dimensional) angle, the concept of new regionalism should be further developed and it should be made explicit how this new conceptual framework is connected to the TLE methodology. No references are found to the recent literature on new regionalism.[3] The typology of regionalism, proposed by the author (old versus new regionalism) is too simplistic. If 'old regionalism is applied in the development strategy known as Import Substitution Industrialization Strategy (ISI)', as sustained by the author (Ruiz, 2004:1017), does this mean that the EU integration model was based on such a strategy? Is the EU a good example of old regionalism?

The regional dimension seems also absent from the design of the presented analytical model itself (the TLE model). The model can be applied to any single country, any set of countries, or all countries. Although we agree with the author that this makes the model 'flexible', the model does not seem to be capable of evaluating the potential of regional trade integration. The application of the model at the regional level, implies an ex ante and ad hoc (exogenous) choice of countries ('candidates to enter an FTA'). In addition, no information is used about the economic relations among these countries. The model does not allow drawing conclusions about the optimal size of an FTA.

In the design of an evaluation model for FTAs, it would seem essential to include data and indicators on intra-regional trade intensities and their evolution (Kunimoto, 1977; Bowen, 1983; Vollrath, 1991; Freudenberg et al., 1998; Gaulier et al., 2006; Iapadre, 2006), on the one hand, and indicators on the intra-regional trade potential and the natural market characteristics of a region (Krugman, 1991; Kreinin and Plummer, 1994; Michaely, 1996), on the other.[4]

[3] See, for example, Hettne et al. (1999), Breslin et al. (2002) and Söderbaum and Shaw (2003).
[4] Without even mentioning openness indicators, convergence indicators and so on.

It would be useful also to contrast the model with existing policy supporting indicator systems for regional integration processes, such as the ones designed by the European Commission, the European Central Bank, UN Economic Commission for Africa, etc.[5]

3. The Economics of the TLE Methodology

An initial remark I would like to make is related to the statement that the TLE methodology "applies dynamic and general equilibrium analysis…" (Ruiz, 2004:1018). I would like to challenge this and label the exercise rather as comparative statics. Apart from this, I would like to raise a few other points related to the economic aspects of the methodology.

The calculation of the TLE index by production sector (Xi) is based on the binary data contained in the multi-input tariff database table. The values that are registered for the tariff barriers (per year and per item) depend on the definition of the fixed average tariff (FAT) and its interpretation. As far as we can see, the FAT has not been defined. Different options lay open: an arithmetic average per item, per country, regionally, globally, per year, etc. One cannot propose a methodology, leaving this question unanswered. This should be addressed by referring to the use that will be given to index numbers and graphs. If one wants to show on a graph how trade liberalization evolves in time, yearly averages should be compared, based on cross-section averaging. If, on the contrary, one wants to show how countries compare in their evolution towards more (or less) free trade, then time series averaging should be preferred.

Working with binary data is not necessary; I would recommend using the full information contained in the tariffs, otherwise a lot of information gets lost. Even for many NTBs tariff equivalents, or some other approximation of their height, are available (for example, from UNCTAD).

In the design of the database table and for the purpose of calculating Xi, the NTB categories ('cases') should be defined. Do they refer to a particular type of NTB or to a particular tariff item/line (type of good or service)?

[5] See, for example, De Lombaerde and Van Langenhove (2006).

The compression of all the information contained in the multi-input database table in one single figure (Xi) implies that the evolution over time disappears. With equal tariff averages, countries moving towards more protectionism or freer trade might show the same index, but the policy implications are completely opposed.

One should be very prudent when comparing Xi for the four sectors. The structure of trade barriers in place for goods is very different from the structure in place for services (where tariffs are mostly irrelevant). The implicit weighting of tariff and non-tariff barriers in the TLE methodology may steer Xi differentials in either direction.

It is also not clear why it is useful to work with these four broad sectors (agriculture, heavy industry, light industry, services). A more disaggregated approach would seem more appropriate.

The interpretation of Xi and of the Area of Coverage of Trade Liberalisation (ACTL) are both problematic. This is linked to the behaviour of the indexes for extreme values (see below). The values for each ACTLi individually do not reveal any economic sense, since they depend not only on Xi but systematically also on Xi+1, which has no relation at all with sector i.

The final step in the TLE methodology is the calculation of the Trade Liberalisation Stage (TLS) index and its graphical representation. This index is essentially identical to a weighted average of protection levels for a particular economy; its novelty remains thus to be explained. A question that immediately comes up is why the a, b, c and d parameters receive ad hoc values, instead of, for example, the economic weights of the corresponding sectors or the weights of the affected trade flows.

