

PART I

EVALUATION OF  
THE DOHA  
DEVELOPMENT  
AGENDA



# POVERTY IMPACTS OF A WTO AGREEMENT: SYNTHESIS AND OVERVIEW

*Thomas W. Hertel and L. Alan Winters*

## **Summary**

This chapter reports on the findings from a major international research project investigating the poverty impacts of a potential Doha Development Agenda (DDA). It combines in a novel way the results from several strands of research. First, it draws on an intensive analysis of the DDA Framework Agreement, with particularly close attention paid to potential reforms in agriculture. The scenarios are built up using newly available tariff line data, and their implications for world markets are established using a global modeling framework. These world trade impacts form the basis for 12 country case studies of the national poverty impacts of these DDA scenarios. The focus countries are Bangladesh, Brazil (2 studies), Cameroon, China (2 studies), Indonesia, Mexico, Mozambique, the Philippines, the Russian Federation, and Zambia. Although the diversity of approaches taken in these studies limits the ability to draw broader conclusions, an additional study that provides a 15-country cross-section analysis is aimed at this objective. Finally, a global analysis provides estimates for the world as a whole.

Some of the main findings are:

- The liberalization targets under the DDA have to be quite ambitious if the round is to have a measurable impact on world markets and hence poverty.
- Assuming an ambitious DDA, the near-term poverty impacts are found to be mixed; some countries experience small poverty rises and others more

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substantial poverty declines. On balance, poverty is reduced under this DDA, and this reduction is more pronounced in the longer run.

- Allowing minimal tariff cuts for just a small percentage of special and sensitive products virtually eliminates the global poverty reduction due to the DDA.
- Deeper cuts in developing country tariffs would make the DDA more poverty-friendly.
- Key determinants of the national poverty impacts include the incomplete transmission of world prices to rural households, barriers to the mobility of workers between sectors of the economy, and the incidence of national tax instruments used to replace lost tariff revenue.
- To generate significant poverty reductions in the near term, complementary domestic reforms are required to enable households to take advantage of new market opportunities made available through the DDA.
- Sustained long-term poverty reductions depend on stimulating economic growth. Here, the impact of the DDA (and trade policy more generally) on productivity is critical. To fully realize their growth potential, trade reforms need to be far reaching, addressing barriers to services trade and investment in addition to merchandise tariffs.

#### **Introduction and Motivation**

International trade is arguably the most direct economic means by which rich countries influence poor countries. Exports of manufactures by developing countries have increased rapidly over the last 30 years, due in part to falling tariffs in the Organisation for Economic Co-operation and Development (OECD) countries as well as in developing countries, declining transport costs, increased specialization, and sustained economic growth. Manufactures accounted for just 25 percent of developing country exports in 1965, and this share tripled to nearly 75 percent over the next three decades, while agriculture's share of developing country exports has fallen from 50 percent to under 10 percent (Hertel and Martin 2000). Increased manufactures trade has benefited many developing countries, helping them make the transition out of agriculture and lifting many out of poverty.

Some of the poorest developing countries, however, have gained relatively little from increased manufactures trade. Market access for their most competitive manufactured export (apparel) remains highly restricted, as it does for their key source of employment and exports, farming, and the problem with agricultural exports is exacerbated by the massive government subsidies provided to farmers in OECD countries. When poverty within the poorest countries is considered, developed countries' agricultural policies become even more central. A majority

of the poor are concentrated in rural areas, where agriculture is usually the main source of economic activity (World Bank 2004), and in the poorest developing countries, large shares of households (including most of the very poorest) depend on self-employment in agriculture for virtually all of their income (Hertel and others 2004). Together, these facts highlight the potential influence that multilateral trade policies can have on poverty in developing countries.

The DDA negotiations, sponsored by the World Trade Organization (WTO), experienced a blow in Cancún, Mexico, because of the question of rich countries' agricultural support and its potential impacts on poverty in developing countries. The Doha negotiations are now emphasizing the need to better understand the linkages between trade policies—particularly in rich countries—and poverty in the developing world. Moreover, poverty reduction is now widely accepted as a central focus for development efforts and has become the main mission of the World Bank and other development institutions. For example, the Millennium Development Goals commit the international community to halve poverty in developing countries by 2015 and identify several key means to achieving this goal with international trade.

With this high level of policy interest, it is hardly surprising that the issue of trade and developing-country poverty has become a focus of much research activity over the last several years. This book contributes to this literature by offering the first comprehensive analysis of the national poverty impacts of specific policy reforms proposed under the auspices of the WTO. To do so, it combines the results from several strands of research in a novel way. First, it draws on an intensive analysis of the July 2004 DDA Framework Agreement, particularly of potential reforms in agriculture, which, as will be shown, have special significance to the poor. The scenarios analyzed below are built up from newly available tariff line data on bound and applied tariff rates. Similarly detailed analysis is undertaken in the case of domestic support for agriculture and export subsidies, as well as for nonagricultural market access.

Second, the research assesses the implications of these alternative Doha scenarios for world markets. These are established using a state-of-the-art, global modeling framework that incorporates the most recent econometric evidence on supply and demand elasticities, with particularly close attention paid to food and agriculture markets that prove crucial in assessing the poverty impacts of the DDA. The outputs of this part of the project include export and import price changes for each region of the world, along with changes in export volumes.

Third, these world trade impacts form the basis for analyzing the poverty impacts of the DDA on 10 individual countries by way of a dozen case studies.

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These case studies use a variety of innovative techniques to establish the potential impacts of the DDA on different household groups and, in some cases, different regions within the country. The focus countries are Bangladesh, Brazil (two studies), Cameroon, China (two studies), Indonesia, Mexico, Mozambique, the Philippines, Russia, and Zambia.

Some case studies also examine other poverty policies in addition to trade reforms—for example, education reform or agricultural extension services. Sometimes these are complementary to the Doha Round in the sense of enhancing its effect, but more often they are independent. They are explored here as yardsticks against which trade reform can be measured and as suggestions concerning how governments can seek to overcome any adverse poverty effects from the Doha Round. However, the authors do not subscribe to the view that such “complementary policies” are necessary for the Doha Round to be beneficial.

### **Choice of Methodologies**

Organization of the research underpinning this volume had two contrasting objectives. On the one hand, the studies had to be consistent with one another to ensure an accurate global assessment of the DDA, as well as comparability across studies. On the other hand, research into the poverty impacts of trade reform is new, and almost the only consensus it has reached is that countries differ. From this perspective, it was important to both encourage a variety of approaches at the country level and exploit the specific skills and knowledge of the case studies’ authors to gear their country models most closely to local characteristics and issues.<sup>1</sup>

The project, therefore, is a composite in which the global analysis—the methodology for deriving the global findings and passing them over to the national case studies—is unique and consistent with current standards in the field of quantitative trade policy analysis, the country case studies display a wide range of methodological innovations and topical design features. This variety has been fruitful, with different country studies emphasizing alternative links between trade and poverty and providing a diversity of insights. Nevertheless, as a check and to draw some broader conclusions, two more uniform exercises are included: a 15-country cross-section analysis, in which a common, fully integrated trade-poverty analysis is provided for a range of developing countries, and, a global analysis of aggregate poverty impacts derived by applying simple poverty elasticities to the predicted outcomes for developing countries in a global simulation of a prospective Doha agreement.

