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Why Isn't the Doha Development Agenda More Poverty Friendly?*

by

Thomas W. Hertel** and Roman Keeney
Purdue University,
Maros Ivanic, The World Bank
and
L. Alan Winters
University of Sussex

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** Corresponding author: T. W. Hertel, Center for Global Trade Analysis, Purdue University, 403 West State Street, W. Lafayette, IN 47907; hertel@purdue.edu

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Abstract

The breakdown of the WTO negotiations under the Doha Development Agenda has inspired critics to highlight the lack of effort on the part of rich countries to reform their agricultural policies. In this paper, we shift the focus to poverty impacts of developing country reforms – particularly agricultural tariff reduction. We argue that the Doha Development Agenda is fundamentally less poverty-friendly than it could be -- in large part due to the absence of tariff cuts on staple food products in developing countries. Such cuts would give the poor access to food at world prices, thereby reducing the cost of living at the poverty line. We also explore the contention that such tariff cuts will hurt the poor working in agriculture. Based on our analysis of the impacts of multilateral trade policy reforms in a sample of fifteen developing countries, we find there is some evidence of poverty increases in agriculture. However, such effects are minimized by ensuring that agricultural tariffs are cut in *all* developing countries. Overall, the poverty-reducing impact of lower food prices dominates; we conclude that the Doha Development Agenda would be more poverty friendly if it were to include deeper cuts in developing country agricultural tariffs.

Keywords: WTO, Poverty, Trade Liberalization, Doha Development Agenda, Agricultural Trade

Introduction and Motivation

The World Trade Organization's Doha Round of trade negotiations will be remembered for at least two characteristics. First, it was the first round to place development explicitly at the center of its business, as epitomized in its title "The Doha Development Agenda." Second, it has revolved around agricultural trade liberalization to a much greater and more critical extent than any other round. These two bold innovations have certainly made negotiations more complex and sensitive and in the course of the six years' negotiations to date they have come to be intimately connected in the public and political perceptions. Such a connection is undoubtedly warranted but we will argue that it has not always been correctly understood. Although the agricultural component of a successful Doha round would enhance development, in the process of balancing the various pressures from the agricultural lobbies and the development advocates, the negotiators have not maximized its effect.

We adopt a limited, operational definition of development – the reduction in the number of people in extreme poverty – and ask, for a medium-term horizon (3-5 years), how different elements of trade liberalization contribute towards this goal. We show that, if an agreement under the Doha round were to be achieved, it will likely be less poverty-friendly than it could have been with a different mix of reforms. Several commentators including ourselves have observed that the emphasis on eliminating industrial countries' agricultural export subsidies is not particularly poverty-friendly, because subsidies reduce food prices and many poor people are heavy net purchasers of food (e.g. Hoekman, Ng and Olarreaga, 2004; Anderson, Martin and Valenzuela, 2006, Hertel et al., 2007). This result is embedded in the current paper, but it takes a distant second place to another problem: the Doha round is set to require developing countries to undertake little agricultural trade liberalization and least developed ones (the poorest) to undertake none. It turns out that this too curtails the ability of the round to reduce poverty in developing countries, despite the fact that among negotiating parties it is the developing countries, and their development advisors, who are insisting on such exemptions.

In fact, our results both pose, and resolve, a paradox. Because of the patterns of protection involved, our analysis suggests that developing country poverty could be reduced both by liberalizing industrial countries' agricultural trade, which will increase agricultural prices in developing countries, and by liberalizing developing countries' trade, which will reduce them. We decompose the effects of the various trade liberalizations on poverty into effects acting via earnings, via the replacement of lost tax (tariff) revenue and via consumer prices. Developed country liberalization reduces poverty via its strong positive effect on the earnings of agricultural factors, which is generally not offset by the adverse effects of higher consumer prices. For developing countries' agricultural liberalizations, the earnings effects are mixed (partly because some countries export to other developing countries) and the revenue replacement effects adverse, but they are generally more than offset by the advantages of the ensuing lower food prices.

The translation of global trade reforms into changes in poverty involves a long and torturous causal chain, which has so far entirely evaded econometric analyses of *ex post* data. The best we have econometrically are studies of specific steps – e.g. Goldberg and Pavcnik (2003) on employment effects of trade reforms – or of specific events – e.g. Niimi, Vasudeva-Dutta and Winters (2007) on Vietnam's trade liberalization. And yet the prominence of the question in global debates means that the economics profession cannot legitimately evade the issue altogether. Thus in this and previous studies – Hertel and Winters (2006) and Hertel et al. (2007) – we use simulation techniques. We first construct plausible scenarios for the outcome of the Doha round, translating them into reductions in agricultural support at a very detailed level; from these we use a detailed global computable general equilibrium model – GTAP – to estimate likely effects on factor and commodity prices and government revenue in 34 countries and regions. Of these we specialize on fifteen developing countries for which we have detailed poverty, factor earnings and consumption data. The latter allow us to calculate the effects on poverty across seven strata of households per country of changes in ten factor rewards and in taxes and consumer prices. From these we construct a synthesis of likely national poverty consequences. The focus countries are based on data

availability; they are neither randomly selected nor strictly representative of the developing world, however, together they span the continents of Africa, Asia and Latin America. In the aggregate, they account for nearly 1 billion people, and more than 400 million poor (measured at the $2/day poverty line; 150 million poor when evaluated at the $1/day poverty line). And, they span a wide range of per capita income levels as well as differing degrees of industrialization, so earnings patterns of the poor in these fifteen countries vary greatly.

The basic scenarios and modeling approach in this paper are the same as in Hertel et al. (2007). Whereas that article looked at rich-country income distribution as well as poor, and only at the net effects on developing country poverty, here we focus on the decomposition of the effects of different policies and the contrast between developed and developing country liberalization. We believe it is the first systematic attempt to look at the poverty dimension of the missing developing country liberalization in Doha. We turn now to our analytical framework, which features a novel approach to decomposing the poverty impacts of trade reform.

Analytical Framework

The Poverty Model: There are many alternative approaches to estimating the change in poverty headcount due to trade reforms (Winters et al., 2004; Hertel and Reimer, 2005). The analytical approach used here builds on that of Hertel et al. (2004), which employs a sequential, macro-micro modeling strategy in which results from the global model are passed to a series of micro-simulation models. More specifically, our poverty analysis begins with the estimation of a consumer demand system and the parameters of the associated utility function. The utility of the household at the poverty line is defined as the *poverty level of utility*. In evaluating changes in poverty in the wake of trade reforms, we will compute the change in the percentage of the population below this poverty level of utility.

