

Deep Integration and Trade Productivity Links: Tentative Lessons for CGE International Trade Models

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June 2006

For presentation at the GTAP Annual Conference, Addis Ababa, Ethiopia, June 2006.
Preliminary draft. Please do not quote. Comments welcome.

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Abstract

1. Introduction

This paper considers the use of trade-focused CGE models to analyze issues of international trade. These models are firmly rooted in neoclassical (Walrasian) general equilibrium theory. They also incorporate and generalize the basic structure of the Heckscher-Ohlin-Samuelson (HOS) model of international trade, and so provide a theoretically complete and coherent framework for analysis. These models have become the workhorse of empirical analysis of issues such as the impact of global liberalization under the WTO and of the creation of preferential or regional trade agreements.

The standard HOS theoretical model turns out to be too simple to provide an adequate basis for realistic empirical models. The development of realistic, empirical trade-focused CGE models required generalization of the standard HOS model to incorporate nontraded goods. A major advance was the incorporation in empirical models of the “Armington insight” that traded and nontraded goods could be treated as “semi-tradable” and the theoretical HOS model could be generalized to incorporate degrees of tradability. The paper will review the development of this model.

While the standard trade-focused CGE model represents a major achievement, it has severe limitations. The paper will argue that this model cannot capture important trends in the evolution of the world trading system in the past fifty years, particularly the emergence of major trade blocs characterized by elements of “deep integration”, expanded trade in new goods and intermediate inputs, and links between expanded trade, productivity growth, and economic performance. There is an active literature on “new trade theory” and “new regionalism” that attempts to analyze some of the elements that characterize deep integration and increasing “globalization” of the world economy, but this work program is at an early stage. The paper will argue that existing CGE models are limited in their capacity to incorporate elements of new trade theory and new regionalism. Given these limitations, the paper provides some thoughts on how the standard CGE model might be extended to provide a better framework for incorporating some of the major features of globalization.

2. Standard Trade Theory and CGE Models

Starting with early work on input-output and linear programming models, multi-sector models have long been used to analyze issues of trade policy. These early models, and later trade-focused single- and multi-country CGE models, are firmly based on the general equilibrium theoretical framework of the Heckscher-Ohlin-Samuelson (HOS) model. Such empirical models are theoretically “coherent” in the sense that they faithfully reflect the underlying theory. However, empirical implementation of the simple HOS model, in which all goods are traded and all traded goods are perfect substitutes regardless of country of origin, showed that this model is too simple, yielding very unrealistic behavior. The problem is that the simple HOS model incorporates the “law of one price” and the assumption that traded and domestically produced goods are identical. While very convenient for analytic models, these assumptions raises serious problems in empirical models.

The Law of One Price and the Armington Insight

The law of one price states that, given commodity arbitrage and ignoring transport costs, all traded goods, wherever produced, will have the same price in all markets. Most neoclassical trade theory uses this assumption, as well as the simplifying assumption that all goods are traded. It underlies the theory of comparative advantage and the standard prescription in project analysis to use world prices as the appropriate measure of shadow prices for domestically produced traded goods.

There are a number of implications of the law of one price for empirical analysis, and empirical models that use this assumption will incorporate these implications.

- All domestic prices of tradable goods are set by world prices in world markets.
- Any change in the world price of an import or export is immediately transmitted to the price of the corresponding domestically produced good.
- Policies that affect border prices (tariffs/subsidies) are very powerful, since they immediately affect prices of domestically produced tradable goods.
- We should observe extreme specialization in production, assuming that there are more factors of production than commodities produced.
- We should never observe two-way trade (cross hauling) of the same good.
- Sectoral trade shares are not important. Only tradability matters, not how much is traded.

In addition, assuming all goods are tradable, the Stolper-Samuelson Theorem implies that changes in world prices and/or tariff policy will have strong (magnified) effects on factor prices. Given the Rybczynski Theorem, changes in factor supplies and factor-biased technological change will have strong (magnified) effects on the structure of production and trade, but no effect on factor prices.

While the theoretical model incorporating the law of one price is complete and mathematically elegant, the implications of the law are all false empirically.