The thresholds that are presented in order to distinguish between under-developed, developing and developed stages of trade liberalization are completely arbitrary and should therefore be checked against real world data.

4. The Mathematics of the TLE Methodology

A number of comments can be made on the technical and mathematical aspects of the methodology.

Concerning the multi-input tariff database, and apart from the question about the novelty of such a table (Ruiz, 2004:1020), I would like to make the following points:

- In order to derive the actual tariff situation (ATS), two options seem to be available: a (horizontal) arithmetic sum (or average) using the values for item i for years 1..N, or a (horizontal) logical operation (ATS = 1 if there is at least one non-zero observation). Arguments can be constructed for both options, but a choice should be made.
- It is not necessary to transform all variables in binary ones in order to give them equal weights (supposed one would want to give them equal weights). On the contrary, a lot of relevant information on the importance of the trade barriers is lost by doing so (see also above), and marginally important barriers are counted in the same way as non-marginal barriers.

The calculation of the TLE index by production sector (Xi) is based on the following expression (Ruiz, 2004:1020):

$$Xi = \frac{\sum TYi - \sum ATS}{\sum TYi} * 100$$

where ATS is the actual tariff situation.

Following the logic of the model and of the multi-input tariff database table with its binary data, we should be able to write:

$$\sum TYi = n.N$$

where n is the number of items and N is the number of years.

As a positive point, the expression for Xi generates an indicator which is easily readable with recognizable upper and lower bounds:

$$0 \leq Xi \leq 1(100\%)$$

However when looking at the extreme values of Xi, the picture becomes less clear. The starting point is the fact that the binary data in the multi-input tariff database table are equal to *'0'* when a trade barrier is in place, and *'1'* when it is absent. In the extreme case of totally free trade (all binary digits equal to 1), Xi is equal to 0 (0%):
Xi = (n.N – n.N)/n.N * 100
In the other extreme case of a completely protected domestic market (all binary digits equal to 0), Xi is equal to 1 (100%):
Xi = (n.N – 0)/n.N * 100

This makes both the multi-input tariff database and the trade liberalization index counterintuitive. The tariff database shows zeros when a tariff or non-tariff barrier exists, and the index shows:

$$trade\_liberalisation \uparrow \Rightarrow Xi \downarrow$$

This is not what one would expect from an indicator of trade liberalization (Xi).

We reiterate also our remark on the use of the FAT (see above). The value of each binary digit in the table is completely dependent on the definition of the FAT. Given the fact that there is apparently no unique definition at hand, it makes Xi also – technically speaking- a volatile variable. And the (valuable) information on the distances between actual tariffs and FATs is completely lost.

The author also presents an expression for the sum of Xi over all *i*:

$$GD = \sum_{i=1}^{4} Xi = \frac{\sum ASi * 100}{\sum TPRi}$$

However, GD is not defined, AS should be equal to ATS, and one should sum over all *i* on the right-hand side. In addition, ΣTPRi (total possible results) should be equal to *n.N*, so why introduce another variable? The expression is not coherent either with the one for Xi (see above), although the implied formula for Xi now does not suffer from the counterintuitive character of the indicator.

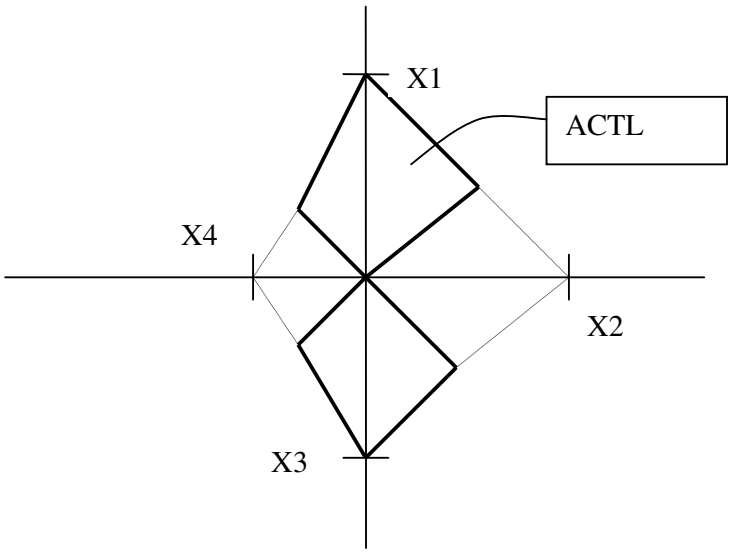
Turning now to the calculation of the Area of Coverage of Trade Liberalization (ACTL)[6] index, this seems –at first sight- unnecessarily complicated and incorrect (Ruiz, 2004:1025).[7] The surface which is calculated is equal to:

$$ACTL = (X_1 + X_3) * (X_2 + X_4) / 2$$

In the formulas on p. 1025, the author divides by 4 instead of by 2 (which would boil down to calculating the surfaces of four triangles). This has the advantage that the ACTL index has a maximum value of 1 (with $0 \leq Xi \leq 1$) but it is not coherent with the graphical representation of the ACTL. Applying the author's formulas, the ACTL is only half of the depicted surface (figure 1).

