Journal of Comparative Economics 42 (2014) 994–1006

Contents lists available at ScienceDirect

Journal of Comparative Economics

journal homepage: www.elsevier.com/locate/jce

Measuring China's trade liberalization: A generalized measure of trade restrictiveness index

Bo Chen [a,*], Hong Ma [b], Yuan Xu [b]

[a] School of International Business Administration, SHUFE, China
[b] School of Economics and Management, Tsinghua University, China

ARTICLE INFO

Article history:
Received 13 May 2013
Revised 7 March 2014
Available online 26 March 2014

JEL classification:
F13
F14

Keywords:
Trade restrictiveness
Trade liberalization
WTO
China

ABSTRACT

Chen, Bo, Ma, Hong, and Xu, Yuan—Measuring China's trade liberalization: A generalized measure of trade restrictiveness index

Neither simple average nor import-weighted average tariff indexes are ideal measures of tariff barriers. In this paper, we propose a generalized trade restrictiveness index (GTRI) that extends Feenstra's (1995) tariff restrictiveness index (TRI) by relaxing the crucial assumption of a small open economy. We show that the GTRI can be measured using import tariffs, import shares, and the corresponding import and foreign export elasticities. We then apply the GTRI to examine how trade restrictiveness has evolved in China from 1997 to 2008, the period in which China entered the WTO. The GTRI indicates a higher level of protection than simple and import-weighted averages, but lower than the TRI. We further show a negative correlation between tariffs and product export supply elasticity, indicating that strategic trade policy was being pursued prior to China's WTO accession. Finally, we calculate the welfare loss and terms-of-trade gain due to tariff protection. The overall tariff pass-through increases from around 28% to almost 47% because of the WTO. *Journal of Comparative Economics* **42** (4) (2014) 994–1006. School of International Business Administration, SHUFE, China; School of Economics and Management, Tsinghua University, China.

1. Introduction

A precise measure of trade restrictiveness is essential in order for researchers and policy makers to understand cross-country differences in trade protectionism, as well as countries' progress in trade liberalization. Because tariff rates vary substantially across thousands of imported products, we need an appropriate method of aggregation. A simple idea, as proposed in the pioneering work of Anderson and Neary (1994, 1996), is to find a uniform tariff that applies to all imported products such that it can achieve the same level of welfare as product-specific tariffs. Such a measure is conventionally called a trade restrictiveness index (TRI).

This paper proposes a generalized trade restrictiveness index (GTRI) that extends the conventional TRI by relaxing the "small open economy" assumption. We stress that an importer may face an upward-sloping supply curve and exert market

* Corresponding author. Fax: +86 21 6590 7458.
E-mail addresses: chen.bo@shufe.edu.cn (B. Chen), mahong@sem.tsinghua.edu.cn (H. Ma), xuyuan@sem.tsinghua.edu.cn (Y. Xu).

http://dx.doi.org/10.1016/j.jce.2014.03.003
0147-5967/

power accordingly. The measure is then applied to China's trade liberalization as indicated by the country's tariff reductions during and after its entry into the WTO.[1]

Our model builds on Feenstra (1995), who provides a simplification to the computable general equilibrium framework of Anderson and Neary. Feenstra (1995) shows that TRI can be expressed as a weighted average of the squared values of individual tariffs and the weights reflect import shares and demand elasticities. This approach is adopted by Kee et al. (2008), who calculate the TRI of 88 countries. Though widely adopted, TRI does not consider the responses of foreign suppliers. Thus it is assumed that the tariff is completely passed through onto domestic buyers.

In this paper, we define the GTRI as a uniform tariff that generates the same aggregate deadweight loss to the world as a whole (i.e. domestic importers and foreign exporters) as product-specific tariffs. From the viewpoint of the WTO, the impact of a country's tariff barrier is not confined only to its domestic economy, due to the prevalence of incomplete tariff pass-through. The GTRI corrects the incomplete tariff pass-through problem ignored in the TRI: a tariff distorts not only the behavior of the domestic importers but also that of the foreign exporters. We show that the GTRI can be measured using import tariffs, import shares, and the corresponding harmonic means of foreign export supply and domestic import demand elasticities. Therefore, given the harmonic mean structure, the TRI is indeed a special case of the GTRI when the importing country is small and hence the foreign export supply facing it is infinitely elastic.[2]