- Changes in world prices and tariffs are only weakly transmitted to domestic markets.
- We do not observe extreme specialization in production.
- We observe two-way trade in most sectors, and at very fine levels of disaggregation.
- Trade shares are clearly important. Sectors with large trade shares are much more responsive to changes in world markets.
- Factor prices and the structure of production and trade are far less sensitive to changes in world prices and factor endowments than would be predicted by the Stolper-Samuelson and Rybczynski Theorems.

It has long been recognized that adding non-traded goods to the HOS model qualifies the Stolper-Samuelson and Rybczynski Theorems, and can potentially ameliorate the unrealistic behavior of empirical trade-focused models based on the simple HOS model. However, identifying non-traded sectors is not easy empirically, since most sectors show some trade in the data at very fine levels of disaggregation. Most sectors are tradable, even if trade shares are low. Since low trade shares will not weaken the

strong link between world prices and domestic prices in the HOS framework, such models still display unrealistic behavior for much of the economy. Also, these models cannot accommodate two-way trade, which is also observed at very fine levels of disaggregation.

An alternative approach taken by those constructing early trade-focused CGE models was to incorporate an insight due to Paul Armington: treat imported and domestic goods of the same commodity classification as imperfect substitutes in demand, and introduce an elasticity of substitution to define the degree of “tradability” at the commodity level. Armington was seeking to estimate import demand functions, and used a CES function to derive import demand as a function of the price ratio of imported to domestically produced commodities. The Armington insight was extended in many CGE models to include exports as well as imports, introducing a CET transformation function to specify the differences between goods bound for domestic versus international markets. The law of one price is still valid in that the domestic price of an export or import equals the world price times the exchange rate plus any tariff/tax/subsidy wedge. However, within each commodity classification, imports, exports, and domestically produced goods sold on the domestic market are treated as distinct commodities, linked by substitution and transformation elasticities.

The specification in CGE models of imperfect substitutability and transformability between domestic and traded commodities was controversial. It was thought to be an ad hoc fix to an empirical problem related to aggregation.¹ The resulting CGE model was thought to be theoretically suspect, deviating from the theoretical coherence of the HOS model. The specification, however, quickly proved to be empirically reasonable and robust, and the suspicion of theoretical incoherence was unfounded. Theoretically, this now-standard, trade-focused CGE model has been shown to be a generalization of the Salter-Swan model, incorporating degrees of tradability, and that the HOS model is a special case of this more general specification.² In this model, trade shares “matter” and all the unrealistic implications of the over-simple HOS model, law of one price, and major trade theorems are qualified in ways that yield much more realistic behavior in empirical models.³ This model has become the standard specification for almost all trade-focused single- and multi-country CGE models.

The standard trade-focused CGE model was developed in the late 1970s and early 1980s, and has become a work horse of trade policy analysis. Most models today still use CES and CET functions for import aggregation and export transformation functions.⁴ We will argue that, while the Armington insight has proved to be theoretically valid and empirically robust, it is time to revisit the specification. The standard model using simple functional forms turns out to have severe limitations in capturing important historical trends and important effects linking trade to economic performance that are increasingly being recognized as empirically important.

¹ See, for example, Stern’s survey article in the *Handbook of International Economics*.

² See Devarajan, Lewis, and Robinson (1990, 1993); de Melo and Robinson (1989); Thierfelder and Robinson (2003); and de Melo and Tarr (19xx) for derivations of the theoretical properties of the model.

³ Thierfelder and Robinson (2003) derive the implications of this specification of degrees of tradability for the Stolper-Samuelson and Rybczynski Theorems.

⁴ There is some work with flexible functional forms such as the translog and nested CES functions.

Trends in the Global Economy

International trade has become increasingly important in the post-war period. The portmanteau term “globalization” has been used to describe a variety of trends:

- Dramatic decreases in transactions costs internationally.
 - Lower transportation and communications costs.
 - Improvement and dissemination of computer technology, lowering costs of production and market coordination and.
- The volume of international trade (exports and imports) has grown much faster than GDP across the globe, and hence the share of trade in GDP in virtually all countries has increased significantly.
- Trade has increased the most among the OECD countries, especially in the early post-war period, but has spread widely over the last 20-30 years.
- Much trade has emerged in products that either did not exist earlier (e.g., electronics) or were not traded (e.g., services and parts).
- Trade in intermediate inputs has increased greatly, more rapidly than trade in final commodities. This increase reflects a variety of trends:
 - The direct and indirect import content of exports has increased in many countries.
 - There has been increasing international segmentation of production, with the emergence of complex trans-national value chains in many sectors.
- Global expansion of communications has led to increased cultural interchange and harmonization of institutions and standards, as well as increased economic integration.
- The collapse of the socialist systems, partially a result of globalization, has also increased its pace and reach.