In this study, we use Rimmer and Powell's (1996) AIDADS demand system to represent consumer preferences. The AIDADS demand system is particularly useful for poverty analysis because it

lends itself to international cross-section estimation, performs well in out of sample forecasting, and devotes two-thirds of its parameters to consumption behavior in the neighborhood of the poverty line (Cranfield et al., 2003). Estimation of this demand system is undertaken using the 80 country, per capita consumption data set offered by GTAP version 6.1 and the resulting parameters are reported in Appendix Table A1. The demand system estimates are then calibrated to reproduce base year per capita demands in each country following the approach of Golub (2006).

A key finding in the work of Hertel et al. (2004) is the importance of stratifying households by their primary source of income. Farm households in developing countries often rely on the farm enterprise for virtually all of their income. The share of national poverty concentrated in agriculture-specialized households is quite high in the poorest countries in our sample – between one-quarter and one-half of the $1/day headcount in Chile, Colombia, Indonesia, Malawi, Mozambique and Zambia. Not only are farm households in the poorest countries more likely to be specialized in farming, these specialized farm households also tend to be poorer, on average, than the rest of the population. The implication of this pattern of farm income specialization is that the poorest households in the poorest countries are more concentrated in agriculture and therefore more likely to benefit from producer price increases engendered by multilateral trade reforms. We follow Hertel et al. (2004) in identifying five household groups that rely almost exclusively (95% or more) on one source of income: agricultural self employment, non-agricultural self-employment, rural wage labor, urban wage labor, or transfer payments. The remaining households are grouped into rural and urban diversified strata, giving seven strata.[1]

Given our emphasis on the poverty headcount, we focus squarely on the households in the neighborhood of the poverty line making use of a *highly disaggregated* poverty elasticity approach.[2] Our

[1] A clear limitation of this approach stems from the rigidity of a given households' classification by earnings specialization. Obviously households maybe induced to change their specialization or diversify in response to changing relative factor returns. We believe that the relatively broad definition of strata circumvents this problem for the majority of households in the face of modest earnings changes. However, this important qualification will be further considered below in the results section.

[2] We have chosen to focus on households in the neighborhood of the poverty line in order to permit generalization of

analysis begins with the cumulative density function of per capita income in region r for the population stratum s: $F_{rs}(y)$. Thus $F_{rs}(\bar{y}_r^p)$ computes the poverty headcount ratio when $\bar{y}_r^p$ is the level of income required to attain the poverty level of utility in region r at initial prices. Since preferences and consumer prices are assumed to be the same across all strata in the country, this poverty level of income is unique. We are interested in the elasticity of this poverty headcount with respect to a small change in the real income of households at the poverty line, in a given stratum *s*: dy_{rs}^p. Assuming unchanging commodity prices, and given the function $F_{rs}(\bar{y}_r^p)$, this may be computed as follows:

$$\varepsilon_{rs} = -\frac{dF_{rs}(\bar{y}_r^p)/dy_{rs}^p}{F_{rs}(\bar{y}_r^p)/y_{rs}^p}. \qquad (1)$$

The top panel in Table 1 reports these stratum-specific poverty elasticities for the fifteen countries in our sample. They range from a low of 0.0006 in the self-employed agriculture stratum in Zambia, where nearly all of the population is well below the poverty line, to a high of 3.63 in the urban diversified stratum of Brazil, where the population density at the poverty line is quite high.

The proportional change in real income of households at the poverty line in stratum s of region r can be written as the income–share weighted sum of the households' real after-tax factor earnings:

$$\hat{y}_{rs}^p = \sum_j \alpha_{rsj}^p (\hat{W}_{rj} - \hat{C}_r^p) \qquad (2)$$

where α_{rsj}^p is the share of income obtained from factor j by households at the poverty line in stratum *s* of region r, $\hat{W}_{rj}$ is the proportional change in after-tax earnings of factor *j* in region *r*, and $\hat{C}_r^p$ is the proportional change in the cost of living at the poverty line in region *r*, obtained by evaluating the

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impacts across countries. An alternative would be to explore the impacts on all households within a single country.

consumer utility function for the level of expenditure required to *remain at the poverty level of utility*.[3] We can now express the proportional change in the poverty headcount in stratum *s* of region *r* as follows:

$$\hat{F}_{rs}(\overline{y}_r^p) = \hat{H}_{rs} = \varepsilon_{rs} \cdot \hat{y}_{rs}^p = \varepsilon_{rs} \cdot \sum_j \cdot \alpha_{rsj}^p (\hat{W}_{rj} - \hat{C}_r^p) \qquad (2)$$

The earnings shares at the poverty line, α_{rsj}^p, will play a critical role in our analysis. At the poverty line, earnings tend to be dominated by unskilled labor.[4]

Having established the determinants of the stratum poverty headcount, we can now progress to the national poverty headcount, which can be expressed as a function of the stratum headcounts and stratum populations (POP_{rs}): $H_r = \left[\sum_s POP_{rs} * H_{rs}\right] / POP_r$, where $POP_r = \sum_s POP_{rs}$. So the proportional change in H_r is given by: $\hat{H}_r = \sum_s \beta_{rs} * \hat{H}_{rs}$, where the share of stratum *s* poverty in nationwide poverty in region *r* is computed as:

$\beta_{rs} = \left[\left(POP_{rs} * H_{rs}\right) / POP_r\right] / H_r = \left(POP_{rs} * H_{rs}\right) / \sum_k \left(POP_{rk} * H_{rk}\right)$. These stratum poverty shares are reported in the bottom panel of Table 1 for our 15 focus countries. Agriculture specialized households and rural diversified households tend to dominate the poverty headcount, although exceptions are Colombia, Venezuela and Peru, where self-employed, non-agriculture households contain a large share of the poor.

Combining (1) and (2) we get a useful expression for evaluating the change in the national poverty headcount in response to a small change in factor and commodity prices:

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[3] Without detailed information by district we have to assume that changes in border prices are fully passed through to domestic agents, whereas in fact those for importables are likely to be attenuated and those for exportables magnified – Winters, McCulloch and McKay (2004). Moreover, importables are differentiated from domestic gods in this model and, border prices respond to tariff changes, so the pass-through of tariff changes will be below 100%, and that the prices of domestic varieties of importables move in the same direction, but by much less than border prices. Thus we do not think that the pass-through assumptions are seriously misleading.

