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## ASSESSING THE POVERTY IMPACT OF TRADE LIBERALISATION: A CRITICAL APPRAISAL OF THE COMPUTABLE GENERAL EQUILIBRIUM APPROACH<sup>1</sup>

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## **Abstract**

Trade negotiators, international development agencies, researchers, NGOs, and civil society at large have a common concern with the potential effects of trade liberalisation on poverty in developing countries. The aim of this paper is to provide a critical assessment of the Computable General Equilibrium (CGE) economic modelling techniques which have gained continuously in popularity as a method for assessing the *ex ante* impact of trade policy reforms. It first summarises the results of several recent modelling studies that have been widely quoted during the WTO's Doha Development Agenda negotiations and highlights their limitations for poverty impact analysis. It cautions against drawing strong policy conclusions from the CGE body of analysis. This paper concludes that an integrated approach to impact assessment methodology is required, which draws on a range of sources of evidence – context-specific case studies, economic modelling, econometric investigations, institutional economic analysis, social impact assessment, expert opinion, stakeholder consultation – when evaluating poverty impacts of trade liberalisation.

**Keywords:** trade, poverty, impact assessment, computable general equilibrium modelling

## **1. Introduction**

The growth in globalisation and the increased importance of trade liberalisation have led to a heightened interest in the relationship between trade and development. At the same time, the international community's commitment to the Millennium Development Goals, and particularly the goal of halving the proportion of the world's population living in poverty by 2015, has focused attention on the reduction of poverty in developing countries. The Ministerial Declaration of the Fourth Session of the WTO Ministerial Conference in Doha, 2001, restated the commitment of the WTO to the goal of sustainable development, and in the Doha Development Agenda acknowledged the contribution that international trade can make

to economic development and the alleviation of global poverty. The Hong Kong WTO Ministerial Meeting in December 2005 reaffirmed the decisions adopted at Doha, emphasised the central importance of the development dimension in every aspect of the Doha Work Programme, and gave a recommitment ‘to making it a meaningful reality, in terms both of the results of the negotiations on market access and rule-making and of the specific development – related issues’ WTO (2005).

What impact will trade liberalisation have on the goal of poverty reduction? Trade negotiators, developing country governments, international development agencies, NGOs, researchers and civil society at large have a common interest in reaching a better understanding of the potential impact of trade liberalisation, or alternatively, trade protectionism on poverty. The assessment of poverty impacts has traditionally been regarded as being within the domain of social impact assessment where the assessment of *ex ante* and *ex post* poverty impacts of interventions has been mainly at the level of project interventions, using qualitative data gathered at the household or local community level to assess the effect of specific interventions on household livelihoods.<sup>4</sup> In contrast to the traditional ‘micro’ level social assessment approach to poverty assessment, economists, particularly from the mainstream economics side have increasingly adopted a ‘macro’ level approach to assessing the poverty impact of policy interventions. Typically, this has involved the application of econometric techniques to aggregate cross-country data (sometimes combined with time-series data), in an attempt to establish a common ‘pattern’ in the relationship between trade policy and poverty reduction.<sup>5</sup> The popularity of this approach has grown, as researchers exploit the growing availability of large cross-country time

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<sup>4</sup> Vanclay (2002), Becker and Vanclay (2003).

<sup>5</sup> For a recent example of this approach, see Dollar and Kraay (2004)

series data sets and access to increasingly powerful computing capacity. Nevertheless, the limitations of the econometric approach to poverty assessment need to be acknowledged. Firstly, there is a standard problem of demonstrating causality. It is relatively simple to show a statistically robust correlation between a change in trade policy and a change in poverty levels: it is more difficult however, to ‘prove’ that the change in trade policy is the cause of the change in poverty.<sup>6</sup> Secondly, the econometric approach lacks precisely the micro detail that characterises the social assessment approach. Typically, it uses broad aggregate measures and restricted definitions of poverty for the macro economy, such as the number of households with an absolute income below the specified poverty line.<sup>7</sup> Thirdly, there are major concerns about the quality of the data and the econometric specifications in this literature (including weak theoretical underpinnings), with considerable differences in the results and in the policy conclusions drawn from the findings.<sup>8</sup>