In the past sixty years, there have also been major shifts in patterns of world trade, with the emergence of new trading blocs and changes in the relationships between developing and developed countries.⁵ The world trading system in the 1960s reflected a bipolar world, with Western Europe and the United States forming blocs with some of their close neighbors, former colonies, and/or cold-war partners; and with hub-and-spoke links to the rest. It was a world characterized by “dependency” between the developed centre and the underdeveloped periphery.

In the 1970s, a realignment of world trade began, with splintering of the earlier European and US-centered blocs and increasing diversification of trade by countries formerly closely linked to either Europe or the US. Both the European and North American blocs became more focused on their core countries and immediate peripheries. East and Southeast (E&SE) Asia emerged as a new trade bloc—a major force in world markets, with a larger share of total world trade than North America.

⁵ For a description of these trends and a discussion of how trade blocs are defined and analyzed, see World Bank (2005) and Evans, Kaplinsky, and Robinson (2006).

In the 1980s, the realignment of world trade continued and the various trade blocs solidified. In addition, two new blocs started to form: (1) Argentina, Paraguay, and Uruguay increased their trade shares with one another and with Brazil—anticipating the development of MERCOSUR; and (2) there was increased trade with South Africa by its near neighbors, Malawi and Zimbabwe, indicating the evolution of a Southern Africa bloc centered on South Africa.

By the 1990s, the bipolar world of the 1960s had evolved into a tri-polar world, with the maturation of the E&SE Asia trading giant. This bloc accounts for a larger share of world trade than North America, and has diversified its exports over time away from the US. Mercosur and the bloc centered on South Africa emerged and are clearly evident in the data as distinct trade blocs. Countries outside these blocs tend to have fairly diversified trade patterns and no other new blocs have emerged.

The policy environment in the post-war period has involved increasing liberalization of world trade through a series of global negotiations under the auspices of the GATT and its successor the WTO. In the last fifteen years, there has also been a proliferation of regional trade agreements (RTAs). These RTAs are especially interesting in that they seem to be motivated by the desire of many countries to achieve integration into the world economy. Many have included elements of “deep integration” that go beyond simply reducing tariffs—elements that will be discussed further below. In addition, the analysis of historical trends indicate that major trade blocs were apparent in the data well before any explicit regional trade agreements were initiated. This analysis suggests a classification of new RTAs into three broad categories:

- Bloc creation (e.g., EU, NAFTA, Mercosur, SACU).
- Bloc expansion (e.g., EU expansion).
- Market access (e.g., EPAs, AGOA, FTAA, many bilateral agreements).

RTAs in these three categories differ in motivation, scope, and structure.⁶ Economic analysis of their implications should take these differences into account. There is a literature on “new regionalism” that seeks to explore some of these implications from the perspective of “new trade theory” but empirical work with global models has not yet incorporated this work. In the next section, we will review the use of standard multi-country CGE to analyze RTAs, and then discuss important trends and forces that are ignored in that analysis.

Standard CGE Analysis of Regional Trade Agreements

In standard trade theory, the analysis of RTAs starts from the theory of customs unions: the Viner-Meade framework.⁷ In this literature, which starts from the basic HOS general equilibrium model, welfare analysis of an RTA focuses on its impact on trade creation, trade diversion, and international terms of trade (world prices). The HOS and Viner-Meade frameworks are well established, representing a kind of conventional wisdom and coherent theoretical structure that is comfortable to use, even though it is widely understood that this framework misses much of the action in new regionalism.

⁶ For a discussion of how this classification scheme can be implemented to explore the characteristics and implications of different RTAs, see Evans et al. (2006).

⁷ Other important and widely-recognized contributions to this analysis were done by Kemp and Wan.