Figure 1: ACTL surface with upper-bound equal to 1.

[6] I suppose that ACTL = ACRI. ACRI is not defined by the author.
[7] In addition, the calculation method suggested by the author is only correct with orthogonal axes, which is not the case in figures 2, 3 and 4.



In order to evaluate the ACTL it is useful to look at the behaviour of the indicator in border cases (maximum and minimum values). The problem here seems to be related to the minimum value of the index (0). This value is not necessarily reached when all Xi values are equal to 0, which would be logical, but it can be reached when minimum two values are equal to 0. However, this is not independent from the organization of the graph (i.e. the position of Xi on the axes). Let us consider a numerical example:

X1 = 1 (maximum value)
X2 = 0,5
X3 = 0 (minimum value)
X4 = 0 (minimum value)

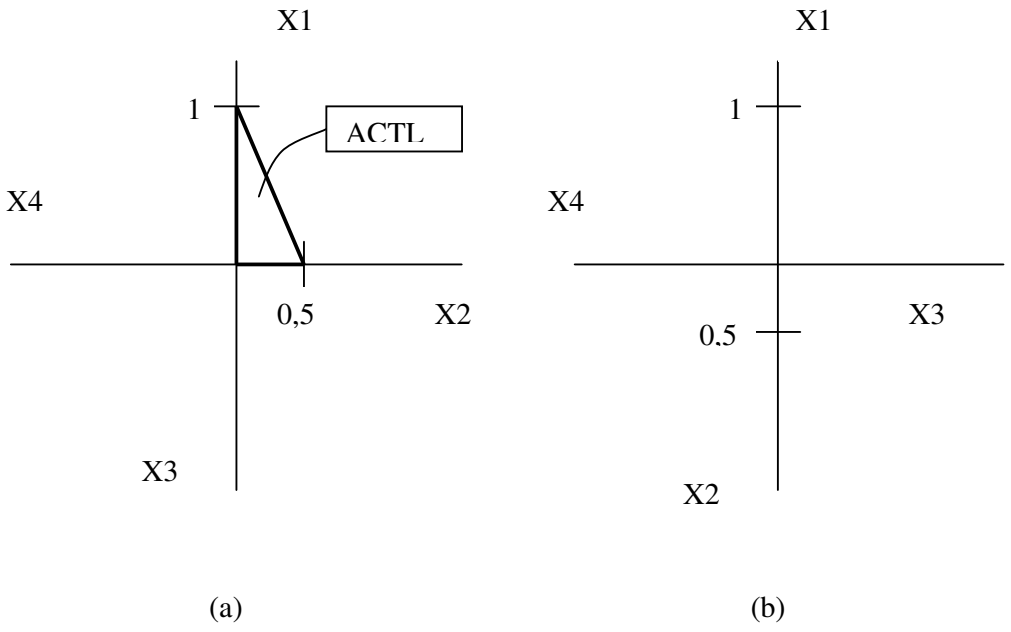
The surface is then calculated as follows (see figure 2a):

$$ACTL = \frac{(X_1 + X_3) * (X_2 + X_4)}{2} = 0{,}25$$

(or: 0,125 if divided by 4)

But if X2 and X3 are switched (permuted), given the fact that the relative location of the heavy and light industries on the graph is completely irrelevant for our purpose, we now obtain a value of 0 (the minimum value of the indicator) (see figure 2b). The minimum value is thus reached because of a –for the rest- completely irrelevant choice made by the analyst.

Figure 2: Graphical example of ACTL with two zero values for Xi and permutation of axes



5. Conclusions

As we have shown in the previous sections, the proposal for a new analytical model in order to evaluate ex ante the conditions to form free trade areas (the TLE methodology) displays a number of serious weaknesses. Many of these are related to an insufficient connection to the existing literature and available indicators. Whereas the author sustains that the study of regional integration should not focus merely on cost/benefit analysis, it seems that he presents rather less than more. Although it is completely justified to present theoretical constructions of indicators, for a model that pretends to be policy-relevant, it is worth looking at the issues of variable selection, data availability and comparability.

From an economic point of view, it has been shown that the calculation of the TLS indicator boils down to calculating an arithmetic average of protection levels for a particular economy. From a mathematical point of view, the TLE methodology reveals a series of inconsistencies and errors.

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