Economic modelling techniques, and particularly Computable General Equilibrium models have gained in popularity as a method of bridging the micro – macro gap in assessment methods for policy interventions. Constructed using sector level data for the entire economy under investigation, the standard CGE model provides a ‘meso’ level analysis, midway between the macro and micro levels. In recent years, there have been attempts to extend the

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<sup>6</sup> A common mistake that is often made in the econometric literature claiming causality between trade liberalisation and poverty is the use of policy outcomes (e.g. changes in trade volumes) instead of policy variables (e.g. average tariffs) in the regression analysis to proxy changes in trade policy that might affect poverty levels. Hence, no inference can be generally made on the impact of policy on any variable since outcomes may be attributed to various other shocks than trade policy variables or tools (see, for example, Rodrik, 2000).

<sup>7</sup> Where poverty is defined in relative terms, measures of income distribution, such as the Gini coefficient are used.

<sup>8</sup> See Ravallion (2004) for a discussion of these limitations.

scope of CGE trade models to poverty analysis, by linking the productive sector component of the model to poverty indicators. Computable general equilibrium models have been widely used to assess the impact of trade liberalisation on aggregate economic welfare and poverty levels, particularly in the context of the WTO trade negotiations.<sup>9</sup> The results have been increasingly used in the Doha discussions aimed at reaching an acceptable ‘development agenda’ outcome from the WTO trade negotiations by the end of 2006 (though the Doha talks have been recently suspended due to the failure of trade negotiators to reach an agreement on modalities to reduce tariffs in agriculture and NAMA).<sup>10</sup>

This aim of this paper is to provide a critical non-technical assessment of the use of CGE modelling to assess the impact of trade liberalisation on poverty in developing countries. Section 2 outlines the main types of CGE models used for trade-poverty analysis, and critically discusses the results of recent CGE studies that have modelled the impact of multilateral trade liberalisation on absolute poverty levels in developing countries. Section 3 provides a summary and concludes.

## **2. Modelling the Impact of Trade on Poverty**

Computable General Equilibrium (CGE) models represent a relatively recent category of modelling methods that convert Walrasian general equilibrium models from an abstract to a

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<sup>9</sup> For example, recent CGE studies assessing the economic implications of trade liberalisation include Francois, van Meijl and van Tongeren (2005), Hertel and Keeney (2006), Anderson, Martin and van der Mensbrugge (2006a), and Polaski (2006).

<sup>10</sup> For example, modelling results have been used by the EU and the United States to support their different views on the potential impact of agricultural liberalisation on developing countries.

realistic representation of an economy (Shoven and Whalley, 1984). The Walrasian general equilibrium theory states that in an economy where consumers are endowed with factors and demand produced goods, and firms demand factors and produce goods with a fixed coefficients production technology (or more generally, a constant returns to scale production function), both output and factor markets clear, whilst perfect competition assures that producer prices equal the costs of production for every operating activity. The theoretical underpinning of CGE models hence heavily draws on the neoclassical economic theory of the optimisation behaviour of rational economic agents against the background of general equilibrium theoretical structures. CGE models are able to provide a fairly complex representation of the economy, and in the same time render their analytical and theoretical underpinnings relatively tractable (Kehoe and Kehoe, 1994). A more complete definition may thus present an CGE model as an analytical deterministic integrated system of non-linear equations derived from the economic theory of optimising behaviour of rational economic agents that describes the simultaneous linkages between markets, institutions and factor resources so that it renders an all-markets clearing equilibrium numerical solution.

A growing number of recent CGE models attempt to provide estimates of the impact of trade liberalisation on poverty and equity. These models may be classified into two categories: global standard CGE models and single-country augmented CGE models (also referred to in some studies as first generation and, respectively, second generation models).