In most of this book, the methodology known as computable general equilibrium (CGE) analysis is used. This is the dominant methodology for the *ex ante*

analysis of the economic consequences of comprehensive trade agreements whether multilateral or bilateral in nature (Francois and Shiells, 1994). This is the dominant methodology because no other approach offers the same flexibility for looking at prospective changes in trade policy while respecting the fundamental economy-wide consistency requirements such as balance of payments equilibrium and labor and capital market constraints that are so important in determining the consequences of comprehensive trade reforms. The CGE approach has come under substantial criticism (for example, from Jorgenson [1984], McKittrick [1998], and Kehoe [2005]) for having insufficient econometric underpinnings and for not being adequately validated. Accordingly, this volume offers a number of econometric-based analyses that focus on key dimensions of the trade and poverty question, including price transmission from the border to households, cropping choices made by farm households, labor market participation decisions, and the intersectoral movement of labor. In addition, when the global market impacts are assessed, a CGE model is used that is based on the most recent econometric evidence on supply and demand elasticities and for which some (modest) validation has been undertaken.

The majority of the studies reported in this volume are based on *comparative static* analysis. The authors abstract from the impact of trade reform on investment and productivity and therefore economic growth. There are two reasons for this emphasis. First, most of the issues that arise in the popular debate over the poverty impacts of trade policy are fundamentally comparative static in nature. Concerns about the urban poor being adversely affected by higher food prices, the potential loss of jobs by women in the apparel sector, or the poverty impacts on low-income farmers in developing countries are all questions about the redistributive impact of trade policy reform. Answering them requires a disaggregated, comparative static framework. Of course, there is also a keen interest in the potential for economic growth to alleviate poverty, and five of the studies use a dynamic framework that accounts for the growth effects of changes in investment deriving from trade policy reform. However, quantifying the impact of trade reform on growth and poverty through channels such as the effect on productivity or the benefits of increasing the range of available goods remains a lively topic for current research on which consensus has yet to emerge. Hence, the second reason for using the comparative static approach is to avoid any appearance of overstating the poverty-alleviating benefits of liberalization.

In the end, it must be said that this project has proven to be a very ambitious undertaking—attempting to bridge micro-based research focusing on the choices and opportunities facing individual households in developing countries with macro-based research on the global impacts of multilateral trade policy reform. The payoff to this exercise must be judged by the insights offered.

## **The Global Impact of the Doha Development Agenda**

Chapter 2 of this book, by Kym Anderson and Will Martin, takes as its starting point the July, 2004, WTO Framework Agreement for the Doha Agenda. It explores the issues emerging from of this document—in particular, the annexes dealing with export subsidies, domestic support and market access in agriculture, and market access for nonagricultural goods. Chapter 2 examines seven different Doha scenarios, one of which is adopted as the core scenario for this book. In constructing this scenario, the authors have taken considerable care to distinguish those trade reforms that are actually being negotiated under the DDA from those that have been agreed to previously. This distinction is complicated because nearly all of the policy databases used predate completion of the Uruguay Round Agreement. In fact, the starting point for all of the analysis in this book is 2001, the most recent year for which comprehensive data are available for tariffs, domestic support, and export interventions. Therefore, before constructing the Doha scenario, a “pre-experiment” is undertaken to account for the major developments in trade policy since 2001. These include tariff reforms undertaken by newly acceding WTO members (most notably China), the phase-in of remaining Uruguay Round commitments by developing countries, European Union (EU) enlargement to 25 countries, and the abolition of export quotas on textiles and apparel under the Agreement on Textiles and Clothing. Thus, even though the full impact of some of these reforms is yet to be felt, the analysis in this book looks beyond these reforms, envisioning a global economy in which they have been fully implemented and focusing on the further impacts of trade liberalization undertaken in the context of the Doha negotiations.

The most important finding from chapter 2 is that, unless the DDA is considerably more ambitious than the Uruguay Round in terms of depth of cuts in bound tariffs and domestic support, it will achieve little development stimulus. The main problem on the market access side is binding overhang. For example, in agriculture—one of the key areas of the DDA with respect to trade and poverty—bound tariffs in developing countries average 48 percent, but applied tariffs average only 21 percent. In the case of the least developed countries (LDCs), the respective figures are 78 percent and 13 percent. Even in the EU (21 percent binding versus 12 percent applied) and the United States (6 percent binding versus 3 percent applied), there is substantial binding overhang in agriculture. So, for many countries and products, bound tariffs can be cut deeply with no impact on applied protection and hence international trade.

In the central Doha scenario featured in this book, agricultural tariffs are cut using a tiered formula, with marginal cuts changing at 15 and 90 percent bound

tariff rates. The marginal cuts are 45 percent for the lowest agricultural tariffs, 70 percent for tariffs in the middle range, and 75 percent marginal cuts for the highest tariffs.<sup>2</sup> For developing countries, the inflection points are placed at 20, 60, and 120 percent bound tariff levels in agriculture, with marginal cuts of 35, 40, 50, and 60 percent, respectively. The LDCs are not required to cut tariffs under this central scenario. Because of a lack of specificity in the July Framework Agreement, nonagricultural tariffs are simply cut by 50 percent across the board (33 percent in developing countries and 0 percent in LDCs). Box 1.1 summarizes the central Doha scenario.

There is much more to the DDA than just agriculture and nonagricultural market access—for example, trade facilitation, services liberalization, and rules on antidumping and regionalism. This book focuses on the former issues partly because they are quantifiable and provide a large agenda in themselves. Mainly, however, they are likely to be the major issues in terms of both effects and negotiators' need for detailed quantitative advice. Moreover, the other issues are basically additive to the analysis of market access for goods, so that as their outcomes and consequences become clear, they may be added to these results to get an overall picture.

As a consequence of the relatively ambitious tariff cuts analyzed here, average worldwide tariffs for all merchandise trade drop from 4.7 percent in the baseline to 3.2 percent. This masks rather different cuts for countries at different income levels. High-income countries' tariffs fall from 2.9 percent to 1.6 percent, middle-income countries' tariffs from 7.2 percent to 6.3 percent, and low-income countries' tariffs (including LDCs, which do not cut tariffs at all) fall from 15.6 percent to 14.6 percent. (Anderson and Martin report these cuts in detail in chapter 2.)

In the case of domestic support, there is also a problem of bound versus applied protection, with bindings generally much higher than applied aggregate measure of support (AMS). But even more severe is the definition of the AMS itself—particularly its reliance on administered prices as a benchmark. This feature makes it possible for administrators in some countries to bring programs into WTO compliance with the stroke of a pen, simply by abolishing the administered price. The core Doha scenario assumes that industrial countries with domestic support in excess of 20 percent of production cut their bound AMS commitments by 75 percent, and others cut by 60 percent. Developing countries are assumed to cut their AMS by 40 percent. Even with these ambitious reductions, only six WTO members would be required to reduce actual support, based on 2001 notifications: Australia, the EU, Iceland, Norway, Thailand, and the United States.

Export subsidies are the one area where bold cuts (full elimination) are on the table, but these have diminished in importance over time. At present, they remain a significant factor only in the case of the EU (and in the United States for

### Box 1.1. Elements of the DDA Scenario Based on the July Framework Agreement

- **Agriculture:**
  - Market access—use nonlinear (tiered) formula (as with progressive income tax):
    - For developed countries, marginal rates (45, 70, and 75 percent) change at 10 and 90 percent tariffs
    - For developing countries, marginal rates (35, 40, 50, and 60 percent) change at 20, 60, and 120 percent tariffs
    - For LDCs, no cuts to tariffs
  - AMS: apply tiered formula:
    - For developed countries, marginal rates of 60 percent (AMS less than 20 percent) and 75 percent
    - For developing countries, marginal rate of 40 percent
    - For LDCs, no cuts to domestic subsidies
  - Export subsidies abolished
- Nonagriculture market access: 50 percent cuts in tariffs (33 percent developing countries, 0 percent LDCs).

dairy products), and the abolition of export subsidies has been made conditional on equivalent treatment of food aid and state trading. Preliminary estimates suggest that reform of the latter two items will have little impact, but the linking of these features to the WTO negotiations makes the whole process much more complex. The central Doha scenario in this book assumes that export subsidies are abolished.

