Economic Modelling 41 (2014) 109–118

Contents lists available at ScienceDirect

Economic Modelling

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

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

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ARTICLE INFO

Article history:
Accepted 2 May 2014
Available online 24 May 2014

Keywords:
Agriculture
Trade
Tariff escalation
CGE
Textiles
Cotton
Coffee

ABSTRACT

The current literature suggests that tariff escalation (TE) lowers the competitiveness of processing sectors. Coffee and cotton are agricultural products that face the problem of TE in developing countries, where we observe low global coffee product export shares but high global cotton textile export shares, posing a question on TE's impact on competitiveness. This paper employs a computable generalised equilibrium (CGE) modelling approach to examine the impact of TE on export shares of processed coffee and cotton textiles. We modify the standard GTAP (global trade analysis project) model to solve for global export shares and simulate the impact of eliminating TE on coffee and cotton to analyse economy-wide trade and welfare implications. Results show that TE has mixed effects on export shares, depending on the initial economic structure. Findings reveal that the elimination of TE on cotton and coffee may generate potential global gains of over US$ 0.7 billion, mainly from the cotton sector. Given the relative size of these sectors in global agriculture, the magnitude of gains is not small. This underlines the need for the policy-makers to examine, address and evaluate the prevalence of TE on a sectoral basis in ongoing WTO negotiations.

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, 1998; 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). Research also shows that TE provides effective protection that leads developing countries to adopt import-substitution strategies, which retard growth and export-diversification in agricultural and manufacturing sectors (Balassa, 1968; GATT, 1982; Laird and Yeats, 1987; Verkat, 2001). 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).

☆ The authors thank Professors Peter Midmore and David Vanzetti for their detailed comments. Feedback from the seminar participants at 2011 AAEA and NAREA joint annual meeting and 2011 IATRC conference is also acknowledged. All errors remain those of the authors.

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http://dx.doi.org/10.1016/j.econmod.2014.05.006
0264-9993/

Studies report evidence of TE in both developed and developing countries (Burman 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)[1] and multi-country CGE models (Rae and Josling, 2003).[2] 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 (Antimiani et al., 2011; McCorriston and Sheldon, 2011). Bouët et al. (2012) develop 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 impacts 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 GTAOP 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.[3] Given that sectoral details on coffee and cotton are not available in the base dataset, we draw on UN Commodity Statistics[4]; International Coffee Organisation (ICO)[5]; International Cotton Advisory Committee (ICAC) [6]; and, country-specific production data sources e.g. China,[7] India,[8] USA[9] and Australia[10] 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-

[1] This distinguishes 160 sectors, 6 types of labour, 8 types of margins and 160 commodities complied from the Taiwanese I–O table for 2004.

[2] This uses the GTAP model. Developed countries included in aggregation include Australia, New Zealand, Japan, Canada, USA and EU. Developing regions include all other remaining countries. Sector aggregation includes paddy rice; wheat, maize and cereal grains; vegetable, fruits, nuts; oilseeds; sugarcane and beet; crops n.e.c.; textiles, clothing and leather; all other manufactures; and services.

[3] This is based on the GTAP 8 Data Base, which is documented in Narayanan et al (2012). The dataset compiled for this study, includes tariff data from the ITC (2006) and Boumellassa et al. (2009); merchandise trade data from UNSD (2004); balance of payments from the IMF (2004); services trade data from the OECD (2006); and, domestic support data from the OECD (2008).

[4] Details available on http://data.un.org/Browse.aspx?d=ICS, accessed on 3rd May 2011.

[5] Details available on http://www.ico.org/coffee_prices.asp?section=Statistics, accessed on 3rd May 2011.

[6] Mainly for cotton statistics for many countries using data from International Cotton Advisory Committee, available online from http://www.icac.org/econ_stats/country_facts/english.html.

[7] Using the data from MacDonald et al. (2004).

[8] Using the data from Bedi and Cororaton (2008) and http://txcindia.com/html/domestic%20%20sub.htm, accessed on 3rd May 2011.

[9] Using data from US Census Bureau (2005a, 2005b).

[10] Using data from Weller (2007).