Global CGE models by design are not particularly well suited for poverty analysis due to their lack of disaggregated information at the household level and their inability to distinguish between poor and non-poor individual households. Instead they tend to distinguish between

various types of “representative agents” or, in other words, categories of households or workers (e.g. unskilled and skilled labour; rural and urban labour). They provide estimates mostly related to aggregate impacts on poverty and on changes in real income at the poverty line. Several global CGE models assess the impact of further trade liberalisation on poverty by differentiating between skilled and unskilled labour, and calculating the number of people that may be lifted above the \$1 or \$2 a day poverty line (Anderson, Martin and van der Mensbrugge, 2006b, Cline, 2004).<sup>11</sup> The number of people lifted out of poverty appears to be, as in the case of economic welfare impacts, dependent on the depth of trade liberalisation: the greater the trade reforms, the greater the increase in the number of people lifted out of poverty. This results from the fact that poverty impacts are mainly explained in CGE models by changes in real rewards to factors. Since the returns to unskilled labour are estimated overall to increase with trade liberalisation more than the returns to skilled labour, and most of the poor are unskilled workers, greater trade reform is expected to contribute to more poverty alleviation. The standard CGE models reviewed in this section are summarised in table 1.

Table 1 about here

Overall, global CGE models estimate modest poverty impacts stemming from full trade liberalisation, and much smaller poverty alleviation effects for developing countries under a

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<sup>11</sup> For example, Anderson et al (2006b) employ a fairly conventional global CGE model that they modify to account for changes in the real average wage of unskilled workers (assuming that these are the most relevant for the poor) and to which they attach pre-determined (World Bank) poverty elasticities in order to compute poverty impacts.

Doha round of partial trade reforms.<sup>12</sup> As in the case of welfare impacts, poverty impacts in more recent studies seem to be significantly lower than previous estimates. The regional distribution of poverty impacts appears to indicate that Asian (particularly South Asian) and Sub-Saharan African countries tend to experience the largest reductions in the number of poor people.

Poverty estimates are based on a number of critical simplifying assumptions. First, it is assumed that changes in unskilled wages are fully passed through to poor households. However, unskilled workers may not necessarily be poverty-stricken or may belong to multi-earner households resulting in higher per capita incomes (Ackerman, 2005). Second, CGE models rely on the representative agent assumption, according to which the behaviour of an economic group is adequately represented by each member of the group having the identical characteristics of the average. However, studies have shown that the representative agent assumption does not hold when sufficient data is available to econometrically test the hypothesis, and that conclusions based on the respective assumption are likely to be misleading (Barker and de-Ramon, 2006). Third, it is assumed that economic growth leads to poverty reduction (i.e. the ideology is that growth is inherently an engine for poverty alleviation), and depends therefore, on the magnitude of the growth elasticity of poverty that could be inserted into economic models (Ackerman, 2005). In other words, CGE trade liberalisation models are inherently pro-poor. Hence, the impact of the DDA on productivity and growth represents the key factor for poverty reduction (Hertel and Winters, 2006).

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<sup>12</sup> Ackerman (2005) reviews a number of CGE models estimating poverty impacts and derives very small gains of the Doha round for developing countries, ranging from as little as one quarter of a penny to a penny per person per day.

A more modest approach that assumes more realistic trade liberalisation scenarios when assessing poverty impacts using global (multi-country) CGE models is adopted in Polaski (2006). The study argues that the data used in global CGE models underpinning the linkages between trade, growth, and poverty are highly contested and tend to depend on the region and on the historical period under consideration. Polaski (2006) does not provide any quantitative poverty estimates of further trade reforms as other global CGE modeling studies do (Anderson et al, 2006b, Cline, 2004), but undertakes a discussion on the likely poverty impacts by combining the income gains or losses estimated by the CGE (Carnegie) model in the Hong Kong scenario case (see table 1 for scenario details) with the data on the current distribution of poverty in the developing world. The author argues that because some developing countries are expected to experience negative effects from agricultural liberalisation under any plausible Doha agreement, and because most of the poor depend on agricultural income, poverty is likely to deepen and spread in rural areas, though displaced farmers may be absorbed, in some cases, by expanding manufacturing exports. Nevertheless, the net effect would depend on the details of the outcome of the Doha Round and several country characteristics, such as the relative size of the agricultural and manufacturing sectors, the rates of growth or contraction likely to be experienced by each sector, and their relative productivity levels. The author gives the example of China that may experience a net poverty reduction effect, as the country is expected to reap the greatest gains from the Doha Round, particularly from manufacturing liberalisation, which seem to significantly surpass any potential losses from agricultural liberalisation. Uncertain poverty effects are envisaged for other countries (e.g. India), because they display a higher share of population engaged in agriculture. Finally, adverse poverty impacts are predicted for countries that are expected to lose from a Doha Round in terms of

decreased shares of world export markets for both agriculture and manufactures (*e.g.* Bangladesh, and several Sub-Saharan African countries).