In addition to this central Doha scenario, this book also considers an important variant in which developing countries fully reciprocate the tariff cuts made by developed countries, thereby eliminating one of the historical pillars of special and differential treatment. The rationale for considering this alternative, labeled Doha-all, becomes clear with the discussion of the results of the global poverty analyses later in this chapter. Under Doha-all, average merchandise tariffs in the middle- and low-income countries drop further, to 5.6 and 13.4 percent, respectively. In the case of the low-income countries, this represents a larger incremental cut in average tariffs than was achieved in the central Doha scenario itself.

Assuming that negotiators honor their initial vision as set forth in the DDA and make significant cuts in agricultural and nonagricultural protection, what impact might this have on poverty? Will they really put development squarely into the DDA? Answering these questions is the primary goal of this book.

The impact of the Doha reforms on world market prices is the subject of chapter 3. Here, Thomas Hertel and Maros Ivanic use a global CGE model to assess the potential impact on world market prices and trade volumes. As established in chapter 2, agricultural protection is central to any assessment of global trade reform, and the analysis in chapter 3 bears this out. The trade reform scenarios invariably have the biggest impact on prices and trade volumes for farm and food products, followed by textiles and apparel. Given the predominance of the poor in rural areas and their heavy reliance on unskilled wages elsewhere, these are the key industries in any poverty assessment. The strongest world price increases are for the heavily subsidized farm products: rice and other grains, cotton, dairy products, and beef. The ranking of the price increases arises from the composition of cuts, both across the three sets of agricultural distortions and across countries. The other important point made in chapter 3 is that, given the increasingly differentiated nature of traded products, there is no one “world price,” and careful attention must be paid to bilateral patterns of trade and country-specific price changes.

Finally, chapter 3 outlines the methodology for transmitting the price and volume changes to the national case studies. This represents an important innovation in the linking of global economic outcomes with national impacts.

### **Price Transmission**

The analysis of the country case studies is structured around the conceptual framework laid out by Winters (2000) and Winters, McCulloch, and McKay (2004). This begins with the question of price transmission: How much of the world price shock is transmitted to producers and consumers?

With a majority of the poor in most countries located in rural areas—often poorly served by transportation and communication infrastructure—it is important to ask whether developments in global markets will really have an impact on these households. Of course, this is an empirical question, subject to econometric investigation, and this is precisely what Alessandro Nicita does in chapter 4 for the case of Mexico. He shows that, indeed, world prices are differentially transmitted to the regions of the country, depending on their distance from the border and the nature of the commodity in question. He begins his analysis by examining the extent of “pass-through” from international prices to domestic prices at the border. Here, he finds that for manufactured goods, about two-thirds of the international price change passes through to the domestic market, whereas the comparable figure for agriculture is just one-quarter.

Nicita’s econometric estimates also show that the transmission of world market price changes diminishes with distance from the border. In addition, urban

areas are more sensitive to border prices changes, when compared to rural areas. Therefore, he concludes that in the more remote, rural regions of Mexico, very little of the international price changes will be felt, particularly in the case of agricultural products. As a consequence, the impact of the Doha scenarios—which have only modest impacts on world prices, anyway—are negligible in rural Mexico, except in the north, near the U.S. border, where rural households see some small gains. Urban consumers face higher food prices and a small decline in unskilled wages as the privileged Mexican position in the U.S. market is eroded by most-favored-nation tariff cuts. Thus, the urban poor experience small losses.

Nicita also explores the impact of complementary domestic reforms that might permit rural producers to respond to improved world market conditions without incurring additional costs (for example, a productivity gain or the employment of surplus labor). This enhances the welfare outcome for rural households in all regions except the south. Rural households in the south benefit from Doha only when the reforms are accompanied by enhanced price transmission—for example, through improved transport and market infrastructure. Thus, there is an important interaction between price transmission and the distribution of gains from global trade reforms.

One of the poorest countries in the world, which also has very poor infrastructure and is plagued by high domestic marketing costs, is Mozambique. In fact, work by Arndt and others (2000) estimates producer-consumer margins as high as 300 percent (for cassava). The biggest margins reported in their study are for food products, which tend to dominate both the consumption and production bundles of the poor. So the existence and behavior of these margins is critically important for any poverty study. Chapter 5, by Channing Arndt, explores this issue in the context of the Doha Round scenarios for Mozambique. As with the Mexico study, the combination of these marketing margins with modest world price changes means that the impact on household welfare in Mozambique is quite small. Indeed, about one-third of rural households are unaffected by the Doha scenario. The largest rural losses are about 1 percent of income, with some households experiencing modest gains. The dispersion among urban households is larger because of the presence of smaller marketing margins. Overall, the impact of multilateral trade reform on Mozambique is adverse as preferences are eroded and prices of imports rise.

### **The Disaggregated Impact on Households**

Moving beyond the question of price transmission, the studies in this book move on to the issue of household-level impacts of—and household responses to—the price changes ensuing from trade reforms. The simplest way of exploring this link

is to focus on a single commodity. This is the approach taken by Jorge Balat and Guido Porto in chapter 6 on the impact of trade reform on cotton producers in Zambia. They note that the critical factor in this case is the share of household income generated by cotton production. To a first-order approximation, the real income impact of a change in the price of cotton may be obtained by multiplying this income share by the percentage change in cotton price. This leads Balat and Porto to focus on the evolution of cotton income shares among the poor in Zambia. Because cotton is grown in significant quantities in only three provinces, this is where they focus attention.

One of the striking things about world cotton markets in the late 1990s was the collapse in world prices. Between 1996 and 1998, cotton prices in Zambia fell by 20 percent. Therefore, it is surprising that cotton's share in income among the poor rose sharply in the eastern and southern provinces over this same period. Among the poorest households in the eastern province, the increase was nearly fivefold, even as the income share fell for wealthier households. Although there are many factors that may bear on this change, the authors argue that the most likely reason was the reform of the cotton marketing board system and the implementation of an out-grower scheme that proved effective in getting seed and fertilizer into the hands of credit-constrained, small-scale producers. This increase in the cotton share boosts the potential benefits from multilateral agricultural reforms, because one of the main consequences of such reform would be to raise cotton prices.

Despite the increase in cotton income shares over this period, the income impact on the poor of higher cotton prices—the authors assume a 12 percent price rise, based on several independent studies of world cotton markets—is still relatively modest (on the order of 1 percent of real income, on average) because the average income share is about 8 percent. This brings the authors to a discussion of complementary domestic reforms. In particular, they cite evidence from other research they have conducted in Zambia, which finds that access to extension services can boost productivity by more than 8 percent, resulting in an aggregate gain of more than 9 percent when combined with higher cotton prices.

But the largest poverty reduction benefits appear to arise when subsistence households switch to cotton production in the wake of increased demand for exports. Here, a careful matching of subsistence and cotton-producing households shows that, all else constant, subsistence producers could boost their incomes by nearly 20 percent if they switched to cotton production. Such a switch would be greatly facilitated by continued improvement of the out-grower schemes and strong demand for cotton exports. When combined with improved extension services and higher cotton prices, the switch from subsistence production to cotton could boost incomes of some of the poorest households in Zambia by nearly

one-third. In sum, Balat and Porto conclude that trade reform alone is not sufficient to raise a large number of poor out of poverty in Zambia, but when the market opportunities presented by trade reforms are combined with complementary domestic reforms, significant headway in the fight against poverty is possible.

Of course, global trade reforms do not simply alter one single commodity price: rather they potentially affect *all* prices in the economy, including the prices of nontradeable commodities and services as well as wages and returns to land and capital. So, the next study seeks to account for the full range of price impacts at a highly disaggregated level. The unusual thing about Joaquim Ferreira-Filho and Mark Horridge's chapter 7 in this volume is the very large number of individuals considered in their analysis—264,000 adults who are members of 112,000 households spread across the 27 regions of Brazil. The authors argue that the regional dimension of their study is critical, given the tremendous disparities in income and poverty incidence across regions. The proportion of poor households ranges from about 14 percent in parts of the southeast, to nearly 60 percent in the north (Amapá). When combined with large variations in industrial composition across regions, there is a recipe for great differences in poverty impacts due to trade reform.