[4] A complete set of shares for all strata are available in the reviewers' annex.

$$\hat{H}_r = \sum_s \beta_{rs} \cdot \varepsilon_{rs} \cdot \sum_j \alpha^p_{rsj} \left(\hat{W}_{rj} - C^p_r \right) \qquad (3)$$

For purposes of subsequent analysis and discussion, it will be useful to further separate the tax component associated with the replacement of lost tariff revenue by another tax instrument. Hertel and Winters (2006) find that the choice of a revenue replacing tax instrument can have a significant impact on the poverty results following trade reform. Here, we follow those authors in adopting the rather neutral approach of an endogenous, uniform factor income tax. Define the uniform *ad valorem* income tax on factor j in region r as follows: $TAX_{rj} = t_r W^m_{rj} \cdot L_{rj}$,where t_r is the tax replacement instrument operating on market earnings, W^m_{rj} . Letting $T_r = \left(1 + t_r\right)$ be the *power* of the replacement income tax in region r, then with fixed endowments, the proportional change in after tax income is given by: $\hat{W}_{rj} = \hat{W}^m_{rj} - \hat{T}_r$. Substituting into (3) we have the following decomposition of changes in the poverty headcount in region r into market earnings, replacement tax, and cost of living components:

$$\hat{H}_r = \sum_s \beta_{rs} \cdot \varepsilon_{rs} \cdot \sum_j \alpha^p_{rsj} \left(\hat{W}^m_{rj} - \hat{T}_r - \hat{C}^p_r \right) \qquad (4)$$

Finally, since only relative prices matter in the general equilibrium model, and since we wish to separate the "earnings" and "spending" effects of trade reform on households, it is useful to normalize both market wages and the cost of living by a common variable. The choice of normalization factor is arbitrary, since we will first subtract it from wages, then add it back in with the cost of living. The normalization variable should be a national, nominal variable that does not vary by stratum or earnings type, and it should have some economic meaning when compared to a particular category of wages, or to the cost of living. For the present analysis, we choose net national income in the region y_r . Subtracting and adding $\hat{y}_r$ to the term in brackets in (4), recognizing that the tax replacement and cost of living effects are independent of stratum and earnings type, and making use of the fact that $\sum_j \alpha_{rsj} = 1$, we

define the national poverty elasticity as the poverty share-weighted sum of the stratum elasticities: $\varepsilon_r \equiv \sum_s \beta_{rs}\varepsilon_{rs}$. This gives the final decomposition of the national poverty impacts of a trade reform in:

$$\hat{H}_r = \sum_s \beta_{rs}\varepsilon_{rs} \sum_j \alpha^p_{rsj}\left(\hat{W}^m_{rj} - \hat{y}_r\right) + \varepsilon_r \hat{T}_r - \varepsilon_r\left(\hat{C}^p_r - \hat{y}_r\right) \qquad (5)$$

The first term in (5) will be termed the "earnings effect" and identifies the change in a particular wage, relative to net national income. The second term is the "tax effect". And the third term is the spending effect, which identifies the change in cost of living at the poverty line, relative to net national income.

For expository purposes, let us now consider what (5) has to say about three different developments: a rise in the unskilled wage rate, a fall in the power of the tax, and a rise in the price of staple foods. Since unskilled wages represent an important part of per capita income, (i.e. $\alpha^p_{rsj} > 0$)and a rise in the wage rate relative to y_r will boost income substantially moving some households across the poverty line. The proportional change in stratum headcount will depend on the density of the stratum population in the neighborhood of the poverty line as captured by ε_{rs}. If this density is high, and the stratum also contains a substantial share of the nation's poor as captured by β_{rs}, then there will be a relatively large reduction in the poverty headcount *ceteris paribus*. Of course, other factors may change as well. If tariffs are cut, we expect that the income tax, t_r will rise so that $\hat{T}_r > 0$ inducing a rise in poverty. Finally, if trade liberalization results in a rise in staple food prices for which the poor household's expenditure share is very large, then we expect a rise in the cost of living at the poverty line relative to net national income and a rise in poverty in region *r*. In light of the fact that trade reforms considered here change all the relative prices as well as tax revenues, the decomposition offered by (5) is quite important for understanding the underlying drivers behind any change in the national poverty headcount. We now turn now to the general equilibrium framework that will determine how these factor prices, commodity prices and taxes change as a function of trade policies.

The Global General Equilibrium Model

Our starting point for the global general equilibrium analysis of the impacts of trade policy is the GTAP version 6.1 data base (Dimaranan, 2007). Virtually all contemporary analyses of the Doha Development Agenda start at this same point. Data availability is easily the most limiting resource for global analysis and GTAP version 6.1 represents the only data base covering global economic activities with bilateral trade and protection data that reflects tariff preferences. These data permit us to draw on the carefully constructed Doha reform scenarios developed and utilized in the recent books by Anderson and Martin (2006), and Hertel and Winters (2006). Included in the Doha reform scenarios are the necessary experiments for updating key trade policies to 2005to establish that year as the benchmark for trade liberalization experiments. Our modifications to the standard GTAP model focus on features that enhance analysis of agricultural reforms and simulation of poverty impacts. We retain the simplistic yet empirically robust assumptions of constant returns to scale and perfect competition typically featured in agricultural trade studies. The remaining modifications are aimed at permitting us to shed new light on the distributional consequences of WTO reforms – focusing particularly on unraveling the puzzle of why the Doha Development Agenda is not more poverty friendly. Specifically, we ensure consistency on the demand-side of the model by modifying the global model to incorporate the same AIDADS demand system used in the poverty module. Thus, aggregate preferences are consistent with the preferences used to evaluate the impact of price changes on households at the poverty line – although expenditure patterns differ due to differing per capita income levels.

The other modifications relate to the factor markets. Ever since the work of T.W. Schultz (1945), economists have recognized the importance of off-farm factor mobility in determining farm incomes. The limitations of agricultural labor markets have also been prominently featured in the development economics literature, as an explanation for the very low level of agricultural supply response (de Janvry *et al*., 1991). We follow recent studies of global agricultural trade liberalization (e.g., Keeney and Hertel, 2005) in modeling farm/non-farm mobility by specifying a constant elasticity of transformation function

which “transforms” farm-labor into non-farm labor and vice-versa. This transformation function permits wages to diverge between the farm and non-farm sectors, a key driver for our distributional analysis. We apply the same approach to the capital market, postulating a transformation function between agricultural and other capital. With segmented factor markets, the impact of reduced subsidies to agriculture in the rich economies will not be shared equally between the farm and non-farm labor forces or between farm and non-farm capital owners and similarly for the benefits from higher farm prices in developing countries following rich country reforms. In order to parameterize these CET factor mobility functions we draw on the OECD’s (2001) survey of agricultural factor markets.

We assume a constant aggregate level of land, labor, and capital employment reflecting the belief that the aggregate supply of factors is unaffected by trade policy. This is not the ‘full employment’ assumption sometimes ridiculed by advocates of structuralist models of development. Rather it assumes that in the medium term aggregate employment is determined by factors such as labor market norms and regulation that are largely independent of trade policy. In addition, we employ a macroeconomic closure which fixes the ratios of government spending, tax revenue, net national savings, and the trade balance, all relative to net national income. This (relatively standard) closure facilitates linking the aggregate and disaggregate welfare impacts of trade reform (see Appendix for a discussion of our closure assumptions and their implications).