CGE modelling techniques have also been recently refined to provide more reliable numerical estimates of trade liberalisation induced poverty effects across countries and regions. This class of augmented CGE models focus on a specific country (single-country CGE models) and are linked to micro-simulation models drawing on more detailed household level data. Augmented CGE models are generally focused on a specific country and depart from their standard counterpart in that they link the CGE model with a micro-simulation model based on household survey data. These models are richer in household level detail and are thus relatively better suited to investigate poverty and equity impacts, and bridge the macro-micro gap of analysis. Recent examples of single-country augmented CGE models are given in Table 2.

Table 2 about here

The DDA trade liberalisation is found to result, for example, in positive but very small poverty impacts in Brazil (Ferreira-Filho and Horridge, 2006 - see table 2). This is largely attributed to the growth in the Brazilian agro-food output and exports predicted to be triggered by greater trade liberalisation, which creates a greater demand for unskilled labour, and, assuming operational factor markets results in a reduction of the number of people below the poverty line. Similar figures are estimated for the case in China in Zhai and Hertel (2006), who estimate that multilateral trade reforms alone may bring modest poverty alleviation. The authors argue that if trade reforms were complemented by investments in education, then the poverty impacts would be greater. However, it is debatable to what extent funds will be realistically

available to provide additional significant investments in education, particularly that part of the tariff revenue may be lost with import liberalisation, and that poor countries heavily rely on import tariff revenues and have a limited ability for effective tax replacement.

Trade liberalisation resulting in further poverty reduction both at the national level and at the level of various household groups is also found in the case of the South Asian countries with large populations, such as India (Khan, 2005). In contrast, some country studies have found that further trade reforms may result in increased poverty. The Philippines is estimated to experience a slight increase in poverty incidence under a Doha scenario with indirect tax for tariff revenue replacement, particularly in rural areas and among the unemployed, self-employed and rural low-educated (Cororaton, Cockburn and Corong, 2006).<sup>13</sup> Furthermore, full trade liberalisation (with a compensatory indirect tax) appears to increase poverty in the Philippines even more than the Doha agreement. DDA trade liberalisation also seems to increase poverty in Bangladesh, which is a net agricultural importer, though this is mostly associated with short-run effects (Annabi et al, 2006).<sup>14</sup> In the longer run, when factors are able to adjust (particularly, capital through investment), trade liberalisation is found to alleviate

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<sup>13</sup> This is explained under a Doha scenario by a worsening of the competitiveness of the Philippines agricultural exports (which already enjoy tariff-free access into the EU), a loss of export shares, a reorientation of agro-producers towards domestic markets and of industrial producers towards export markets, and a reallocation of production, worsening the income situation of particular poor households (Cororaton et al, 2006).

<sup>14</sup> In the case of Bangladesh, the rise in poverty in the short run due to trade reforms is mainly attributed to the net agricultural-importing situation of the country combined with the deterioration in the terms of trade, higher trade reform-induced world agricultural prices and the increase in consumer prices at a faster pace than nominal incomes, particularly for the poorest households (Annabi et al, 2006). The negative effects on poverty of global free trade are found to be stronger than those associated with the July Framework Agreement.

poverty. In addition, the liberalisation of services, particularly improved mobility of service providers (labour) may contribute to poverty alleviation through greater remittances.<sup>15</sup>

In addition, the poverty impacts across countries appear to be influenced by the probability and type of tax used to replace the forgone revenue. For instance, the negative poverty impacts of free trade on the Philippines case is assumed to be exacerbated if a uniform income tax is applied (Cororaton et al, 2006). Significant consequences of tax replacement for poverty impacts are also identified in the case of Cameroon, illustrating that tax replacement may represent a key issue for some countries when evaluating the poverty effects of trade reforms (Emini, Cockburn and Decaluwé, 2006).