Ferreira-Filho and Horridge find that the Doha scenarios benefit agriculture at the expense of industry. This is no surprise, because virtually all previous studies of global agricultural trade reform have concluded that Brazil would be a substantial beneficiary from such a development. However, the real question is, which households within Brazil will benefit? Many believe that all of the benefits will go to large farmers, thereby worsening the income distribution in Brazil. The research reported in chapter 7 argues that, when one takes account of the additional employment generated by the expansion of agriculture and related industries in many of the poorer states of Brazil, the largest gainers are actually the households that are most heavily reliant on low-skill labor. As a consequence, the income distribution in Brazil *improves* under the Doha scenario. This is a very important finding. It is a point that has been previously emphasized in more highly aggregate research on trade and poverty reported by Harrison and others (2003).

As a percentage of initial poverty, the estimated national decline in chapter 7 is modest (less than 1 percent), but it still amounts to a large number of persons: Under the Doha scenario, poverty falls by about 236,000, and it declines by about twice that amount in the case of the full-liberalization scenario. The declines in poverty are fueled by the growth in agricultural activity—Brazilian farm and food exports expand strongly in the wake of trade reform—and the subsequent increase in demand for the lowest skill workers, 41 percent of whom still work in the farm sector.

Of course, these wage gains hinge on the existence of an operational labor market. Such a market may not exist in some cases, and the potential consequences of factor market failure are explored in considerable depth in chapter 8 by Marijke Kuiper and Frank van Tongeren. These authors approach this problem by employing a village-level model of a community in Jiangxi province in China. They capture the heterogeneity of household types by grouping them according to their factor endowments. In particular, they distinguish whether or not households have access to draft power and whether or not they have family members involved in temporary migration outside the province. After a detailed analysis of circumstances in this village, they conclude that the markets for labor, land, and capital are imperfect, thereby preventing households from simply taking wages and rental payments as given when making decisions about consumption and production. This “nonseparability” complicates the household’s decision-making process and can result in some striking results in the wake of trade reforms.

In the case of Doha reforms, the real income gains for the village are quite modest—about 1.2 percent of income—and relatively evenly spread across the different household groups. However, in the case of full liberalization, the aggregate gains are four times as large and much more unevenly spread across households, with the gains to households with draft power nearly twice as large as those for the other household groups. This reflects the intensification of production in agriculture engendered by higher prices for rice and other farm products.

### **Labor Markets**

The main resource with which the poor are endowed is their own labor. Whether they are self-employed farmers, providers of services, or wage earners, their income is closely tied to conditions in the labor market. This point surfaces clearly in the Brazil and China studies discussed above, both of which emphasize the importance of labor markets as a mechanism for transmitting favorable developments in the world marketplace, as well as elsewhere in the domestic economy, to impoverished households. The next set of studies focuses primarily on the labor markets in Brazil and China, as well as on a third country, Indonesia. The first of these is chapter 9, by Maurizio Bussolo, Jann Lay, and Dominique van der Mensbrugghe, on Brazil. Their focus is specifically on the link between the farm and nonfarm labor forces. They model the decision to move out of agriculture based on an econometric model that predicts the likelihood of a given individual changing sectors, based on the historical evidence in Brazil. The other important feature of this chapter is the authors’ analysis in the context of a 2001–15 baseline for the Brazilian economy. This permits viewing the impacts of trade reform in the context of ongoing changes in the economy, labor markets, and poverty.

In their baseline projection, Bussolo, Lay, and van der Mensbrugghe find that the poverty headcount falls by almost 14 percent. The majority of this decline is due to poverty reduction in agriculture, a sector that grows considerably faster than the nonfarm economy under their business-as-usual forecast. The majority of this poverty reduction is due to factor price changes (for example, higher wages), but a significant portion is attributable to the exit of labor from the relatively low-wage agricultural sector to higher-wage, nonfarm jobs. This intersectoral movement is particularly important to the poorest farm households.

Having established this baseline scenario, Bussolo, Lay, and van der Mensbrugghe analyze the implications of alternative trade reforms for poverty—in particular for the different labor force groups: the “movers” who move from agriculture to nonagriculture over the course of the baseline, the “stayers” who remain in agriculture, and the “stayers” in nonagriculture. The largest percentage point reduction in poverty over the baseline is for the “movers,” who experience a 22.4 percentage point reduction in their headcount (down from 53.4 percent to 31 percent). This is the poorest of the three groups, and it is also the group that experiences the greatest incremental poverty reduction, above and beyond the baseline, as a result of the Doha trade reforms. Overall, the authors find quite modest poverty gains from the Doha scenarios (just 3 percent of the baseline change over the 2001–15 period). Full liberalization generates estimates of national poverty reduction that are three times as large as the Doha reductions, but still modest in the context of projected baseline changes. This underscores the fact that trade reforms taken alone are a relatively small piece of the overall poverty reduction puzzle.

Chapter 10 by Fan Zhai and Thomas Hertel takes a deeper look at the Doha reforms through the lens of a labor-focused CGE model of China and the scope for enhancing these outcomes through complementary education reforms. Like chapter 9, this chapter emphasizes the farm–nonfarm labor market linkage, which Zhai and Hertel argue is partly a function of educational attainment and therefore susceptible to change through educational policy. They also emphasize the link between rural and urban labor markets in China through the temporary migration of workers. (Permanent migration is still restricted in that country.) In their analysis of multilateral trade reforms, the authors find that poverty falls across all of their household categories: by 1.3 percent in the case of Doha and 2.7 percent in the case of full liberalization. Inequality also declines slightly under these scenarios.

Zhai and Hertel cite econometric evidence that suggests that an additional year of education boosts an individual’s chances of obtaining an off-farm job in China by 14 percent. Educational attainment is also important for workers seeking to meet the needs of an increasingly integrated global marketplace, yet education expenditures per pupil in the rural areas lag significantly behind their urban counterparts in China. The authors explore the implications of accompanying trade

reform with additional educational investments in rural areas to enhance rural labor mobility, productivity, and income. In particular, they boost expenditures per pupil enrolled in mandatory education by 16 percent to reach the comparable urban level. This increment is assumed to be financed in part by public funds, raised through additional taxation, and in part through increased private contributions taken out of rural households' disposable income. This combination of educational and trade reforms has a much stronger impact on poverty alleviation, with the number of poor (living on less than US\$2 per day) falling by 13.4 percent. This scenario also has a favorable impact on rural-urban income inequality.

The final chapter focusing on labor markets, chapter 11, is a case study of Indonesia by Anne-Sophie Robilliard and Sherman Robinson. Instead of focusing on the farm-nonfarm or rural-urban movement of labor, these authors draw a sharp distinction between the formal and informal labor markets. The formal sector offers high wages, but few opportunities for employment. The informal sector, by contrast, has a flexible wage that is assumed to clear the market. Robilliard and Robinson explicitly model each individual's decision to participate in one or the other of these labor markets. In this way, they are able to predict which types of individuals will lose their job when formal sector employment contracts and which will be hired when employment expands. These changes in employment represent an important determinant of the welfare impacts on households of any change in a country's pattern of trade, production, and employment.

Robilliard and Robinson explore the poverty impacts of multilateral trade reform under three alternative labor market closures: fixed aggregate employment and flexible wages; fixed, sector-specific labor (no change in employment by sector); and fixed real wages and variable aggregate employment (that is, changes in unemployment are permitted). They focus on the full-liberalization scenario for this sensitivity analysis and find that the largest reduction in poverty comes from the fixed employment scenario: about 1.4 million people are lifted out of poverty. The proportional reduction is slightly higher in the rural areas and more favorable to the poorest of the poor as well, so that the national Gini index falls in this closure. When labor is not permitted to move across sectors, the poverty reduction is much smaller—only 900,000—because the economy is not permitted to fully adjust to the new world prices, efficiency gains are blunted, and the national rise in per capita income is muted.

