



Measures of trade openness using CGE analysis

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Abstract

Using a computable general equilibrium (CGE) model of the world economy, a group of measures of trade openness are derived which lie on the unit interval and have a welfare interpretation. They are transformations of the Uniform Tariff Equivalent and have the property that national welfare increases monotonically with the measure of openness. An alternative measure is the ratio of the volume of trade in a restricted trade situation to that under the free trade situation. These measures are calculated for 14 regions of the world economy, using the Global Trade Analysis Project (GTAP) model. We find close correspondence between all the CGE measures, but the ranking of countries according to these measures differs substantially from that of the actual trade ratios. © 2002 Society for Policy Modeling. Published by Elsevier Science Inc. All rights reserved.

JEL classification: B41; C68; F13; F14

Keywords: Trade openness; CGE analysis; GTAP; Uniform Tariff Equivalent

1. Existing measures of openness

Measures of openness have long been of interest to international economists because of the debate about protection and the level of national output or national welfare. This interest has been renewed with the development of New Growth Theory, which posits a relationship between openness and the rate of growth of national output (see Edwards, 1993; Harrison, 1995; Pritchett, 1996). However,

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empirical studies of these relationships have been hampered by the absence of a suitable theoretically derived measure of openness.

The common measure is the ratio of actual exports plus imports to GNP or GDP. One difficulty with this measure is that the figures in the numerator and denominator are in current prices. Over time, the prices of goods and services traded internationally and those of goods and services produced domestically may diverge because of changes in the exchange rate or other relative price movements. A second and more substantial problem is that this measure of openness depends on two quite distinct sets of factors: One set is the resource endowments, country size, tastes, technology, and other determinants of comparative advantage, and the other set is the levels of trade restrictions. The former are nonpolicy variables, whereas the latter are policy variables. A country may have a high trade ratio because it is small or has resources that are valuable to other countries or perhaps because its residents have a preference for foreign goods rather than because it has low restrictions on trade with other countries.

Some attempts have been made to separate these two sets of factors. One approach is to use deviations of actual from predicted trade ratios. A model can be used to predict the pattern and volume of trade and then to compare the actual and the predicted trade ratios (Leamer, 1988). The model could be a gravity type model which use variables such as country size and distance or a theoretical trade model. This approach does not use trade policy variables as explanators of trade patterns or deviations from the predicted pattern.

It is the level of trade restrictions that is the concern of policymakers and analysts. The appropriate approach is to construct some measure that is an average of the levels of trade restrictions on different traded commodities. However, there is a fundamental obstacle to constructing summary statistics of the average level of trade restrictions in an economy. There has long been argument among trade theorists about the appropriate weights to attach to the level of trade restrictions in each industry group. This is an index number problem.

Section 2 presents alternative indices that use computable general equilibrium (CGE) analysis. The CGE model used is the Global Trade Analysis Project (GTAP) model of the world economy. CGE analysis has the advantage that it captures economy-wide effects of changing restrictions on trade. Section 3 reports calculations of these indices. Some conclusions are reported in Section 4.

2. Measures of openness using CGE analysis

The problem of calculating an average of differentiated levels of assistance is a particularly difficult index number problem. We require a scalar index that aggregates the levels of assistance to the producers of all commodities. It is an index number for the whole economy and one set in a general equilibrium context.

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