Thus, the single country CGE models show that, national poverty impacts of further trade liberalisation vary across countries and are dependent on factor mobility, the effectiveness of price transmission channels, and the incidence of tax replacement, as well as the extent to which complementary reforms, and mitigating and enhancing measures are implemented (Hertel and Winters, 2006). On balance, trade liberalisation may contribute to poverty alleviation, but there is no guarantee that the poor will always stand to benefit.

### **3. Summary and Conclusions**

What conclusions can we draw from the computable general equilibrium economic modelling literature for assessing the impact of trade on poverty? The first is that there is no single,

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<sup>15</sup> Countries that are major suppliers of migrant labour (e.g. Philippines, Bangladesh) are argued to benefit from greater movement of service providers, and are hence interested in pushing the services liberalisation agenda.

unambiguous answer provided to the question ‘will trade liberalisation reduce poverty?’ Furthermore, the poverty impacts of trade reforms across developing countries and regions are mixed, and tend to largely depend not only on country specifics but also on model characteristics. It is inappropriate, therefore, to draw strong generalised policy conclusions from this body of analysis. The need for caution is reinforced by the significant caveats that need to be applied to the simplifying assumptions that are made in the construction of CGE models. These include: neoclassical general equilibrium assumptions that all markets clear with a focus on equilibrium outcomes instead of the adjustment process and the dynamics of interactions between modelled variables; the assumption that growth is inherently pro-poor; the representative agent assumption; parameter calibration usually based on a single year, instead of parameter estimation based on historical trends, and, in general, a monetary reductionist approach to the analysis of social issues.<sup>16</sup>

Secondly, the level of micro level analysis that can be achieved in CGE models falls well short of the detailed impact on individual household incomes and livelihoods that is needed for accurate estimates of poverty impacts. As a result, the analysis disguises important implications for other areas of policy, particularly in the area of social protection and other pro-poor mitigation measures.<sup>17</sup>

Finally, we conclude that an integrated approach which draws on a range of sources of evidence – context-specific case studies, economic modelling, econometric investigations,

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<sup>16</sup> See Scriciu (2006) for a detailed discussion of the limitations of CGE models for sustainability impact assessment.

<sup>17</sup> This point is made by Ravallion (2004). See also the current debate on aid-for-trade, summarised in Kirkpatrick, George and Scriciu (2006).

institutional economic analysis, social impact assessment, expert opinion, stakeholder consultation – should be used in attempting to assess the poverty impact of trade policy.<sup>18</sup> This eclectic approach is always open to the charge of lacking intellectual rigour but is almost certain to provide a more reliable evidence base for policy makers, than relying solely on the results of CGE modelling.

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<sup>18</sup> The Sustainability Impact Assessment methodology is an example of such an approach, combining quantitative and qualitative evidence to estimate the significant potential economic, environmental and social impacts of trade liberalisation (George and Kirkpatrick, 2004)