The third case, in which wages are fixed and the unemployment rate is permitted to fall in the wake of increasing labor demand, presents a particularly interesting contrast in chapter 11. With increasing aggregate employment, national per capita income rises more than in the first case with fixed employment and flexible wages. The authors point out that the poverty outcome depends critically on who gets the new jobs. If the new jobs go to individuals from nonpoor households

(that is, families with other wage earners or other sources of income), the unemployment specification could worsen income inequality because the pool of unemployed workers prevents unskilled wages from rising and, without the benefit of higher wages, the poverty reduction would be muted. To quantify this outcome, the authors have estimated the likelihood that each type of unemployed individual will obtain one of the newly available jobs. There is a considerable uncertainty associated with these estimates, and Robilliard and Robinson reflect this by reporting their results in terms of the mean and standard deviation of a Monte Carlo simulation for each closure or scenario. Although the mean poverty reduction under the unemployment closure is larger than that under the standard labor market specification, the standard deviations suggest that the two are not significantly different in a statistical sense.

### **Interactions with Tax Policies**

An important theme in many of the chapters in this volume is the potential for interactions between the Doha scenarios and domestic policies to alter the poverty outcomes obtained from multilateral trade reform. Does multilateral trade liberalization lessen the distortions introduced by domestic commodity and factor market policies, or does it exacerbate them? To what extent can complementary reforms of domestic policies enhance the degree of poverty reduction? When trade liberalization results in reduced tax revenues, how will this shortfall be made up? Two of the chapters in this volume focus squarely on the question of tax replacement.<sup>3</sup>

Chapter 12, by Christian Arnault Emini, John Cockburn, and Bernard Decaluwé, focuses on the case of Cameroon. They examine the poverty impacts of the central Doha scenario, paying particular attention to the structure of the domestic tax system and the different options available for replacement of the lost tariff revenue. They view the value added tax (VAT) as the most likely tax replacement tool in Cameroon. This tax has a very heterogeneous impact on sectors, with effective rates ranging from 0 percent in the case of agriculture to 13 percent in the case of petroleum refining. When the authors combine this tax replacement tool with the Doha scenario, they find that poverty falls slightly, by about 22,000 people, in Cameroon, as does inequality. Of course, with relatively small tariff cuts under the Doha scenario, tax replacement is not all that central in this scenario.

In the case of full liberalization, tax replacement becomes much more important, and the authors consider three alternative tax scenarios with these tariff cuts. In every case, poverty rises, but the size of the poverty increase, as well as its causes, vary with the choice of replacement tax. When Arnault Emini, Cockburn, and Decaluwé use a nondistorting production tax, 106,000 people are estimated

to be lifted out of poverty, but 193,000 formerly nonpoor fall into poverty, resulting in a net poverty increase of 87,000 people. This occurs despite an increase in aggregate welfare in Cameroon, so it is clearly a consequence of the pattern of imports and exports in that country. When trade reform is coupled with an increase in consumption taxes, the poverty rise is much larger—nearly half a million people. This impact is lessened somewhat (a 300,000-person increase) by the use of the VAT to replace the forgone tariff revenue. Clearly, in the case of Cameroon, the choice of tax instrument used to replace the lost tariff revenue can be as important as the type of trade liberalization (full liberalization versus Doha reforms only).

Chapter 13, by Caesar Cororaton, John Cockburn, and Erwin Corong, is a study focusing on the issue of tax replacement in the Philippines. This is an interesting case because the agriculture sector has evolved from net exporter to net importer over the past three decades. Because the country is a relatively recent net food importer, there is widespread concern in the Philippines that trade reforms will jeopardize food security. However, in their analysis of the Doha scenarios, the authors find that the national poverty headcount is barely affected. There is a small rise in poverty among the self-employed households, particularly those in rural areas, but poverty among salaried urban workers falls. In contrast to many of the focus economies studied in this volume, the Doha reforms are not favorable to Philippine agriculture, and this effect is more pronounced under full liberalization. Because Philippine agriculture currently receives relatively high protection, full liberalization results in a contraction of the agricultural sector and an increase in rural poverty. This is offset by a reduction in poverty among the urban population, where wages rise. As a consequence, there is a small decline in the national poverty headcount. However, when the authors switch from the VAT to a uniform income tax for purposes of tariff replacement, poverty rises in the full-liberalization case. Once again, the pattern of exemptions in the indirect tax system favors the poor, and its use for purposes of tax replacement is a critical piece of the poverty puzzle.

### **Cross-Country Comparisons**

With their differences in factor market closures, elasticities of substitution, methodologies for grouping households and modeling labor markets, and so forth, the country case studies discussed up to this point have not been comparable. This makes it difficult to generalize on the basis of cross-country comparisons. Therefore, chapter 14, by Maros Ivanic, features a cross-country comparison for 15 countries, each of which has been treated symmetrically. Although this approach is somewhat stylized, and therefore less definitive for any given country, each of the

focus country databases has been built up from the same types of individual household surveys as the single-country case studies. Another virtue of this chapter is that it offers a fully integrated, global-national-micro modeling approach. In particular, Ivanic has augmented the Global Trade Analysis Project (GTAP) global CGE model with reconciled data on 140 disaggregated household groups for each of the 15 focus countries. His grouping is based on income specialization—for example, agriculture-specialized households rely almost entirely on agricultural self-employment for their income, and similarly for a wage-specialized stratum, and so forth. Because Ivanic uses a global framework, he can simulate all of the trade reform scenarios directly in his model, which also facilitates further decomposition of the elements of trade reform and their poverty impacts.

Ivanic's findings with respect to the poverty impacts of the DDA are particularly interesting. Specifically, he finds that the Doha trade reform scenarios are not as poverty friendly as the global liberalization scenario. If Doha represented the same mix of policy reforms as full liberalization, both simulations would be expected to have the same pattern of poverty reduction, but with larger cuts under full liberalization because of its deeper cuts in protection (for example, 100 percent versus 33 percent). However, this is not the case, and, in a decomposition analysis, Ivanic shows why.

The DDA as outlined in chapter 2 has a variety of different elements, and these have conflicting impacts on poverty. The removal of export subsidies in the EU and the United States tends to raise poverty in most of the developing countries in Ivanic's sample, even while reducing poverty among the agricultural households in these poorer countries. This is hardly surprising in light of earlier studies highlighting the vulnerability of low-income, net-food-importing countries to higher world prices for these products (see, for example, Valdes and McCalla [2004]).<sup>4</sup> Because these export subsidies are fully removed under the Doha scenario, this impact is fully realized under that partial reform. However, Ivanic finds that cuts in developing-country tariffs as a group have a very favorable impact on national poverty in the focus countries.<sup>5</sup> Yet there is very little reform of developing-country tariffs under Doha—first as a result of limited reciprocity (part of special and differential treatment), and second as a result of the extensive binding overhang in developing countries. Thus, although developing-country tariff cuts are among the most poverty-friendly elements of global trade reform, very little of the beneficial impact of these reforms is felt under the Doha scenario. When combined, these facts explain why Doha is less poverty friendly than the comprehensive reform scenario. It accentuates those aspects of reform that adversely affect poverty (export subsidies), while largely omitting those aspects that benefit the poor.

This suggests that deeper cuts in developing-country tariffs under the Doha scenario might have a beneficial impact on the poverty outcome. This is explored

under the alternative scenario, Doha-all, in which developing countries fully reciprocate the developed-country reductions in tariff bindings. Ivanic shows that Doha-all does have a more favorable poverty outcome than the base Doha scenario.