Implementation of (5) requires us to map factor earnings in the general equilibrium model to household income sources. Agricultural labor and capital receive the corresponding farm factor returns from the general equilibrium model, as do non-agricultural labor and capital. Wage labor for diversified households reported in the surveys presents a problem because information is lacking to allocate it between agricultural vs. non-agricultural activities. We simply assign to it the composite wage for all labor determined by the CET endowment function. Finally, transfer payments are indexed by the growth rate in net national income (see Appendix section Ib for a detailed discussion).

Policy Scenarios

Our attention in this paper is on the developing country poverty impacts of trade reforms undertaken in both rich and poor countries. We address these in two stages focusing initially on the poor country poverty impacts of liberalizing rich country agricultural policies in isolation. We then contrast this with agricultural trade reforms in the poor countries. The latter have proven controversial – particularly with regard to their impact on poverty, with some policy makers emphasizing that lowering protection for agriculture in developing countries will hurt poor farmers. Others have argued that lower food prices will serve to reduce poverty. Our poverty decomposition from equation (5) allows us to identify both the earnings and spending sides of the problem, providing a natural framework for analyzing the combined impact on poverty in our sample of fifteen countries. Finally, we bring in non-agricultural reforms (in both rich and poor countries) to complete the global reform scenarios.

We consider both full liberalization – as a benchmark – as well as a carefully constructed Doha scenario which derives from the so-called July 2004 Framework Agreement (WTO, 2004). The Doha scenario follows the core liberalization assumptions in Hertel and Winters (2006) and is summarized alongside other policy scenarios considered in this paper in Appendix Table A2. Our treatment of Doha entails a combination of cuts to domestic support, export subsidies and tariffs. We assume that industrial countries with domestic support in excess of 20 percent of production cut their bound commitments by 75 percent, while others cut by 60 percent. However, even with these ambitious reductions, the binding overhang means that effectively only five WTO members would be required to reduce actual support, based on 2001 notifications: Australia, EU, Iceland, Norway, and USA (Jensen and Zobbe, 2006). When it comes to developing countries domestic subsidy bindings are cut by 40 percent. In this case, Jensen and Zobbe (2006) estimate that only Thailand's subsidies would be affected. Export subsidies are the one area where bold cuts (full elimination) have been on the negotiating table, and we assume this outcome in our Doha scenario. Agricultural tariffs in the rich countries are reduced using a tiered formula with marginal cuts changing at 15 and 90 percent bound tariff rates. The marginal cuts are 45 percent on the first 15

percentage points of the tariff, 70 percent for the range between 15 and 90 percent, and 75 percent on the remainder. 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.

Cross-sector trade-offs are at the heart of the WTO negotiations, so we also consider the impact of non-agricultural elements of a prospective Doha Development Agenda. Improved access to rich country manufactures markets, as well as access to the markets of other developing countries can have an important impact on the demand for unskilled labor, and hence poverty rates in the poor countries. As was done in the country level studies contained in Hertel and Winters (2006), we focus our attention on market access in non-agricultural markets, since barriers to services trade and investment remain difficult to quantify and those WTO negotiations appear unlikely to yield significant changes in the near term. Specifically, non-agriculture tariffs are subjected to proportional cuts of 50 percent for developed and 33 percent for developing countries. The Least Developed Countries are not required to cut tariffs under this central scenario (see Anderson and Martin, 2006). As a consequence of these tariff cuts in farm and non-farm trade, average world-wide tariffs for all merchandise trade drop from 4.7% in the baseline to 3.2%.

Results

Agriculture Liberalization by the Rich Economies: In our empirical analysis, we make use of the poverty decomposition outlined in equation (5), working through this expression from the inside out, beginning with the fundamental "drivers" of poverty changes, namely factor prices, tax rate changes and the cost of living change, by region. We then translate the earnings changes into poverty changes by strata, using the earnings shares and poverty elasticities in (5). Finally, we aggregate across strata to examine the national poverty impacts in each region resulting from the effects of changes in earnings taxes and cost of living. This approach provides significant new insights into the contrasting effects of trade reforms in rich and poor countries, as well as Doha vs. Full Liberalization.

Table 2 reports the change in relative factor returns, cost of living and income tax rates, by country resulting from agricultural trade liberalization by the rich economies.[5] We first note that relative returns to factors employed in agriculture (land, labor and capital) increase throughout the sample, while returns to non-agriculture factors decline. Economy-wide returns to unskilled wage labor rise, while those associated with skilled wage labor fall. These results are to be expected, since rich country agricultural reforms tend to shift agricultural production from North to South, thereby boosting the demand for agricultural inputs and unskilled labor in general in developing countries. Observe that the impact on the "earnings" associated with transfer payments is zero, as these payments are indexed to net national income, which is also used to deflate all earnings types reported in Table 2.

The first row of the second block of Table 2 averages the changes across our focus countries, while the second row reports the Average Absolute Value (AAV) of the price changes, which tells us how large the price changes are regardless of sign. Thus, we see that the impact on factor price is largest for land, followed by agricultural unskilled labor, and then skilled labor and agricultural capital. The absolute size of the impacts on non-agricultural factor returns and economy-wide wages are much smaller. Thus we expect the earnings-driven poverty impacts from rich country agricultural liberalization to be greatest in strata where agricultural factors command large earnings shares.

The consistency of the results across sample countries is neatly summarized by the "sign consistency" statistic (Hertel and Ivanic, 2006) of a given variable (e.g., agricultural unskilled wages). This is the ratio of the average to the average absolute value of the price change, and it is reported in the third row of the second block.. Since rich agricultural reforms boost unskilled wages in all countries, the sign consistency measure reaches its maximum value of 1.0 for these factors. On the other hand, when it lowers a relative price in all regions – as is the case with non-agriculture skilled wages, the sign consistency measure reaches its minimum value of -1.0. The most striking thing about the sign

[5] A complete analysis of the macroeconomic results of the trade scenarios is available in the appendix.

consistency of relative factor returns in Table 2 is the great consistency of effects across this diverse group of countries.