Empirically, this paper complements existing literature by applying the GTRI to the world's largest developing country, China. The rise of China and its opening-up to global trade is one of the most important and influential event that has been ongoing for more than two decades. There is a large literature talking about the impact of the liberalization (Branstetter and Lardy, 2008). However, little attention has been paid to the progress of the liberalization itself. How much more liberalized is China after its accession to the WTO compared with before the accession? Has the WTO effectively reduced strategic protection? We show in this paper that neither conventional measures (i.e. the simple average or import-weighted average of tariffs) nor TRI are ideal measures for answering those questions. The GTRI that takes into account the price responsiveness and terms of trade effect is a better alternative.

We examine how trade restrictiveness has evolved in China from 1997 to 2008, a period covering China's entry into the WTO in 2001. The GTRI indicates a higher level of protection than simple and import-weighted averages, but lower than the TRI. For example, in 2000, the simple and weighted averages of tariffs were 16.95 and 14.68 percentage points, respectively, whereas the GTRI measure was higher (18.75), and the TRI measure was even higher at 27.53. Furthermore, using the GTRI, the tariff reduction after China's entry into the WTO is more pronounced than when measured using simple average tariff rates. In terms of tariff reduction, the GTRI moves closely with the import-weighted average of tariffs, particularly during the period following China's WTO accession. However, at the sector-level, we show that the two indexes do not always display similar patterns. Existing research provides cross-country measures of trade barriers instead of a time-series evolution of trade policies, with a notable exception by Irwin (2010).[3] Our paper therefore complements the literature in providing a country study over an important reform period (the WTO entry period).

Furthermore, the GTRI accounts for tariff distortions on foreign suppliers. It thus provides interesting implications to the literature on international trade policy. Following Kee et al. (2008), we divide the GTRI into the average tariff, the variance of tariffs, and the covariance between tariffs and the harmonic means of the trade (i.e. foreign export and domestic import) elasticities. We find that the covariance is large and negative before WTO entry, along with finding that tariffs are positively correlated with import demand elasticities. Hence we can infer that higher tariffs may be targeted at those products with a lower import/export elasticity ratio (i.e. smaller tariff pass-through). Recent literature on trade policy has emphasized the value of market power in determining the optimal import tariff (Broda et al., 2008) as well as the effect of market power on a country's trade negotiations (Ludema and Maria Mayda, 2010). Bagwell and Staiger (2011) demonstrated that negotiated tariff cuts required for entry into the WTO depend on pre-negotiation tariffs, import volumes and prices, and trade elasticities. Our findings can be viewed as supporting evidence for strategic tariff policies.

Finally, the GTRI has important implications for welfare and terms of trade. As in Kee et al. (2008), we construct a linear approximation for the deadweight loss (DWL) associated with tariff structure. The DWL to importers and to exporters both decline substantially after China's WTO entry. We also find that the overall tariff pass-through increases from around 28% to more than 47% due to the WTO. We further quantify the improving terms of trade situation to foreign exporters during our sample period.

This paper contributes to a growing body of literature discussing the measurement of trade restrictiveness (Cipollina and Salvatici, 2008; Coughlin, 2010) and studying the welfare impact of tariff reform using new measures (Falvey and Kreickemeier, 2009).[4] Kee et al. (2008) provide estimates of TRI for a cross-section of 88 countries while Irwin (2010) measures the changes in TRI for the US over the course of a century, from 1867 to 1961. Chen and Ma (2012a,b) adopted Kee et al.'s

[1] Calculating non-tariff measures is also an important direction, which falls out of the scope of this paper. Kee et al. (2009) provide estimates for ad-valorem equivalents of non-tariff barriers.

[2] It is true, however, that other alternative measures of trade restrictiveness are available. For example, Anderson and Neary (2003) propose a uniform tariff equivalent (MTRI) that would leave aggregate imports unchanged at their current level as the existing structure of product-specific tariffs. Kee et al. (2009) propose the so called "Market Access Overall TRI", which is a uniform tariff imposed on the exporting country and which achieves the same level of exports as the current tariff structure faced by this exporting country.

[3] Irwin (2010) provides an annual measure of TRI for the United States over nearly a century.

[4] Anderson and Neary (2005) provide a detailed and excellent review of their work.