Multi-country trade-focused CGE models incorporate the general equilibrium framework necessary to evaluate trade creation, trade diversion, and terms-of-trade effects in the Viner-Meade framework. These are structural models that incorporate all the elements in the Viner-Meade framework, differentiating commodities by country of origin. The effects of an RTA on the demand for non-member goods depends on the elasticity of substitution between member and non-member country goods. CGE models allow controlled simulations of the effects of trade reforms on endogenous prices and quantities relative to some benchmark base year. Burfisher and Jones (1998) survey the results of CGE-based case studies related to agriculture, including analyses of NAFTA, Western Hemisphere integration, EU expansion and APEC. The RTAs surveyed by Burfisher and Jones were all welfare-increasing for members and the world, but not for the U.S. when it is a non-member. Robinson and Thierfelder (2002) survey the CGE-based literature and find robust conclusions from the many existing studies of RTAs: (1) they increase welfare of participants, (2) aggregate trade creation is much larger than trade diversion, (3) positive welfare effects are even larger if features of new trade theory are considered, and (4) there are additional welfare gains from expanding membership. More recent work on bilateral RTAs (including EPAs) raises some questions, indicating that the hub-and-spoke framework of these agreements is likely to lead to significant trade diversion and limited gains from increased market access by developing countries, with a potential net welfare loss.⁸

The applied non-CGE literature on the estimated welfare impacts of regionalism is large and growing, and for the most part supports a consensus view that RTAs have been net trade-creating and world welfare-improving. Baldwin and Venables' (1995) review of the empirical literature found generally positive impacts on the living standards of RTA members and negligible impacts on nonmembers.

Schiff and Winters (2003) critique the use of CGE models to draw *ex poste* conclusions about RTAs because the models are used for counterfactual simulations, not forecasts, and because of their typically *ad hoc* estimates of behavioral and trade/productivity parameters. The counterargument is that: (1) sensitivity analysis indicates that the broad conclusions are robust to reasonable variation in parameter estimates, and (2) that CGE models provide the theoretically most appropriate tool for examining the impact of trade liberalization and RTAs.

Schiff and Winters (2003) also argue that CGE models overstate the terms-of-trade benefits to RTA members because the models use the assumption that products are differentiated by country of origin, giving each country some degree of market power. This characterization is incorrect because it focuses only on the terms-of-trade gains members experience at the expense of non-members. One needs to consider the changes in both intra-union terms of trade and terms of trade with the non-union countries, which are both captured in CGE models.

3. New Trade Theory and Trade-Productivity Links

There is a body of work on “new trade theory” and “new regionalism” that has sought to incorporate the impact of forces that go beyond efficiency gains from reallocating

⁸ See Evans et al. (2006), which describes studies of EU EPA agreements with Egypt, Morocco, and the Caribbean that indicate potential welfare losses to the developing countries from these agreements.

resources according to comparative advantage.⁹ This work has been stimulated in part by the observation that, while efficiency gains from trade liberalization and various regional schemes are significant, they are small in relation to national product and appear to be much too small to explain the rapid economic growth that has accompanied trade expansion in many countries.

This new body of work is much more eclectic and less coherent than work in the HOS and Viner-Meade frameworks, although there are certainly many examples of elegant models in new trade theory. There are partial and general equilibrium models incorporating a variety of new elements, including, for example, rent seeking, political economy, game theory, industrial organization (especially imperfect competition), geography, open-economy macroeconomics, and new growth theory. An important strand of this research agenda analyzes the links between international trade and total factor productivity, which provides additional sources of growth and welfare gains from expanded trade. There is an active literature seeking to understand the links between productivity and trade, especially in an environment with various elements of deep integration, and to measure their quantitative importance.

Integration and Trade-Productivity Links

“Shallow” integration: Involves the lowering or elimination of barriers to the movement of goods and services across national borders within the region. Within this context “negative” integration entails the lowering trade barriers created by national policies.

“Deep” integration: Involves establishing or expanding the institutional environment in order to facilitate trade and location of production without regard to national borders. Within this context “positive” integration suggests policies designed to encourage trade and facilitate segmentation of production processes and value chains.