The final two columns in Table 2 report the percentage changes in the power of the income tax and the cost of living at the poverty line. Since the rich agricultural reform scenarios involve no tariff reductions in developing countries, there is no need to raise income taxes to replace lost revenue. So the only tax changes are due to the interaction between trade, production and consumption volumes and the associated taxes. In this case, we see that, in most cases, income tax rates increase slightly, thereby increasing the power of the tax. From the next column, we see that the cost of living at the poverty line rises in all focus countries, save Malawi. Each of these factors has an adverse impact on poverty, *ceteris paribus*

For purposes of comparison, we report the summary statistics from the rich countries' partial reforms under Doha[6]. Note that the SC summary measures share the same sign, but are somewhat muted – i.e. the results are more mixed across the focus countries. Similarly, the AAV measures are considerably smaller. As a result, we expect the poverty impacts of the rich country agricultural liberalization to be broadly similar in sign between Full and Doha reforms, but considerably smaller in size under the partial reforms of the Doha scenario.

As previously discussed, our analysis of poverty change and the elasticity of poverty is developed at the earnings and stratum level. From these results (see Appendix Table A4) we can summarize the poverty impacts across different types of households. In general, we find that poverty falls in the earnings specialized agricultural stratum and rises in the specialized non-agricultural stratum. Due to the importance of unskilled wages in all strata and agricultural returns in the diversified strata, earnings-driven poverty falls in all the other strata. Thus, apart from those households specialized in self-employment in non-agricultural activities, earnings impacts of rich country agricultural liberalization are

[6] Complete results from Doha experiments are available in the Reviewers' Appendix.

favorable for poverty reduction. This general finding follows through in the subsequent Doha partial reform scenario as well – albeit with a slightly less sign consistency and much smaller AAV.

In order to determine the national poverty impacts, we must aggregate the earnings impacts across strata (weighting the stratum changes by the groups' share in national poverty), and combine this with the poverty impacts of changing taxes and consumer prices. Table 3 depicts these results of the national poverty impacts separately for earnings, taxes, and cost of living changes, in addition to their sum which is the total impact on the national poverty headcount. Earnings changes from rich country agricultural liberalization contribute to national poverty reduction in all cases. The rise in agriculture-related returns as well as unskilled wages is sufficient to reduce poverty, even in those countries where the non-agriculture stratum contains a relatively large share of the poor (e.g., Colombia and Peru). The tax effect is negligible as previously noted, while the cost of living effect contributes to a rise in poverty in all regions save one (Malawi).

With the earnings and spending effects working in opposite directions, it is now a question of relative size in determining the total impact on national poverty. From Table 3, we see that the earnings effect dominates in nine of the fifteen cases, and it is sufficiently large to boost the SC measure to -0.88 (recall that uniform poverty reduction across countries would yield a SC of -1.0). Thus we conclude that full agricultural liberalization in the rich countries is poverty reducing on average for this sample of countries. In contrast, the partial rich country reforms of the Doha scenario yield summary measures at the bottom of Table 3, where we find a smaller SC measure of -0.55, and an AAV about one-quarter the magnitude of full liberalization. Thus we conclude that rich country reforms under Doha are less poverty-friendly than they would be under full liberalization, and about one-quarter as large in absolute magnitude. This can be attributed to the heavy emphasis on elimination of export subsidies and the relatively modest cuts in tariffs and domestic subsidies (Hertel and Ivanic, 2006).

Agriculture Liberalization by the Developing Economies: Next we consider the impacts of poor country agricultural liberalization following the same scheme as the previous section for rich countries. Table 4 reports the impacts by underlying "driver" in each focus economy. Note that now it is nonagricultural labor and capital, as well as skilled labor, that realize the largest post-reform gains. This is as expected, because the tariff cuts are now implemented in the developing countries; they reduce the relative demand for unskilled labor and result in the loss of tariff revenue. The impact on deflated agricultural returns is mixed, with substantial declines in some cases, and modest rises in those cases where agricultural exports to other developing countries rise as a result of increased South-South trade. With the exception of agricultural land and transfers (the latter's impact is zero due to indexing), however, the SC summary measure is positive for all factors. Unlike the previous case, the tax and cost of living impacts are now consistent across countries, with income tax rates rising (to replace lost tariff revenue) and the cost of living falling as consumers get access to food at world market prices (SC = -1.0).

As before, we aggregate the earnings effects across factors and translate them into poverty reductions, by stratum (see table A5). We now find that the set of households specialized in non-agricultural self-employment realize the most consistent poverty reduction. The other strata show aggregate poverty reductions, but less consistently so. Not surprisingly, the largest AAV is for the agriculture specialized and rural diversified households as these are the groups most directly affected (on the earnings side) by the agricultural tariff cuts. This pattern of poverty reduction presents a striking contrast with the stratum impacts of reforms in agriculture by wealthy countries. In the latter case, the non-agriculture stratum consistently experiences poverty increases. So combining agriculture reforms in the poor countries with those in the rich countries is quite appealing from a poverty point of view since they benefit different segments of the poverty population.

Table 5 summarizes the national poverty impacts of poor country agricultural trade liberalization. The first column represents the poverty share-weighted sum of the percentage changes in stratum poverty headcounts. Here, we see that the earnings impacts on poverty while mixed, are on balance poverty

reducing. This is somewhat surprising in light of concerns about agricultural tariff cuts on the poor. However, the reader needs to bear in mind that these are the impacts prior to tax replacement. Once the income tax adjustment is introduced (next column), the earnings picture is less rosy. Indeed, in all countries excepting Brazil, income taxes rise and this has an adverse impact on poverty. Furthermore, the AAV of the tax rise is nearly half as large as the earnings effect, and it dominates the former for several of the focus countries.

Of course the primary benefit of agricultural tariff cuts with respect to poverty alleviation is access to food at lower prices. This effect is evident in the cost of living column, where the deflated cost of living falls in all regions except Brazil, where increased export demand in other developing countries boosts food prices. The sign consistency measure is -0.99 for the cost of living contribution to national poverty changes and the AAV measure of 0.82 is even larger than the earnings AAV. The results presented in this table demonstrate clearly the beneficial impact of developing country agricultural liberalization on poverty, through the lowering of food prices.

The final column in Table 5 reports the total impact arising from agricultural trade reform in the poor countries, taking into account the combined earnings, tax, and cost of living impacts. It is striking to note that poverty falls in all but one country. And the SC measure of -0.91 indicates that these reforms are even more consistently poverty friendly than the rich agricultural reforms in Table 4. On the other hand, the contribution of poor country agriculture tariff cuts under Doha, while also poverty friendly, are negligible in magnitude, as indicated by AAV = 0.09, which is just one tenth of the AAV for full liberalization of developing country agriculture trade policies.

