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A computable general equilibrium analysis of export taxes in the Australian wool industry

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Abstract

We solve for Australia's optimal export tax on wool using a computable general equilibrium model — an aggregated version of the Monash model. A key aspect of the analysis is the way in which we model short-run and long-run comparative statics. As opposed to varying the Armington elasticity which measures the degree of substitutability between domestic and imported goods, we contrast the unrestricted movement of primary factors of production with a specific factors representation. We find that while results are virtually unchanged for the range of Armington elasticity values we employ in our sensitivity analysis, the specific factors specification has a significant impact on model results. In addition, we provide an explanation for why there are differences between our optimal export tax results and those generated by the Johnson [Johnson, H.G. (1965), Optimum Tariffs and Retaliation, in *International Trade and Economic Growth*, London: George Allen & Unwin Ltd., pp.31–61.] inverse elasticity formula. These results indicate that it is necessary to be cautious when interpreting optimal export tax estimates based on the Johnson inverse elasticity formula.

JEL classification: F13; C68; Q17

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1. Introduction

Despite no longer "Riding on the Sheep's Back" wool is still an important industry for Australia. In 2000–01 Australia exported $3.9 billion dollars worth of wool, almost 98% of

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production, second only to wheat in terms of magnitude of agricultural production. These exports accounted for 74% of world raw wool exports while the next largest was New Zealand with 15% (ABARE, 2001a,b). Given the importance of Australian wool production it is of little surprise to find that there is an extensive literature examining many aspects of the industry (e.g., Hinchy and Fisher, 1988; Bardsley, 1994; Cashin and McDermott, 2002). However, for an industry with such a large share of world trade, and in principle the ability to exert market power, there is minimal research examining the adoption of an export tax for wool. This lack of attention is even more surprising as wool is not a homogeneous product. As Beare and Zwart (1990) explain, the physical characteristics of wool are important in determining end use. Wool from New Zealand is coarse and used in non-apparel production. Wool from Australia is much finer and appropriate for use in the production of apparel. So wool from Australia and New Zealand can be considered different products, providing even greater support for the argument that Australia could exert some market power.

To date, the only papers that examine the effects of an export tax on wool are Alston and Mullen (1992) and Edwards (1997). Alston and Mullen do not directly consider the export tax. They are interested in how R&D in the wool industry should be funded. Alston and Mullen recognise that a wool tax levied on grower output to fund R&D is essentially tantamount to an export tax because almost all wool produced in Australia is exported. Edwards provides a more detailed review of the theory underpinning the adoption of an export tax for wool. Both papers infer the likely size of an optimal export tax for wool based on the approximation of Johnson (1965) and Cordon (1974).

The first objective of our paper is to estimate the optimal export tax for wool in a comprehensive modelling framework. We employ a Computable General Equilibrium (CGE) model to examine an export tax on wool for Australia. Our research adds to the CGE literature that examines the economic implications of introducing an export tax for primary commodities (e.g., De Santis, 2000; Warr, 2001, 2002; Wiig et al., 2001). However, unlike the existing literature we are considering the production of a primary commodity in a developed economy. Existing research on export taxes has typically focused on developing economies (for example, Bangladesh and the production of jute (Repetto, 1972; Hwang and Mai, 1999; Ahammad and Fane, 2000)). Furthermore, we compare the optimal export taxes generated by our CGE model with those derived using the Johnson (1965) inverse elasticity formula. When other distortions exist (as in our CGE model), Johnson's inverse elasticity formula needs to be revised to account of the effect that the export tax on wool has on tax revenue derived from other distortions. We use the CGE model to identify those distortions in the dataset which cause our estimates of Australia's optimal export tax on wool to deviate from that predicted by Johnson's inverse elasticity formula. This adds to the literature (e.g., Rodrik, 1989; Yilmaz, 2006) that has previously relaxed assumptions (i.e., domestic perfect competition and no retaliation by other countries) for the derivation of optimal export taxes.

The second objective of this paper is to show how a specific factors modelling frame-work can be used to contrast short-run and long-run comparative static results in a CGE model. Typically, such comparisons between short and long-run results are made by varying the Armington elasticity which measures the degree of substitutability between domestic and imported goods. In our model, sensitivity analysis on the Armington elasticity shows that results are insensitive to different specifications of this parameter, which is in contrast to other research (e.g., Irwin, 2003). Instead we argue that it is more appropriate to model short and long-run behaviour by assuming that some share of primary factors in production is specific in the short-run, and then allow these specific factors to become perfectly mobile between