“New regionalism” can be characterized as involving many of the elements found in deep integration, and may include (in rough order of increasing depth):

- Facilitating financial and foreign direct investment flows (real and financial capital mobility) by establishing investment protocols and protections.
- Improvements of communications and transportation infrastructure to facilitate increased trade and factor mobility.
- Liberalizing movement of labor within the RTA.
- Harmonization of institutional structures:
 - o Legal systems, commercial law
 - o Dispute resolution
 - o Domestic tax and subsidy policies, especially those that affect production and trade incentives.
- Harmonizing macro policies, including fiscal and monetary policy, to achieve a stable macroeconomic environment within the RTA, including coordinated exchange rate policy.

⁹ See, for example, Ethier (1998a, b), Baldwin (1997), Baldwin and Venables (1995), and Schiff and Winters (2003). The discussion below draws on Burfisher, Robinson, and Thierfelder (2004) and Evans et al. (2006).

- Establishing institutions to manage and facilitate integration:
 - o Regional development funds
 - o Institutions to set standards
 - o Dispute resolution mechanisms.
- Regulatory harmonization of product and factor markets:
 - o Competition policy
 - o Commercial law
 - o Labor relations
 - o Financial/banking regulation
 - o Industrial policy.
- Establishment of common standards and technical regulations:
 - o Established and enforced by private, national, regional, or international institutions
 - o Commodity/industry specific or broader.
- Monetary union — establishment of a common currency and completely integrated monetary and exchange rate policy.

Elements of deep integration all seem to involve externalities in the sense that they are beyond the reach of individual decision makers and/or involve changing the “rules of the game” by which markets operate. Following standard practice, such externalities can be classified into various types:

- External to firm, internal to industry,
- External to industry, internal to country,
- External to country, internal to world,
- Public good externalities, and
- Institutions that affect the economic environment in which firms operate.

The existence of such externalities arising from deep integration and work on “new regionalism” suggests potential links between expanded trade and economic performance. One chain of causation might be: shallow integration → expanded regional trade → deep integration → externalities → further trade expansion → increased productivity and scale economies → improved economic performance.

Deep integration and associated externalities suggest a number of potential mechanisms leading to trade-productivity links:

- Technology transfer through trade and associated foreign direct investment (FDI).
- Dynamic comparative advantage.
- Learning by doing.
- Fragmentation of production.
- Gains arising from segmentation of production processes:
 - o Ricardian gains from expanded ability to exploit differences in factor proportions, and

- Smithian gains from achieving local economies of scale and finer division of labor through expanded extent of the market for intermediate inputs.¹⁰

The role of FDI and productivity growth in Ethier's framework incorporates the endogenous growth theory that has become embedded in recent empirical work on RTAs. Typically, trade is assumed to have a role in stimulating productivity growth through channels that include technology differences among countries, knowledge spillovers, the transmission of ideas, and market expansion that lead to increasing returns to scale and/or Smithian economies of "fine specialization" (as opposed to differences in factor proportions in the HOS model).

The sources of trade and resulting welfare gains associated with deep integration differ from trade and welfare gains in the standard HOS model. The standard trade model incorporates only gains from exploiting comparative advantage. Deep integration and associated externalities generates technology transfer, productivity increases, and economies of scale (Smithian gains). The differences between these two approaches is summarized below:

Ricardian-HOS gains from trade:

- Inter-industry trade creation
- Factor endowments and technology differences determine trade
- Assume constant returns to scale in production technology
- Technology is assumed to be exogenous
- Homogenous goods
 - No role for standards

Smithian gains from trade:

- Intra-industry trade creation:
 - Horizontal quality differentiation
 - Vertical specialization.
- Productivity, specialization, and technology determine trade.
- Assume potential increasing returns to scale in production.
- Technology and technological change is endogenous.
- Heterogeneous goods and product differentiation:
 - Standards and harmonization are important,
 - Complex producer-customer relations: not "ship and forget".

Existing work suggests some tentative hypotheses regarding deep integration and trade-productivity links:

- A degree of shallow integration is a necessary precursor to successful deep integration.

¹⁰ Adam Smith (*Wealth of Nations*): "As it is the power of exchanging that gives occasion to the division of labor, so the extent of this division must always be limited by the extent of that power, or, in other words, by the extent of the market." Robinson and Thierfelder (2002); Burfisher, Robinson, and Thierfelder (2004); and Evans et al. (2006) discuss the potential for achieving "Smithian" gains through trade expansion.