An additional finding from Ivanic's cross-section analysis pertains to the common assumption that "a rising tide lifts all boats," that is, that poverty rises and falls in concert with changes in national per capita income. Ivanic shows that this is not always the case in the near term because trade reform generates uneven gains in the economy. One sector gains and another loses, so it matters greatly where the poverty is concentrated. If most of the poor work in agriculture, and agriculture is hurt by trade reform, poverty may rise even if real national income rises. This is the case in Malawi, where 40 percent of the population is specialized in agricultural self-employment.

### **Effects on Productivity and Economic Growth**

Sustained reductions in poverty require economic growth, which leads naturally to the question of how a prospective DDA might affect the growth rates of countries currently experiencing the highest levels of poverty. This is a challenging area of research—worthy of an entire volume in its own right—but the final section of this book offers two country case studies and a global synthesis chapter oriented toward this theme.

Chapter 15 on Bangladesh focuses on the growth question by emphasizing the impact of trade reform on capital accumulation. Nabil Annabi, Bazlul Khandker, Selim Raiham, John Cockburn, and Bernard Decaluwé begin with a short-run analysis in which they find that Bangladesh experiences an aggregate loss, as well as a small rise in poverty, under the Doha scenario. There are two reasons to expect such short run losses. First, Bangladesh is a net agricultural importer and, as such, will suffer from higher world prices of agricultural products. Second, as an LDC, Bangladesh currently enjoys tariff-free access to many of the rich countries' markets. When tariffs in these markets fall, Bangladesh is expected to suffer from preference erosion—that is, the value of these tariff preferences diminishes. The analysis in this book suggests that the first explanation is the relevant one, with the main losses associated with imports of cotton, wheat, and oilseeds. There is no evidence of *net* preference erosion adversely affecting the terms of trade for Bangladesh. Because the apparel exports displaced by erosion from the EU are absorbed in the North American market, where, de facto, most apparel exports from Bangladesh do not enjoy preferential market access, Bangladesh benefits from the tariff cuts. The terms of trade losses facing Bangladesh under Doha are magnified under full liberalization. In addition to the above, to pay for additional imports, Bangladesh must expand the volume of its textile and apparel exports,

which account for nearly 80 percent of export revenues. This tends to depress their prices.

However, these short-run losses are transitory and the authors of chapter 15 estimate that after two to three years, the economy will be better off under full liberalization than under the business-as-usual scenario. The reason is that the cost of investment goods will fall, and increased investment will flow to the more competitive sectors, thereby stimulating additional growth. The authors estimate that in the long run (15 years), gross domestic product (GDP) will be 1.44 percent higher and poverty 6.1 percent lower under the full-liberalization scenario. A closer look at these results reveals that most of the stimulus for the increased investment and economic growth comes from the reduction in Bangladesh's own tariffs, which would be missing under the Doha scenario.

These authors also explore an issue that has been the subject of much discussion recently in the context of the WTO: remittances from overseas workers. They formally explore the implications of a 50 percent increase in the flow of remittances to Bangladesh—and specifically to those households currently receiving these transfers. As a result, the domestic labor supply is reduced. This development has a favorable impact on poverty, reducing it by 0.8 percent in the short run and 4.0 percent in the long run. To the extent that rich countries are concerned about the impact on Bangladesh of higher food prices and preference erosion, a policy that permits increased temporary migration appears to be a good way to offset some of these negative effects, because the benefits of increased remittances dominate the short-run costs of trade liberalization.

Chapter 16, by Thomas Rutherford, David Tarr, and Oleksandr Shepotylo, explores one of the key trade-growth linkages in the case of Russia. They focus particularly on the potential for international trade and foreign direct investment (FDI) in the services sector to bring new varieties of goods and new technologies to Russia, thereby enhancing productivity, generating economic growth, and lifting households out of poverty. The role of services sector reforms—an important aspect of future WTO agreements—is often neglected in analyses of trade and poverty. Yet, as Mattoo, Rathindran, and Subramamian (2001) demonstrate, such reforms, particularly in telecommunications and financial services, can boost long-run growth rates. The chapter on Russia begins by analyzing the Doha scenario explored by other authors. The impact of this scenario is mixed, but most of the households experience a small welfare loss. The full-liberalization scenario shifts the distribution of welfare impacts in the positive direction, so that most Russian households now gain and poverty falls, but again the changes are quite modest.

The authors then turn to domestic reforms in the services sectors—a part of the economy that the DDA is not expected to affect to any great degree, but an

area that is currently receiving a great deal of attention in the context of Russia's WTO accession negotiations. The authors show that the liberalization of barriers to FDI greatly enhances the potential welfare gains. The main vehicle for this enhancement is the provision of new varieties of services, which improve productivity, not only in the services sector, but also in services-using sectors as well. Indeed, the added productivity boost from the elimination of services FDI barriers alone is sufficient to generate a per capita income increase of 5.3 percent, ensuring that virtually all Russian households benefit from the reform. There are two lessons to be drawn from this work. First, productivity growth is essential for generating widespread gains from trade reforms, and second, one way of obtaining such growth is through ambitious services sector reforms, such as those that have been a part of recent WTO accession negotiations, most notably in China, but also now in Russia.<sup>6</sup>

The final chapter in the book provides an integrated, global analysis of the potential for multilateral trade reforms to reduce poverty in the long run (by 2015). In this chapter, Kym Anderson, Will Martin, and Dominique van der Mensbrugghe use the latest version of the World Bank's LINKAGE model, along with the same GTAP dataset used in chapters 3 and 14, to project the growth path of the global economy from 2001 to 2015. They find that trade reforms have a modest impact on capital accumulation and thereby boost the projected global gains from multilateral trade reform by about one-quarter. However, they devote most of their attention to the potential impacts of increased trade on productivity growth. (It should be noted, however, that the authors focus entirely on productivity growth associated with increased manufactures exports, not services trade or investment as in the Russia study).

There is now a rapidly growing literature on the impacts of trade and trade policy reforms on productivity, and Anderson, Martin, and van der Mensbrugghe draw on this in their chapter. When they incorporate the additional impact of openness on labor productivity, they find a substantial boost to the global gains (40 percent larger gains in 2015) with a disproportionate share accruing to the South and East Asia developing economies. The poverty impacts of these alternative scenarios are elicited by first estimating the income gains to the poorest households and then applying to this an estimated elasticity of poverty reduction with respect to income growth at the poverty line. Instead of using real per capita income for the region as a whole, the authors use the unskilled wage rate, deflated by an index of food and clothing prices, reflecting the dual facts that the main endowment of the poor is their own labor and they spend the bulk of their income on nondurable goods. Another critical assumption is that the poor do not pay taxes, so that any increase in tax rates required to offset forgone tariff revenues does not affect them.

Applying these estimates of earnings at the poverty line to the poverty elasticity of income in each region, which varies depending on the regional distribution of income, the authors predict the extent of poverty reduction in developing countries. Of course, this depends on the poverty line. It also depends on the baseline poverty projections, which decline considerably between 2001 and 2015. For US\$1 per day poverty, the estimated reduction in 2015, in the absence of additional productivity gains, is 2.5 million people for the Doha scenario and 31.9 million people for full liberalization. When applied to current (2001) poverty levels, the authors' calculations result in poverty reductions of 9.7 million and 80.5 million people under the Doha and full-liberalization scenarios, respectively. The 2015 poverty reductions are increased to 4.3 million and 43.5 million, for Doha and full liberalization, respectively, when productivity gains are factored in. For US\$2 per day poverty, the reduction in the number of the poor is larger, but the percentage reduction is smaller (see table 1.1).<sup>7</sup>

Based on the Doha–full liberalization comparison, it is clear that the (rather ambitious) Doha scenarios capture only a relatively small portion of the total poverty reduction possible under trade reforms. When the authors consider the Doha-all scenario, they find that implementing deeper cuts in the developing countries enhances the poverty outcome, nearly doubling the poverty reduction obtained under the central Doha scenario. This finding reinforces Ivanic's conclusions, in chapter 14, with respect to the beneficial poverty impacts of developing-country tariff cuts under the DDA. It is also hardly surprising in light of the increasing importance of south-south trade and the relatively high level of developing country tariffs, as reported in chapter 3.