Table 6 summarizes the poverty outcomes under rich, poor and combined (Subtotal Agric. Reforms column) agricultural reforms. Here we see total poverty changes repeated from agricultural reforms as reported in Tables 4 and 5, along with their combined effect. Given the total impact of agricultural liberalization we see that our findings suggest that only Mexico and Uganda would see an

increase in the poverty headcount attributable to agricultural reforms (due to rich country reforms for Uganda and reforms by both country classes for Mexico). Furthermore, the AAV summary measure of 1.91 indicating significant movement of persons across the poverty line due to agricultural reforms, with the impact of combined rich and poor country reforms significantly more important than either one of these sets of reforms taken alone. The sign consistency value of -0.93 is also higher than the either of the two sets of reforms alone and indicates that global agricultural trade reforms are heavily weighted in the direction of poverty alleviation. This outcome is a direct consequence of the fact that both developed and developing country reforms reduce poverty – but each tends to do so for a different segment of the population; their poverty benefits are complementary in nature.

The bottom panel in Table 6 summarizes the results from the combined agricultural reforms undertaken under Doha. We find (see Appendix Table A6) that only seven of the fifteen countries realize a reduction in the poverty headcount due to partial agricultural reforms under the postulated Doha scenario. The limited poverty reduction impact is reflected in the small (one-third of full reforms) value for the AAV of 0.31 shown in the bottom panel of Table 6, and the lack of uniform cross-country reductions of these partial reforms is reflected in the more moderate -0.76 sign consistency value, considerably smaller than that under full agriculture reforms (-0.93).

Beyond Agricultural Liberalization

The fourth column of Tables 6 reports the focus country poverty impacts of non-agricultural reforms and the fifth and sixth columns show the combined effect with agricultural reforms (full liberalization and Doha, respectively). The full reform of non-agricultural tariffs contributes to a poverty increase in the majority of our focus countries. However, the AAV of 0.80 is less than the values for rich or poor agricultural full reform, indicating lesser absolute impact on poverty, and the sign consistency of 0.23 indicates that some of the large effects are actually seen on the poverty reduction side (note the importance of the large reduction in Vietnam in this calculation). In the fourth column of the bottom

panel of Table 6 these same impacts are reported for Doha reforms in non-agriculture and we see that the AAV is smaller, indicating less impact, but slightly more consistent (SC = 0.32), indicating that the impact of the Doha reforms across this sample countries is somewhat less poverty friendly than full reform.

The final two columns in Table 6 reports the combined impact of all merchandise trade reforms on poverty in our focus countries. The full reforms reduce poverty in 9 of the 15 countries, with a Sign Consistency of -0.81 and an average absolute value of 1.96. On the other hand, Doha reforms (last column in Table 6) reduce poverty in only 7 of the 15 countries, with lower Sign Consistency and an AAV only about one-fifth as large. Thus, we conclude that the Doha reforms only generate about one-fifth of the poverty change as Full reforms and are considerably less poverty friendly. This stems from the fact that both the agriculture and the non-agriculture Doha reforms are individually less poverty friendly than the full reforms.

Conclusion

This paper has examined the likely poverty impacts of trade reforms under the Doha Development Agenda, and contrasted them with the poverty consequences of full reform. We expect partial reforms to generate smaller poverty responses than full reforms, and indeed we find this to be the case, with lower Average Absolute Values (about one-fifth as large) for national poverty changes across our fifteen focus countries. However, the two types of reforms are also *qualitatively* different. This is captured in our Sign Consistency measure, which reports how poverty friendly a given reform is, regardless of magnitude. By this measure, we judge that full reforms are nearly twice as poverty friendly as the Doha reforms.

There are two factors driving this result. The first is that rich country agricultural reforms under Doha emphasize those elements of policy reform – export subsidies and to a lesser degree domestic support -- that are less important to developing countries as a whole (Hertel and Keeney, 2006), and less

favorable to poverty in particular (Ivanic, 2006). The latter is underscored by our comparison of the Sign Consistency of rich country agricultural reforms under Doha and Full Liberalization. Less well-understood is the second reason why the Doha scenario is not more poverty friendly – it largely omits tariff cuts in the developing countries themselves. Our analysis shows that this is the most poverty friendly aspect of global trade reform and serves to effectively complement the poverty impacts of rich country reforms. While the latter tend to raise food prices, the developing country reforms lower food prices for the poor, by reducing tariffs on these products. This generates rather widespread poverty reduction.

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Table 1. Key Data for Focus Country Poverty Analysis

Country	Strata							
	Agric.	Non-Agric.	Urban Labor	Rural Labor	Transfer	Urban Diverse	Rural Diverse	Total
*Elasticity of Poverty Headcount by stratum ($1/day) wrt total income**								
Bangladesh	1.64	2.02	1.58	0.63	0.56	1.74	1.09	1.24
Brazil	0.75	1.28	1.94	2.19	0.34	3.63	2.69	1.35
Chile	1.90	2.24	2.06	1.55	2.45	2.29	2.60	2.18
Colombia	0.79	0.60	1.73	1.72	0.93	1.14	1.00	0.82
Indonesia	2.35	2.14	2.38	2.89	1.17	2.58	2.87	2.47
Malawi	0.49	0.30	2.26	1.97	0.43	1.04	0.76	0.58
Mexico	1.73	1.90	3.33	2.08	2.28	1.63	1.80	2.02
Mozambique	0.28	0.94	0.97	0.76	0.48	1.58	0.99	0.64
Peru	1.50	1.32	2.37	1.73	0.44	1.09	1.05	1.07
Philippines	2.25	1.96	2.98	2.44	1.69	2.42	1.98	2.15
Thailand	2.30	2.42	2.98	2.45	2.78	2.42	2.59	2.57
Uganda	0.28	0.40	1.71	0.34	0.01	0.36	0.21	0.24
Venezuela	0.69	1.16	2.57	2.17	0.01	1.72	1.53	1.20
Vietnam	0.48	1.12	2.81	8.98	0.84	0.86	1.01	0.98
Zambia	0.00	0.64	2.28	0.91	0.45	1.29	0.37	0.61
*Stratum Contributions to the $1/day Poverty Population in each Country **								
Bangladesh	0.15	0.13	0.04	0.22	0.03	0.07	0.37	1.00
Brazil	0.14	0.09	0.24	0.15	0.32	0.04	0.03	1.00
Chile	0.26	0.01	0.09	0.09	0.28	0.15	0.12	1.00
Colombia	0.28	0.43	0.03	0.04	0.12	0.05	0.04	1.00
Indonesia	0.42	0.12	0.02	0.07	0.04	0.06	0.28	1.00
Malawi	0.54	0.11	0.00	0.03	0.07	0.01	0.25	1.00
Mexico	0.05	0.06	0.05	0.12	0.28	0.14	0.29	1.00
Mozambiqe	0.41	0.13	0.01	0.05	0.14	0.06	0.19	1.00
Peru	0.07	0.35	0.01	0.02	0.22	0.11	0.23	1.00
Philippines	0.12	0.06	0.03	0.05	0.03	0.23	0.49	1.00
Thailand	0.06	0.02	0.00	0.06	0.11	0.07	0.68	1.00
Uganda	0.10	0.04	0.00	0.03	0.02	0.07	0.75	1.00
Venezuela	0.08	0.24	0.17	0.10	0.28	0.08	0.05	1.00
Vietnam	0.04	0.11	0.00	0.00	0.05	0.10	0.70	1.00
Zambia	0.34	0.23	0.10	0.07	0.07	0.09	0.11	1.00

Notes:*Values in strata columns are elasticities of the poverty headcount with respect to changes in earnings. Total column gives the national elasticity which is the poverty share weighted aggregate elasticity for each country. Elasticities estimated by authors using country specific household survey data.
**Values are shares of the impoverished population that are specialized in a particular stratum of earnings. Shares are derived from country-specific household surveys. Total column reflects that entire poverty population is allocated among the seven strata.