- Some of the links are “broad”, involving externalities that affect much economic activity.
- Some of the links are commodity/sector specific. Examples can be found across agriculture, manufacturing, and services.
- There are potential feedbacks in the chain of relations, with possible beneficial synergies and virtuous circles.

4. New Trade Theory and CGE Models

In this section, we consider some of the weaknesses of the standard trade-focused CGE models, focusing on the role of the Armington insight and potential trade-productivity links, including causal chains arising from deep integration.

Trade Shares

Incorporating degrees of tradability (the Armington insight) was a crucial step in the development of trade-focused CGE models, providing a generalization of the HOS model that is empirically much more realistic. The standard approach is to use CES and CET functions (possibly nested), which has the desirable feature that they are sparse in parameters that need to be estimated. The share parameters can be accurately estimated from a Social Accounting Matrix (SAM), which provides the underlying data framework for all CGE models. The only parameters that remain to be estimated are the sectoral import substitution and export transformation elasticities.

The CES and CET functions, however, are homogeneous, with the result that sectoral trade shares are determined only by relative prices—production levels or aggregate expenditure have no effect on trade shares. In this framework, the only way that aggregate trade shares can change is through changes in relative prices within traded sectors or changes in the structure of production and demand toward trade-intensive sectors. In general, observed changes in the structure of prices, production, and demand are far too modest to generate the kinds of changes in trade shares that have been observed in many countries in the post-war period. The standard CGE model simply cannot track these observed changes in trade shares over time.

The assumption of differentiated products also implies that world markets are characterized by imperfect competition in which all suppliers face downward-sloping demand curves. With homogeneous trade aggregation functions, the result is that multi-country CGE models tend to overstate the impact of trade liberalization on international prices, and also give the models a welfare “tilt” in favor of optimum protection policies that exploit market power. The problem is that the only way a supplier can increase market share in these models is to lower prices—the models do not allow any other form of market penetration or notion of “contestability” of markets.

Finally, CES and CET functions effectively start from existing trade shares embodied in the share parameters and specify that changes in trade shares results from changes in relative prices. In this framework, it is difficult to introduce new commodities, since the functions are parameterized on the initial trade shares. If observed changes in trade shares are due to the emergence of new sectors within existing defined sector aggregates, we would expect that increased trade shares could occur with no change

in relative prices, a phenomenon that the standard CGE model is unable to accommodate.

One approach to dealing with these problems is to replace the homogeneous CES and CET functions, and use a flexible functional form such as the translog which allows trade-expenditure elasticities to differ from one. There are some examples of models which use this approach, but it adds only one element—changes in aggregate production or expenditure—to the determination of trade. The historical analysis of trends in international trade indicates a number of effects such as increased trade in intermediates, international segmentation of production processes, introduction of new commodities, and externalities arising from increased trade supported by deep integration that cannot be summarized with the introduction of one additional expenditure-elasticity parameter.

Another approach that has been used is to change the share parameters in the CES and CET functions exogenously, reflecting changes in “tastes” in the demand for imports or changes in technology in the supply of exports.¹¹ In effect, the CES and/or CET functions are assumed to slide along the budget line, changing trade shares without changing output/demand levels and relative prices. The shift is specified exogenously, but in principal this approach could be used to model the impact of elements of deep integration or new trade theory on trade shares. Empirical work is required to explore the nature and empirical magnitudes of the links, which would then have to be incorporated as “shifters,” perhaps explicitly over time, in the sectoral import demand and export supply functions in the CGE model. This approach has promise, since it allows the possibility of formally modeling the links between “shifters” and other phenomena.

Trade-Productivity Links

In CGE analyses, the operational links between trade liberalization and total factor productivity (TFP) growth are frequently based on the stylized trade-productivity externalities described by de Melo and Robinson (1992). There is an export externality link between export growth and an increase in TFP within the sector. On the import side, imports of intermediate and capital goods are linked with sectoral TFP. Finally, an increase in aggregate exports leads to economy-wide increases in the efficiency of capital inputs.¹²

Although this modeling approach typically incorporates ad hoc assumptions about the parameters that describe trade-productivity links, there is a growing body of empirical literature that seeks to measure links between trade volumes and productivity, using regression analysis that does not consider the explicit mechanisms by which increased trade might be linked to increased productivity.¹³ The simple reduced-form approach taken in many CGE models is consistent with such regression analysis, although it would be far better to explicitly incorporate deep integration and the causal chains discussed above.