Another important finding from the Anderson, Martin, and van der Mensbrugghe chapter relates to sensitive agricultural products, as well as special products, in developing countries. Industrial countries have proposed that certain sensitive products be exempt from steep tariff reductions, instead being liberalized through a combination of quota expansion and tariff reduction. In chapter 2, Anderson and Martin suggest that a cut in bound tariffs might be most effective, and they consider the case in which these commodities, limited to 2 percent of industrial-country tariff lines in agriculture, face a modest 15 percent cut in bound tariffs. In the case of developing countries, an additional category of exemptions is provided for in the Framework Agreement. These special products, identified "based on criteria of food security, livelihood security and rural development needs," will be eligible for more flexible treatment as well (WTO 2004). Allowing for this additional category, the scenario outlined by Anderson and Martin permits developing countries to exempt 4 percent of agricultural tariff lines from the tiered cuts, facing instead just a 15 percent cut in bound tariffs.

Of course, both special and sensitive products invariably have the highest tariffs, so that exempting them can make a big difference in the results. The authors find that merely introducing these modest exemptions for a maximum of 2 percent of the industrial tariff lines in agriculture (4 percent for developing countries) virtually eliminates the poverty impacts of a Doha agreement. Therefore, to have a significant poverty impact, the DDA must not only have ambitious numerical targets, it must also seek to limit—indeed, eliminate—the use of sensitive and special product exemptions.<sup>8</sup>

### **Summary and Conclusions**

Assessing the impact of multilateral trade liberalization on poverty is a challenging assignment. As Winters (2000, p. 43) notes, “Tracing the links between trade and poverty is going to be a detailed and frustrating task, for much of what one wishes to know is just unknown. It will also become obvious that most of the links are very case specific.” This book represents an attempt to make known a few more of these unknown linkages. As such, the approach has been heterogeneous and opportunistic, calling on experts in this field to undertake in-depth studies in countries for which appropriate data and analytical infrastructure are available. All of this research capacity has been directed toward the analysis of the trade policy question that is central in many policy makers’ minds today: What are the likely poverty impacts of a successful DDA? And what elements could be added to enhance this outcome?

As noted previously, the approach taken in this book ensures consistency of methods in the global analysis of the multilateral trade reform scenarios, as well as in the methodology for incorporating these results into the national analyses. However, at the country level, different authors have had the liberty to take a variety of approaches depending on the particular circumstances facing their countries and their own analytical interests. This is why there are two studies of the Brazilian economy—one of which focuses on near-term impacts across heterogeneous individuals, households, and regions in Brazil, and one of which focuses on longer-term impacts, particularly in light of the barriers to intersectoral labor mobility. In the case of China, one study focuses on market failure at the village level, and another focuses on labor mobility at the national level. Similarly, there are differences in methodology taken across country case studies, with a mix of partial and general equilibrium approaches, and static and dynamic frameworks. The base years differ across studies, and even the poverty lines chosen are not uniform across all studies. Their findings, therefore, are not strictly comparable. Finally, because the choice of countries to include in this volume was made on the

basis of preexisting work that laid a foundation for the current research project, this is not a random sample of developing countries. With these qualifications in mind, let us take an overview of the findings.

Table 1.1 summarizes the poverty results from each of the national studies (subnational studies are not reported here) for both the Doha and full-liberalization scenarios, distinguished by length of run for the analysis. The long-term studies factor in the impact of trade policy on investment and capital accumulation—and in the case of the global analysis, productivity as well—whereas the short-term studies do not. The national poverty changes are reported in two different ways: first, as the change in number of persons in poverty, and second, as the percentage change in the poverty headcount. Thus, a negative number in table 1.1 means that the number of poor has fallen as a result of multilateral trade reform, and a positive number indicates that the number of poor has risen.

Table 1.1 suggests several tentative conclusions. First, the near-term analyses are mixed in terms of their outcomes, with poverty rising in some cases and falling in others. We view this diversity as correct and as a strength of the country-based approach. Even setting aside the methodological differences between studies, the case specificity alluded to above leads us to expect differences between countries' interests in the DDA, and the chapters explain exactly why this is so.

The largest poverty reductions in table 1.1, in both absolute and relative terms, are in countries with agricultural export potential to the markets that liberalize most (that is, East Asia and Europe). The strong poverty reduction in Brazil is driven by increased agricultural production, which tends to be concentrated in regions with relatively higher poverty incidence. In China, the poverty reduction is fueled by increased agricultural exports to the highly protected agricultural markets of East Asia. However, the poverty increases tend to be in countries that are net importers of agricultural products (for example, Bangladesh) and that may eventually benefit from preferential market access (for example, Mozambique). Thus, the strongest difference between countries concerns their exposure to the shocks generated by the DDA. Even holding this constant, however, poverty impacts can vary with, for example, the degree of transmission of world prices to rural households, the barriers to the mobility of workers between sectors of the economy, and the incidence of national tax instruments used to replace lost tariff revenue. Taken as a whole, the number of countries where poverty declines under the Doha scenario is about the same as the number of countries where it falls, although looking at the absolute number of poor, it can be seen that poverty declines in several of the most populous countries (Brazil, China, and Indonesia) and therefore declines overall in this nonrandom sample of countries.

As for the long-run results, all of the studies that consider the impact of trade on capital accumulation, productivity, or both predict a reduction in poverty

**Table 1.1. Poverty Impacts of a Prospective DDA**

Country (chapter number)	Change in poverty headcount							
	Near term: fixed capital				Long term: investment impacts			
	Doha		Full liberalization		Doha		Full liberalization	
	1,000 people	%	1,000 people	%	1,000 people	%	1,000 people	%
Bangladesh (15)	38	0.3	1,354	1.1	0	0	-5,758	-4.6
Brazil (7)	-236	-0.4	-482	-0.8				
Brazil (9)					-380	-1.1	-1,030	-2.9
Cameroon (12)	-22	-0.4	303	4.8				
China (10)	-4,590	-1.1	-8,271	-2.0	-5,378	-1.3	-11,170	-2.7
Indonesia (11)	-48	-0.1	-1,384	-3.5				
Mexico (4)	4	0.0	127	1.0				
Mozambique (5)	27	0.3	60	0.6				
Philippines (13)	12	0.0	-7	0.0				
Russia (16)	209	0.9	-122	-0.5				
<b>All developing countries (17)</b>								
US\$1 per day:								
2001 <sup>a</sup>	-7,000		-66,300		-9,700		-80,500	
2015 <sup>b</sup>	-1,700	-0.3	-23,800	-3.8	-2,500	-0.4	-31,900	-5.1
US\$2 per day:								
2001	-8,700		-103,900		-12,600		-123,200	
2015	-4,100	-0.2	-52,300	-2.7	-6,200	-0.3	-65,600	-3.3
<b>Productivity effects added<sup>c</sup></b>								
US\$1 per day:								
2001					-20,400		-126,500	
2015					-4,300	-0.6	-43,500	-6.5
US\$2 per day:								
2001					-29,600		-193,200	
2015					-12,100	-0.6	-94,700	-4.9

Source: Studies reported in this book.

- Based on percentage changes in 2015, but applied to 2001 poverty headcount.
- Computed for the year 2015 when the total number of poor is projected to be significantly lower.
- Productivity gains from increased openness to trade apply to both manufactures and agriculture. (Earlier versions assumed only productivity gains in manufactures. See chapter 17 for details.)