Table 2. Drivers of Poverty Change across Focus Regions: Rich Country Agricultural Reforms

Countries	Land	Ag. Unskilled Labor	Ag. Skilled Labor	Non-Ag. Unskilled Labor	Non-Ag Skilled Labor	Wage Labor Unskilled	Wage Labor Skilled	Agricultural Capital	Non-agricultural Capital	Transfers	Taxes	Cost of Living
Rich Agric. Full												
Bangladesh	2.1	1.1	0.9	-0.1	-0.2	0.3	-0.2	0.9	-0.3	0.0	0.0	0.3
Brazil	41.5	17.7	16.3	-0.6	-1.0	1.6	-0.8	16.2	-1.3	0.0	0.3	0.8
Chile	13.5	7.0	6.3	-0.2	-0.5	0.9	-0.5	6.3	-0.6	0.0	0.0	0.7
Colombia	11.5	5.8	5.1	-0.5	-0.7	0.7	-0.7	5.1	-1.0	0.0	0.1	1.2
Indonesia	3.2	1.9	1.5	-0.2	-0.4	0.5	-0.4	1.5	-0.4	0.0	0.0	0.6
Malawi	1.0	0.4	0.1	-0.4	-0.7	-0.1	-0.7	0.2	-0.7	0.0	0.1	-1.3
Mexico	11.2	5.0	4.5	0.0	-0.2	0.9	-0.2	4.5	-0.3	0.0	0.1	0.9
Mozambique	2.2	1.1	0.9	-0.2	-0.3	0.2	-0.3	0.9	-0.3	0.0	0.0	0.5
Peru	16.9	9.6	7.9	-0.8	-1.2	2.3	-0.9	7.7	-1.3	0.0	0.1	0.8
Philippines	3.1	1.9	1.5	-0.1	-0.2	0.8	-0.1	1.4	-0.4	0.0	0.2	0.6
Thailand	23.4	12.2	9.6	-0.2	-1.2	3.8	-1.0	9.3	-1.8	0.0	0.1	1.2
Uganda	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Venezuela	2.4	1.3	1.2	-0.1	-0.1	0.1	-0.1	1.2	-0.1	0.0	0.0	0.3
Vietnam	4.9	2.7	2.3	-0.3	-0.5	0.4	-0.5	2.3	-0.4	0.0	0.1	0.3
Zambia	1.8	1.0	0.8	-0.1	-0.1	0.2	-0.1	0.8	-0.3	0.0	0.0	0.2
Average	9.2	4.6	3.9	-0.2	-0.5	0.8	-0.4	3.9	-0.6	0.0	0.1	0.5
AAV	9.2	4.6	3.9	0.3	0.5	0.8	0.4	3.9	0.6	0.0	0.1	0.7
Sign Cons.	1.0	1.0	1.0	-1.0	-1.0	1.0	-1.0	1.0	-1.0	0.0	0.9	0.7
Rich Agric. Doha												
Average	2.2	1.1	1.0	0.0	-0.1	0.2	-0.1	1.0	-0.1	0.0	0.0	0.2
AAV	2.5	1.3	1.1	0.1	0.1	0.2	0.1	1.1	0.2	0.0	0.0	0.2
Sign Cons.	0.9	0.9	0.9	-0.3	-0.6	0.8	-0.5	0.9	-0.5	0.0	-0.8	0.9

Source: Authors' simulations

AAA is the average absolute value of the data in the column; 'sign cons' is the "sign consistency" of the data - the ratio of the average to the average absolute value of the variable.

Table 3. Earnings-Driven Percent Change in the Poverty Headcount ($1/day) across Developing Country Stratums, when Rich Countries Reform Agriculture

Countries	Earnings	Taxes	Cost Of Living	Total
Rich Agric. Full				
Bangladesh	-0.46	-0.04	0.39	-0.11
Brazil	-3.16	0.39	0.97	-1.80
Chile	-5.42	0.01	1.51	-3.90
Colombia	-1.28	0.05	0.95	-0.28
Indonesia	-2.68	0.05	1.40	-1.23
Malawi	-0.05	0.05	-0.74	-0.74
Mexico	-1.74	0.12	1.93	0.31
Mozambique	-0.23	-0.01	0.31	0.07
Peru	-1.32	0.07	0.85	-0.40
Philippines	-2.35	0.32	1.27	-0.76
Thailand	-9.63	0.16	2.84	-6.63
Uganda	-0.01	0.00	0.05	0.04
Venezuela	-0.17	0.00	0.42	0.25
Vietnam	-0.13	0.05	0.31	0.23
Zambia	-0.01	0.02	0.13	0.14
Average	-1.91	0.08	0.84	-0.99
AAV	1.91	0.09	0.94	1.13
Sign Cons.	-1.00	0.93	0.89	-0.88
Rich Agric. Doha				
Average	-0.46	0.10	0.16	-0.19
AAV	0.52	0.11	0.31	0.42
Sign Cons.	-0.88	0.92	0.52	-0.46

Source: Authors' simulations

Note: The total results in this table differ from the RichAgrFull poverty results in Hertel et al. (2007) since the results in this paper are computed as part of a full liberalization experiment using the methodology of Harrison, Horridge and Pearson (1999). Thus the results in this table reflect interactions with agricultural policy reforms in the poor countries, as well as non-agriculture reforms.