¹¹ Nielsen, Thierfelder and Robinson (2003 and 2004) use this approach and discuss alternatives in their analysis of the impact of changes in demand for agricultural products containing genetically modified organisms (GMOs).

¹² Many multi- and single-country CGE models incorporate these ad hoc trade-productivity linkages.

¹³ See, for example, Coe, Helpman, and Hoffmaister (1997) and Frankel and Romer (1999). For a skeptical view, see Rodriguez and Rodrik (1999).

Trade-productivity externalities have been a defining element of new trade theory and regionalism, incorporating elements of new growth theory and related empirical literature. Open questions remain for theoretical analysis of new regionalism, and for incorporation of elements of deep integration in CGE models. Analysis of the role of institutions and how they determine the manner links are exploited could make an important contribution to the literature on regionalism. The role of trade rules and institutions is another area that has yet to be fully incorporated into empirical and CGE analysis of regionalism.¹⁴ To incorporate such elements in CGE models will require a much richer specification of sectoral production technologies and how they might be related to these elements.

5. Conclusion

The historical transition from old to new regionalism—a transition from shallow to deep integration, and the partnering of developed and developing countries—has been accompanied by developments in economic theory and empirical work in international trade. Old trade theory, based on the elegant Heckscher-Ohlin-Samuelson (HOS) and Viner-Meade theoretical frameworks, provided a powerful set of tools for analyzing issues arising from both global trade liberalization and the formation of regional trade agreements involving liberalizing commodity trade within the RTA (e.g., a customs union or free trade agreement). As both global liberalization and regional trade agreements moved beyond commodity trade to incorporate additional elements—deep versus shallow integration—new theoretical analysis also followed. New trade theory, however, is much more eclectic than work in the earlier HOS and Viner-Meade frameworks, at least in part because the theory is less unified and coherent—as would be expected of a new field.

There is a significant body of CGE work using the methods of old trade theory to analyze the impact of new regionalism. The old paradigm is well developed, well understood, and comfortable, providing a body of conventional wisdom that facilitates analysis. The standard CGE model provides a structural empirical model framework that incorporates this body of theory. Much of this work, however, is unsatisfactory, focusing on a narrow range of forces at work and missing a lot of the action arising from deep integration that goes well beyond commodity trade flows. It is time to move beyond this work and incorporate elements of new trade theory in empirical and theoretical analysis of new RTAs, and CGE models.

The state of knowledge concerning new trade theory and new regionalism is certainly in flux. There are many important hypotheses that are as yet highly tentative, calling for both theoretical and empirical work. A partial list includes:

- Given that new regionalism usually involves integrating developed and developing countries, what are the links between the formation of RTAs and successful development strategies in the developing countries?
- What is the nature of trade productivity links, in both developed and developing countries? Are there differences in the nature of these links in developed and developing countries?

¹⁴ Rodrik et al. (2002) argue for the primacy of institutions in explaining economic growth. They find that the effect of trade on income, after controlling for institutions and geography, is almost always insignificant, although it is positively related to effective institutions. Their results, however, are consistent with the view that development of “institutions” is a part of the process of deep integration.

- To what extent does an RTA, which guarantees access to partner markets, affect the structure of production? Do we observe finer specialization in production, suggesting Smithian gains at the microeconomic level?
- Does deeper integration among partners contribute to productivity gains? At the micro level, is there more harmonization in production?
- Are there changes in FDI following the creation of RTAs? To what extent is the RTA responsible for FDI growth in members, and is technological transfer associated with FDI?
- Finally, an issue much studied but not yet resolved, is the extent to which the formation of RTAs impedes or supports continued global trade liberalization.

At this point, we are left with many questions and few answers, and little guidance for those who wish to build empirical models to analyze issues of international trade. The standard CGE framework has been a work horse for such analysis for twenty-five years, and has provided a flexible framework for analysis of issues of shallow integration that have been the major focus of policy during this period. However, new trends have emerged, the policy focus is changing, and trade theory is evolving. It is time to reconsider the standard CGE model in light of these developments.

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