(with the exception of Doha-Bangladesh, where there is no long-run measurable impact). Trade stimulates investment, investment stimulates growth, and growth reduces poverty. When productivity impacts are also considered (bottom group of rows in table 1.1), this effect is even stronger. This distinction between the short run and the long run is particularly striking in the case of the full-liberalization scenarios for Bangladesh, where the short-run impacts of trade reform translate into a rise in headcount poverty, and the long-run impacts of trade reform suggest a substantial decline.

In addition to the quantitative summary reported in table 1.1, the research documented in this book has generated some additional insights. First, the liberalization targets under the DDA have to be ambitious if the round is to have a measurable impact on world markets and hence poverty. Second, assuming an ambitious DDA, the near-term poverty impacts are likely to be mixed.

The analysis suggests, however, that countries can enhance the impact on poverty by pursuing complementary domestic reforms to enable households to take advantage of market opportunities created by the DDA.<sup>9</sup> These include improved infrastructure and the reform of domestic marketing institutions to improve price transmission to rural areas, rural education reform to enhance labor mobility between the farm and nonfarm sectors, and extension outreach to permit farmers to take advantage of new export opportunities opened up by the DDA.

Of course, sustained poverty reduction depends on stimulating economic growth. Here, the impact of the DDA on productivity is critical. Empirical evidence suggests that increased merchandise trade will likely bring with it productivity gains through disciplinary effects of import competition on domestic firms as well as, possibly, learning by doing on the export side. To fully realize potential productivity gains, however, trade reforms need to be far reaching and should include reducing barriers to services trade and investment in addition to merchandise tariffs, which lie mainly or wholly outside the DDA. Thus, even if the DDA is very successful, a major agenda of unilateral reform and further rounds of multilateral talks remains. Only through such comprehensive reforms can long-term growth and poverty reduction be ensured.

## Notes

1. The forthcoming book, *Globalization and Poverty*, edited by Ann Harrison, adopts the same strategy, combining a set of cross-country econometric studies with several individual country case studies.

2. For example, a tariff of, say, 100 percent is cut by 66–95 percent:  $[15\% \times 0.45 + (90-15)\% \times 0.70 + (100-90)\% \times 0.75]$ . Applying the cuts at the margin avoids the discontinuities implied by the July Framework.

3. Of course, some assumption about tax replacement is required in each of the studies in this volume. The standard assumption used is one of replacement of lost tariff revenue with an equiproportional (distribution-neutral) income tax. Although not a realistic assumption in most cases, it facilitates the comparability of results across regions. In those cases where country case study authors have emphasized the treatment of the domestic tax system, they have been encouraged to explore the impacts of replacing the lost tariff revenue with the most likely instrument (usually the value added tax).

4. Dimaranan, Hertel, and Keeney (2004) demonstrate that many developing countries have become much more dependent on imports of subsidized crops from OECD countries over the past 40 years. Removing these subsidies will obviously have an adverse effect in the near term.

5. In Ivanic's analysis, most of these gains come from improved market access to other developing countries. This is due to the relatively high optimal tariff in the underlying GTAP model, which makes unilateral reform relatively unattractive (see also chapter 3). This implies that to reap the benefits, developing countries must liberalize together—the multilateral aspect of reform is important.

6. Similarly dominant welfare effects from services reforms have been found in the case of China's WTO accession agreement (Walmsley, Hertel, and Ianchovichina Forthcoming).

7. These estimates of poverty reduction are considerably smaller than earlier predictions using the World Bank's LINKAGE model. The difference is due to the fact that these estimates are based on the most recent (Version 6) GTAP database, which is further updated to account for EU enlargement as well as the WTO accession of China and others. These recent trade reforms have reduced the overall level of protection worldwide, thereby lessening the gains from reform. In addition, the Version 6 database has a complete treatment of preferential tariffs, including the EU's 2001 Everything but Arms initiative, which means that gains to the LDCs from trade reform are considerably reduced.

8. It is not argued that individual developing countries couldn't improve their poverty outcomes by exempting a few special products from liberalization. But given the multitude of products and countries, such cases cannot be identified here. Besides, it is implausible that developing countries could leave the exemptions door open in any significant fashion without industrialized countries also squeezing their sensitive products through the same opening.

9. The volume edited by Harrison (Forthcoming) reaches a similar conclusion, based on a set of ex post analyses of trade reform and poverty.

## References

- Arndt, Channing, Henning Tarp Jensen, Sherman Robinson, and Finn Tarp. 2000. "Marketing Margins and Agricultural Technology in Mozambique." *Journal of Development Studies* 37 (1): 121–37.
- Francois, J. F., and C. R. Shiells. 1994. "Applied General Equilibrium Models of North American Free Trade: An Introduction." In *Modelling Trade Policy: Applied General Equilibrium Assessments of North American Free Trade*, 3–46. Cambridge: Cambridge University Press.
- Harrison, G. W., T. F. Rutherford, D. G. Tarr, and A. Gurgel. 2003. "Regional, Multilateral, and Unilateral Trade Policies of Mercosur for Growth and Poverty Reduction in Brazil." Policy Research Working Paper 3051, World Bank, Washington, DC.
- Hertel, Thomas W., Maros Ivanic, Paul V. Preckel, and John Cranfield. 2004. "The Earnings Effects of Multilateral Trade Liberalization: Implications for Poverty." *World Bank Economic Review* 18 (2): 205–36.
- Hertel, Thomas W., and Will Martin. 2000. "Liberalizing Agriculture and Manufactures in a Millennium Round: Implications for Developing Countries." *World Economy* 23: 455–70.
- Jorgenson, D. W. 1984. "Economic Methods for Applied General Equilibrium Analysis." In *Applied General Equilibrium Analysis*, ed. H. E. Scharf and J. B. Shoven, 139–203. Cambridge: Cambridge University Press.
- Kehoe, Timothy J. 2005. "An Evaluation of the Performance of Applied General Equilibrium Models of the Impact of NAFTA." In *Frontiers in Applied General Equilibrium Modeling: Essays in Honor of*

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- Herbert Scarf*, ed. Timothy J. Kehoe, T. N. Srinivasan, and John Whalley, 341–77. Cambridge: Cambridge University Press.
- Mattoo, A., R. Rathindran, and A. Subramanian. 2001. “Measuring Services Trade Liberalization and Its Impact on Economic Growth.” Policy Research Working Paper 2655, World Bank, Washington, DC.
- McKittrick, R. R. 1998. “The Econometric Critique of Computable General Equilibrium Modeling: The Role of Functional Forms.” *Economic Modeling* 15 (4): 543–73.
- Valdes, A., and A. McCalla. 2004. “Where the Interests of Developing Countries Converge and Diverge.” In *Agriculture in the New Trade Agenda*, ed. M. Ingco and L. A. Winters, 136–150. Cambridge: Cambridge University Press.
- Walmsley, T., T. W. Hertel, and E. I. Ianchovichina. Forthcoming. “Assessing the Impact of China’s WTO Accession on Investment.” *Pacific Economic Review*.
- Winters, L. A. 2000. “Trade and Poverty: Is There a Connection?” In *Trade, Income Disparity and Poverty*, ed. D. Ben David, H. Nordstrom and L. A. Winters, Special Study No. 5. Geneva: WTO.
- Winters, L. A., N. McCulloch, and A. McKay. 2004. “Trade Liberalisation and Poverty: The Evidence So Far.” *Journal of Economic Literature* 42: 72–115.
- World Bank. 2004. *Global Economic Prospects 2004—Realizing the Development Promise of the Doha Agenda*. Washington, DC: World Bank.
- WTO. 2004. *Doha Work Programme: Decision Adopted by the General Council on 1 August, 2004*. Geneva: WTO.