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Specification choice and robustness in CGE trade policy analysis with imperfect competition

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Abstract

In order to contribute to a more comprehensive understanding of the robustness of the quantitative results of applied trade policy simulations to variations in the assumptions about firm conduct, this article provides a systematic synopsis of alternative formulations of imperfectly competitive supply behaviour in applied general equilibrium trade models and examines the sensitivity of simulated trade policy effects to the specification choice and calibration strategy within a prototype multi-country model. The analysis suggests in particular, that simulation results are generally far more sensitive to numerical specification choices at the calibration stage, than to the prior choice of firm conduct specification.

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1. Motivation

Starting with the industrial organization revolution in trade theory in the 1980s, a growing number of applied partial and general equilibrium trade policy simulation studies featuring imperfectly competitive supply behaviour and economies of scale has been presented in the literature. In contrast to conventional models based on perfect competition, these second-generation models are able to account for potential scale effects and pro-competitive price mark-up effects commonly emphasized by proponents of trade liberalization and regional integration schemes.

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However, the design of a structural model allowing for industrial organization effects faces an immediate problem: Once the fairly clear-cut world of perfect competition is abandoned, a wide range of a priori plausible alternative specifications of firm conduct opens up. The possibility that the choice of specification may crucially predetermine the tenor of CGE simulation results would seem to call for extensive sensitivity analyses across a wide spectrum of alternative oligopoly models, given that the empirical industrial organization literature provides little guidance with respect to the appropriate choice in this respect. Yet practical feasibility constraints necessarily limit the scope for sensitivity analysis in large-scale multi-region models and some model pre-selection is required to reduce the range of specification alternatives under consideration in any applied study. Correspondingly, the existing applied trade policy literature as a whole employs a wide array of different models of firm conduct, while individual studies offer at best only rudimentary sensitivity results for narrow subsets of specification alternatives.

In order to contribute to a more comprehensive understanding of the robustness of the quantitative results of applied trade policy simulations to variations in the assumptions about firm conduct, the present article provides a systematic synopsis of alternative formulations of imperfectly competitive supply behaviour in applied general equilibrium trade models and examines the sensitivity of simulated trade policy effects to the specification choice within a stylised proto-type multi-country model.

The article is organized as follows. Section 2 sets out the generic analytic framework into which the various models of firm conduct are embedded. Since all models of firm conduct under consideration are based on profit maximisation behaviour subject to given perceptions about the type of oligopolistic interaction, firms' supply behaviour is generically characterised by a Lerner-type mark-up equation, which relates equilibrium price-cost margins to perceived elasticities of demand. Section 3 describes in explicit algebraic detail the endogenous determination of these perceived elasticities: Section 3.1 considers supply behaviour in models with intra-industry product homogeneity across firms located in the same region while Section 3.2 turns to models featuring intra-industry product differentiation. In each case, we distinguish (i) between Bertrand- and Cournot-type behaviour including conjectural variations extensions of each, (ii) between international market integration and market segmentation regimes, and (iii) between alternative assumptions about agents' preference relations among goods of different regional origin, i.e. between alternative demand-side commodity nesting hierarchy specifications. In order to compare the comparative-static behaviour of the various imperfect competition models under consideration and to assess the sensitivity of results to the choice of model, all specifications are calibrated to the same hypothetical benchmark data set as detailed in Section 4, and subjected to the same trade policy shock in Section 5. Section 6 draws conclusions.

2. The generic analytical framework

The generic analytical framework for the illustrative simulations presented below distinguishes three countries (A,B,C), two industries/commodity groups per country

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