# COMMENTS ON:

# EVALUATING THE ROBUSTNESS OF TRADE RESTRICTIVENESS INDICES: SOME GOOD AND BAD NEWS

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**Comments on Tokarick's TRI Robustness Paper**

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The TRI concept is model free but its application depends on specifying a model and thus taking a stand on economic structure that is not knowable with certainty. Steve Tokarick's estimates of the robustness of the TRI with respect to model specification provide a useful cautionary note for the future use of TRI measures to rank the trade restricitiveness of countries in panel data. I will make a couple of remarks about this below but basically agree with the message.

I find Steve's concern with what he calls the robustness of the TRI with respect to economic growth to be a misinterpretation. I will show below that in his main concern he has in fact defined a different concept than the TRI. I will call it the Globalization Index of Growth. It may be useful for economic analysis but I cannot quite see for what. In contrast, his paper also addresses a subtle issue which arises with the interpretation of the TRI in a growing economy and shows that the TRI is relatively insensitive to growth at least in his simulations.

## 1. Robustness to Model Specification

Start with the initial definition of the TRI, the uniform deflator that, applied to domestic prices in situation 1 (superscriped 1, a situation that could be free trade), yields just as much welfare $u^0$ as the initial trade policy with prices superscripted 0. (Notice that this form is different from that used by Tokarick. His form is taken from an early version of our work; we later switched to the form shown here.)

$$B(p^1_{M1}/\Delta, p^1_{M2}/\Delta, u^0, v^0) = B(p^0_{M1}, p^0_{M2}, u^0, v^0). \tag{1.1}$$

Denote $p^\Delta_{Mi} = p^1_{Mi}/\Delta$. The implicit definition of the TRI above can be differentiated with respect to changes in the initial trade policy 0 to form the rate of change

$$\frac{d\Delta}{\Delta} = \left[\frac{B^\Delta_u}{B^0_u}\frac{B^0_1 p^0_{M1} + B^0_2 p^0_{M2}}{B^\Delta_1 p^\Delta_{M1} + B^\Delta_2 p^\Delta_{M2}}\right]\frac{B^0_1 dp^0_{M1} + B^0_2 dp^0_{M2}}{B^0_1 p^0_{M1} + B^0_2 p^0_{M2}}.$$

The square bracket term is an adjustment coefficient reflecting the fact that the derivatives of $B$ are evaluated at two different points. For small changes about the same initial situation the square bracket term is equal to one. The rate of

change equation utilizes the equilibrium condition about point 0: $dB = 0 \Rightarrow du^0 = -\left(B_1^0 dp_{M1}^0 + B_2^0 dp_{M2}^0\right)/B_u^0$.

Nontraded goods (and factors) have prices determined in the background (by general equilibrium market clearing conditions) in this setup. Depending on the CGE model used, these background price movements may be quite important in determining the value of the TRI.

Tokarick alters the CGE model used by Anderson and Neary by removing the nontraded final good and adding 2 more factors of production to form a 3 good (2 imports, one export) model. Then the 3 factor model is broken down into a mobile factors (long run) and specific factors (short run) model in which one of the factors is not intersectorally mobile. This difference in specification matters to the size of the TRI estimates, while elasticities of substiution in production do not matter much.

My reaction on reading the results was that I was surprised that specification did not matter more — I am not sure how surprised I should be but the numbers did not strike me as being as large as I anticipated. I think more research on these lines is indicated and especially, when data becomes available, a study of robustness to specification when the criterion is the ranking of countries or years by restrictiveness under different specifications. This ranking study will of course only be possible when the TRI calculation program is ready to process large blocks of country data.

## 2. Growth and the Globalization Index

Now suppose that the initial situation changes due to economic growth with unchanging trade policies and unchanging terms of trade. We can form an index which measures the trade policy equivalent of the economic growth, as follows.

Now consider an initial situation from which there is economic growth, with, for simplicity, no change in trade policy. The change in $v$ gives rise to a change in $u^0$. One could ask what trade policy change would be equivalent to the change in $v$ in its effect on welfare. Set the situation 1 prices of tariff-ridden goods at the situation 0 values, maintain $v$ at its initial value on the left hand side of (1.1) and alter $\Delta$ such that the change in $u$ is equal to that generated by the change in $v$. Differentiating yields

$$\frac{d\Delta}{\Delta} = \left[\frac{B_u^\Delta}{B_u^0}\right] \frac{B_v^0 dv^0}{B_1^\Delta p_{M1}^\Delta + B_2^\Delta p_{M2}^\Delta}.$$

This expression is quite similar to what Tokarick calls the TRI, but it clearly has a different economic logic. It gives a trade policy equivalent to the economic growth due to domestic resource growth.

Interpretation of the TRI in a growing economy does, however, raise a subtle issue. Suppose we apply (1.1) in the situation where 1 refers to free trade prices, and 0 refers to a successsion of years of data for a single country. The model generates a series of TRI estimates, one for each year and in each case having the interpretation that the uniform tariff equivalent $1/\Delta - 1$ would yield the same real income as does the actual tariff vector for that year. An unchanging trade policy would in this example ordinarily produce changing TRI estimates as the changing $v^0$ and $u^0$ would generate changing implicit weights. Our position is that the change in the TRI is economically relevant and should be part of a proper index that is motivated by real income equivalence. Intuitively, if economic structure shifts such that import demand vector changes, as does the substitution effects matrix, we should expect that the welfare equivalent uniform tariff should change.

Formally, the issue is addressed by differentiating the right hand side of (1.1) with respect to $u, v$ to solve for the equilibrium change in real income $du^0$. Then totally differentiate the left hand side of (1.1) and substitute the equilibrium change in $du^0$ from the previous operation. The resulting proportionate change in $\Delta$ is given by

$$\frac{d\Delta}{\Delta} = \frac{[B_v^\Delta - (B_u^\Delta/B_u^0)B_v^0]dv^0}{B_1^\Delta p_{M1}^\Delta + B_2^\Delta p_{M2}^\Delta}.$$

For small trade policies and changes, the coefficient $(B_u^\Delta/B_u^0)$ is equal to one and the square bracket term is equal to zero. For discrete trade policies and discrete changes, the influence of growth on the TRI measure is discrete and may be large. Tokarick's simulations show, however, that the influence of growth is rather small: trade policy evaluation is rather insensitive with respect to economic growth.One case where implicit weights would not change would be neutral economic growth; scalar growth in the vector $v$ and real income $u$ in a constant returns economy. This is true if neutral growth is understood to include an equiproportionate increase in the external deficit or surplus. (Proof follows from the scalar increase in the GDP and expenditure functions and hence the excess demands for the distorted goods, all raising the balance of trade function by the scalar increase.)

A similar issue arises with changes in the international prices, the terms of trade. The TRI for each year should in our opinion be based on the conditions

of that year, domestically and internationally.