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TECHNOLOGY, GEOGRAPHY, AND TRADE

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We develop a Ricardian trade model that incorporates realistic geographic features into general equilibrium. It delivers simple structural equations for bilateral trade with parameters relating to absolute advantage, to comparative advantage (promoting trade), and to geographic barriers (resisting it). We estimate the parameters with data on bilateral trade in manufactures, prices, and geography from 19 OECD countries in 1990. We use the model to explore various issues such as the gains from trade, the role of trade in spreading the benefits of new technology, and the effects of tariff reduction.

KEYWORDS: Trade, gravity, technology, geography, research, integration, bilateral.

1. INTRODUCTION

THEORIES OF INTERNATIONAL TRADE have not come to grips with a number of basic facts: (i) trade diminishes dramatically with distance; (ii) prices vary across locations, with greater differences between places farther apart; (iii) factor rewards are far from equal across countries; (iv) countries' relative productivities vary substantially across industries. The first pair of facts indicate that geography plays an important role in economic activity. The second pair suggest that countries are working with different technologies. Various studies have confronted these features individually, but have not provided a simple framework that captures all of them.

We develop and quantify a Ricardian model of international trade (one based on differences in technology) that incorporates a role for geography.[2] The model captures the competing forces of comparative advantage promoting trade and of geographic barriers (both natural and artificial) inhibiting it. These geographic barriers reflect such myriad impediments as transport costs, tariffs and quotas, delay, and problems with negotiating a deal from afar.

The model yields simple expressions relating bilateral trade volumes, first, to deviations from purchasing power parity and, second, to technology and geographic barriers.[3] From these two relationships we can estimate the parameters

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[2] Grossman and Helpman (1995) survey the literature on technology and trade while Krugman (1991) provides an introduction to geography and trade.

[3] Engel and Rogers (1996) and Crucini, Telmer, and Zachariadis (2001) explore the geographic determinants of deviations from the law of one price.

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We want to formulate π_{ni}, the probability that country n will buy from country i

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Key results:

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- By LLN and continuum of goods, π_{ni} is also expenditure share
- Gravity-like structure emerges naturally and is microfounded

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Trade elasticity with respect to trade costs: $-\theta$

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Counterfactual policy experiments / welfare calculations are computationally feasible

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- Extensions relax some assumptions (goods not on a continuum)