Table 4. Drivers of Poverty Change across Focus Regions under Poor Agricultural Reforms

Countries	Land	Ag. Unskilled Labor	Ag. Skilled Labor	Non-Ag. Unskilled Labor	Non-Ag Skilled Labor	Wage Labor Unskilled	Wage Labor Skilled	Agricultural Capital	Non-agricultural Capital	Transfers	Taxes	Cost of Living
Poor Agric. Full												
Bangladesh	-1.9	-0.9	-0.7	0.7	0.7	0.3	0.7	-0.7	0.7	0.0	0.5	-0.5
Brazil	1.9	1.3	1.2	-0.1	-0.1	0.1	-0.1	1.1	-0.2	0.0	-0.1	0.0
Chile	3.0	1.6	1.5	0.1	0.0	0.4	0.0	1.5	0.0	0.0	0.2	-0.1
Colombia	-0.7	-0.3	-0.3	0.3	0.2	0.2	0.2	-0.3	0.3	0.0	0.2	-0.5
Indonesia	0.1	0.1	0.0	0.2	0.0	0.2	0.0	0.1	0.2	0.0	0.2	-0.4
Malawi	3.7	2.3	1.8	0.2	-0.1	1.1	-0.1	1.8	-0.4	0.0	0.6	-0.8
Mexico	-12.4	-5.3	-4.7	0.0	0.2	-0.9	0.2	-4.7	0.3	0.0	-0.1	-0.5
Mozambique	3.4	2.3	2.0	0.8	0.7	1.2	0.7	2.1	0.7	0.0	0.9	-1.2
Peru	-1.9	-1.0	-0.8	0.4	0.3	0.0	0.3	-0.7	0.7	0.0	0.4	-0.5
Philippines	-2.3	-1.4	-1.0	0.4	0.4	-0.3	0.4	-0.9	0.8	0.0	0.2	-1.1
Thailand	3.4	2.4	2.1	0.7	0.5	1.2	0.5	2.0	0.5	0.0	0.7	-1.2
Uganda	0.3	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.0	0.2	-0.3
Venezuela	-1.6	-0.7	-0.7	0.3	0.2	0.1	0.2	-0.7	0.3	0.0	0.2	-0.2
Vietnam	5.7	3.9	3.6	1.8	1.6	2.3	1.6	3.5	1.4	0.0	1.5	-1.4
Zambia	-0.7	-0.4	-0.2	0.4	0.4	0.2	0.4	-0.2	0.7	0.0	0.3	-0.4
Average	-0.0	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.4	0.0	0.4	-0.6
AAV	2.9	1.6	1.4	0.4	0.4	0.6	0.4	1.4	0.5	0.0	0.4	0.6
Sign Cons.	-0.0	0.2	0.2	1.0	0.9	0.7	0.9	0.2	0.9	0.0	0.9	-1.0
Poor Agric. Doha												
Average	-0.09	-0.04	-0.03	0.01	0.02	-0.01	0.02	-0.03	0.01	0.00	-0.01	-0.06
AAV	0.38	0.20	0.16	0.03	0.04	0.04	0.04	0.16	0.05	0.00	0.02	0.07
Sign Cons.	-0.24	-0.22	-0.18	0.50	0.53	-0.16	0.53	-0.20	0.26	0.00	-0.42	-0.90

Source: Authors' simulations

Table 5. Earnings-Driven Percent Change in the Poverty Headcount ($1/day) across Developing Country Stratums, when Poor Countries Reform Agriculture

Countries	Earnings	Taxes	Cost Of Living	Total
Poor Agric. Full				
Bangladesh	-0.10	0.56	-0.63	-0.17
Brazil	-0.15	-0.05	0.05	-0.15
Chile	-1.36	0.19	-0.24	-1.41
Colombia	-0.03	0.14	-0.39	-0.28
Indonesia	-0.30	0.39	-0.92	-0.83
Malawi	-0.85	0.32	-0.43	-0.96
Mexico	1.84	-0.15	-1.08	0.61
Mozambique	-0.78	0.48	-0.78	-1.08
Peru	-0.07	0.34	-0.50	-0.23
Philippines	1.36	0.40	-2.33	-0.57
Thailand	-2.61	1.02	-2.96	-4.55
Uganda	-0.04	0.04	-0.06	-0.06
Venezuela	-0.11	0.25	-0.29	-0.15
Vietnam	-1.42	1.13	-1.42	-1.71
Zambia	-0.19	0.17	-0.27	-0.29
Average	-0.32	0.35	-0.82	-0.79
AAV	0.75	0.38	0.82	0.87
Sign Cons.	-0.43	0.93	-0.99	-0.91
Poor Agric. Doha				
Average	0.01	0.01	-0.10	-0.07
AAV	0.07	0.03	0.11	0.09
Sign Cons.	0.07	0.56	-0.88	-0.83

Source: Authors' simulations

Note: The total results in this table differ from the RichAgrFull poverty results in Hertel et al. (2007) since the results in this paper are computed as part of a full liberalization experiment using the methodology of Harrison, Horridge and Pearson (1999). Thus the results in this table reflect interactions with agricultural policy reforms in the poor countries, as well as non-agriculture reforms.

Table 6. Percentage change in the $1/day Head Count under Agr and Nonagr Reforms

	Full Liberalization					Doha
Countries	Rich Agric. Reforms	Poor Agric. Reforms	Subtotal Agric. Reforms	Subtotal Non-Agric. Reforms	Total Full Lib	Total Doha Lib
Bangladesh	-0.11	-0.18	-0.29	0.57	0.28	-0.04
Brazil	-1.79	-0.15	-1.94	0.53	-1.41	-0.80
Chile	-3.89	-1.41	-5.30	0.31	-4.99	-1.29
Colombia	-0.29	-0.28	-0.57	0.67	0.10	-0.10
Indonesia	-1.24	-0.82	-2.06	0.61	-1.45	-0.20
Malawi	-0.74	-0.96	-1.70	-0.14	-1.84	0.36
Mexico	0.31	0.61	0.92	0.43	1.35	0.13
Mozambique	0.07	-1.08	-1.01	0.32	-0.69	0.02
Peru	-0.40	-0.23	-0.63	-0.16	-0.79	0.06
Philippines	-0.76	-0.56	-1.32	0.57	-0.75	-0.25
Thailand	-6.63	-4.55	-11.18	2.31	-8.87	-1.97
Uganda	0.04	-0.06	-0.02	0.08	0.06	0.04
Venezuela	0.26	-0.15	0.11	0.75	0.86	0.21
Vietnam	0.22	-1.70	-1.48	-4.37	-5.85	0.89
Zambia	0.14	-0.29	-0.15	0.24	0.09	0.03
Average	-0.99	-0.79	-1.77	0.18	-1.59	-0.19
AAV	1.13	0.87	1.91	0.80	1.96	0.43
Sign Cons.	-0.88	-0.91	-0.93	0.23	-0.81	-0.46
Doha Reforms						
Average	-0.16	-0.08	-0.24	0.04	n.a.	-0.19
AAV	0.30	0.09	0.31	0.13		0.43
Sign Cons.	-0.55	-0.86	-0.76	0.32		-0.46

Source: Authors' simulations