Tariff escalation, export shares and economy-wide welfare: A computable general equilibrium approach

G. Badri Narayanan a,⁎, Sangeetha Khorana b

a Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University, 403 W State Street, West Lafayette, IN 47907, United States
b University of Keele, United Kingdom

1. Introduction

Negotiations to liberalise agriculture through modalities on agriculture market access (AMA) reflect trade liberalisation effort by World Trade Organization (WTO) member countries since the launch of the Doha round in 2001. The AMA negotiations which explicitly acknowledge tariff escalation (TE) as a relevant issue for developing countries as is the associated concept of effective protection, has been a long-recognized issue in trade policy literature (Anderson, 1958; Balassa, 1965; Greenaway and Milner, 2003, Ruffer and Swinbank, 2003). Tariff escalation occurs when tariffs on downstream imports tend to be higher than tariffs on upstream imports such that the level of protection offered downstream, where goods are typically more processed, exceeds that upstream for less-processed intermediate goods. This is a typical problem faced by agricultural commodity exporters, who recognise that the imposition of higher import duties on processed products than on input commodities is a form of protection that impedes developing countries’ efforts to move away from the production of primary agricultural products to value-added exports (Mathews, 1994). TE creates a distinct disincentive for export diversification by developing countries that do not employ resources towards higher stages of agricultural processing (Antimiani et al., 2009; Clarke and Bruce, 2006). The disadvantage is further magnified by low world prices of primary commodities, which increases the burden on balance of payments. In this manner, TE hinders the development and expansion of processing industries in the developing countries by restricting trade-induced industrialisation, and fosters specialisation in primary exports whilst excluding processed products (Beghin and Aksoy, 2003; Sharma, 2006). Further, the deterioration in terms of trade of developing countries is attributed mainly to declining shares of these countries in agricultural trade and price volatility of agricultural products, which indicates that TE is a significant issue in agricultural trade (Dollar, 1992; FAO, 2004; Laird and Yeats, 1987; Valdes, 1987).
Studies report evidence of TE in both developed and developing countries (Berkum et al., 2001; OECD, 1996, 1997; Page, 1994; Safadi and Yeats, 1993; UNCTAD, 2003; USDA, 2001), with higher tariffs in developing than in developed countries (Laird and Yeats, 1987). Post-Uruguay Round studies, on the incidence of TE, find higher TE in bound than in applied tariffs (Elamin and Khaira, 2004), in particular, for the products on which preferential tariff applies (Bureau et al., 2007), even in developed countries (Lindland, 1997) in sectors such as rice (Wailes et al., 2004), meat, sugar, fruit, coffee, vegetable oils, beef, eggs, cereal products, tobacco, cocoa, skins, leather, dairy, sugar and concentrated fruit juice (Berkum, 2009; Cernat et al., 2002; FAO, 2004). For cotton textiles, TE is probably the most important distortion (Cable, 1987), particularly after the removal of MFA quotas in 2005. The recently agreed upon Framework of Modalities (on agriculture) elaborates on the general principle for reducing TE (Laborde and Martin, 2010; WTO, 2008), but the countries are still hesitant to fully eliminate TE.

Different modelling approaches have been used to analyse the political-economic causes of TE (Cadot et al., 2004; Khasnobis-Guha, 2003), with some focusing on the consequences in partial equilibrium (Wainio and Vanzetti, 2008), single-country CGE frameworks (Lee et al., 2008) and multi-country CGE models (Rae and Josling, 2003). Recent studies, focussing on the understanding and measurement of TE, express concerns and highlight how TE impedes the development of processing industries, particularly with regard to the agriculture and food sectors (Antinmi et al., 2011; McCorriston and Sheldon, 2011). Bouët et al. (2012) design a stylized theoretical world partial equilibrium model of the oilseed value chain to study the effect of TE on oilseeds. The model shows that implementing a tax on exports of raw agricultural commodity in a developing country is a rational response to tariff escalation in the developed country when the objective of the government is the sum of profits in the processing sector, farmers’ surplus, final consumers’ surplus in the processed sector, and public revenues. Despite a unanimous agreement among all studies about the detrimental effects of TE, none have analysed sectors with contrasting observed TE effects on export shares in a multi-country CGE framework. This paper attempts to fill this gap in the literature, by employing this approach to examine the impact of TE on the competitiveness and export shares of coffee products and cotton textiles. Coffee and cotton sectors both have TE but are contrasting cases — developing countries are competitive in cotton textiles but this is not the case in coffee products. This poses a policy related question as to whether or not TE deters competitiveness of sectors producing processed commodities. Using GTAP 8 Data Base, further supplemented by various other international data sources on cotton and coffee, as well as a modified version of GTAP model, the paper analyses economy-wide trade, export-shares and welfare implications of TE elimination on coffee and cotton sectors. The paper is structured as follows: Section 2 discusses the modelling framework, data sources, and simulation scenarios. Section 3 reports the results. Section 4 concludes.

2. Data and modelling framework employed

We prefer a global CGE approach for this paper, for a methodological reason. Given that our focus is on counterfactual “what-if” scenarios of removal of TE, simulation modelling is preferred over econometric modelling. In a partial equilibrium theoretical set-up, it is already well-established in the literature that TE results in less competitive processing sectors. It is likely that such results are obvious, given the abstraction from the economy-wide effects, which are well-captured in CGE models. Our aim in this paper is to understand the links between TE and export shares, which are best explored in a data-intensive economy-wide framework incorporating the relationships between different sectors and countries. Such a global framework is offered by the GTAP model and database. We begin with the standard GTAP versions of the model and database and make modifications to understand the central topics of this paper.

2.1. Description of the data set

This paper uses the GTAP model and dataset to capture international data and linkages between sectors and countries. The base data is GTAP 8 Data Base 2004 version. Given that sectoral details on coffee and cotton are not available in the base dataset, we draw on UN Commodity Statistics4; International Coffee Organisation (ICO)5; International Cotton Advisory Committee (ICAC)6; and country-specific production data sources e.g. China7, India8, USA9 and Australia10 for the value chain of cotton and coffee products. Disaggregated trade and tariff data for these sectors are obtained by using the Tariff Aggregation and Simulation Tool for Economists (TASTE) (developed by Horridge and Laborde, 2008). Using available information, the sectors in the standard GTAP 8 Data Base 2004 version are split as under:

1. Other crops (GTAP sector “ocr”):
   i) Coffee
   ii) Other crops (OthOCR)

2. Plant-based fibres (pfb):
   i) Cotton
   ii) Other fibres (OthPFB)

3. Other food products (ofd):
   i) Coffee-products (CofProd)
   ii) Other food products (OthOFD)

4. Textiles (tex):
   i) Cotton textiles (CotTex)
   ii) Other textiles (OthTex),

All other sectors in the dataset are aggregated to the following:

1. Other agriculture
2. Wearing apparel
3. Other manufacturing
4. Services.

To further disaggregate the GTAP sectors into those related to cotton and coffee, and to compute trade and bound tariff rates at the modified HS4 level, GTAP data is supplemented with data from Horridge and Laborde (2008). With this information, it is possible to employ the PE nested GTAP model developed by Narayanan et al. (2010), but given that this framework ignores the input–output (I–O) linkages between the disaggregated sub-sectors (above), we look for information on production and assume a simple and realistic I–O structure within the sub-
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