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| <b>Table 1: CGE Modelling of Poverty Impacts of Further Trade Liberalisation.<br/>The Global (Standard) Approach using a Representative Household</b> |   |  |   |
|---|---|--|---|
|   | Anderson et al (2006b)  | Cline (2004)   | Polaski (2006)  |
| Liberalisation Scenarios  | <ul style="list-style-type: none"> <li>• Full merchandise trade liberalisation</li> <li>• Several possible Doha scenarios with a focus on a Core Doha scenario (see Anderson et al, 2006a in table 1).</li> </ul>   | <ul style="list-style-type: none"> <li>• Full merchandise trade liberalisation</li> </ul>  | <ul style="list-style-type: none"> <li>• Poverty effects are only discussed for the Doha scenario case labelled the "Hong Kong scenario": <ul style="list-style-type: none"> <li>○ A modest ambitious market access expansion for both manufactures and agriculture, i.e. a reduction in the applied rates of tariffs and other border protection rates by 36 percent and 24 percent for developed, and respectively, developing countries;</li> <li>○ Agricultural domestic support is reduced by one third by all countries, except LDCs;</li> <li>○ All agricultural export subsidies are eliminated</li> </ul> </li> </ul>  |
| Poverty Impacts   | <p>Full liberalisation scenario</p> <ul style="list-style-type: none"> <li>• Using the \$2 per day poverty line: poverty drops by 3.6% of the global total (65.6 mln people of whom 20.4 mln in SSA and 9.6 mln in South Asia)</li> <li>• Using the \$1 per day poverty line: poverty drops by 5% of the global total (31.9 mln, of whom 21.1 mln in Sub-Saharan Africa &amp; 5.6 mln in South Asia)</li> </ul> <p>Core Doha scenario</p> <ul style="list-style-type: none"> <li>• Using the \$2 per day poverty line: poverty drops by 0.3% of global poverty (6 mln people of whom 2.3 mln in South Asia &amp; 0.5 mln in SSA)</li> <li>• Using the \$1 per day poverty line: poverty drops by 0.4% of global poverty (2.5 mln of whom 1.4 mln in South Asia &amp; 0.5 mln in SSA)</li> </ul> | <ul style="list-style-type: none"> <li>• 440 million people are estimated to be lifted out of poverty using the \$2 per day poverty line</li> <li>• The capital growth effect contributes the most to overall poverty reduction: 184 mln people (42%); followed by the productivity effect: 156 mln people (35%); and the remaining 98 mln people is attributed to the standard CGE model forecast.</li> <li>• Substantial poverty reductions are estimated for Asia (almost 360 mln people), particularly for India (150 mln), Pakistan (70 mln), China (around 60 mln) and Bangladesh (almost 30 mln), whereas more modest estimates are provided for SSA (46 mln).</li> </ul> | <ul style="list-style-type: none"> <li>• No numerical poverty estimates due to DDA trade liberalisation are provided, but a modest discussion is pursued;</li> <li>• Poverty is likely to deepen and spread in rural areas in many developing countries, because these are expected to experience negative effects from agricultural liberalisation under any plausible Doha agreement, and because most of the poor depend on agricultural income.</li> <li>• The net poverty effect would depend on the details of the outcome of the Doha Round and several country characteristics, such as the relative size of the agricultural and manufacturing sectors, the rates of growth or contraction likely to be experienced by each sector, and their relative productivity levels.</li> <li>• Country examples: under the Hong Kong scenario, China may experience poverty reduction effects, India may witness ambiguous poverty impacts depending on the details of the Doha Round outcome, whereas Bangladesh and several Sub-Saharan African countries are likely to face adverse poverty impacts.</li> </ul> |

Source: Authors' compilation

|                          | <b>Table 2: CGE Modelling of Poverty Impacts of Further Trade Liberalisation. The Single-Country (Augmented) Approach Using Disaggregated Household Data</b>   |  |  |
|--------------------------|--|--|--|
|                          | Ferreira-Filho and Horridge (2006)   | Khan (2005)  | Zhai and Hertel (2006)   |
| Country of Analysis      | Brazil   | India  | China  |
| Liberalisation Scenarios | <ul style="list-style-type: none"> <li>• Full merchandise trade liberalisation</li> <li>• Central Doha scenario involving a tiered formula with: <ul style="list-style-type: none"> <li>◦ Agricultural market access: Inflexion points at 15% and 90% and marginal tariff cuts of 45%, 70% and 75% in developed countries; and inflexion points at 20%, 60% and 120% and marginal tariff cuts of 35, 40, 50 and 60 percent in developing countries</li> <li>◦ Agricultural market support: marginal rates are cut by 60, and 75 percent for developed countries; for developing countries, 40 percent marginal rate; zero cuts for LDCs</li> <li>◦ Export subsidies are abolished</li> <li>◦ NAMA: 50%, 33%, &amp; 0% tariff cuts for developed, developing &amp; LDCs.</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Trade reform experiment consists of cuts in tariffs from 87 percent to below 20 percent</li> </ul>  | <ul style="list-style-type: none"> <li>• Full merchandise trade liberalisation</li> <li>• Central Doha scenario (same as in Ferreira and Horridge, 2006 in table 4.2)</li> </ul>   |
| Poverty Impacts          | <ul style="list-style-type: none"> <li>• Positive but very small effects: decline in national poverty by less than 1 percent</li> <li>• Poverty declines by around 236,000 persons in the Doha scenario and 482,000 persons in the full trade liberalisation scenario</li> <li>• Largest gainers are household relying on low-skill labour, as declines in poverty are fuelled by trade liberalisation induced agricultural growth</li> </ul>  | <ul style="list-style-type: none"> <li>• Positive but limited poverty impacts</li> <li>• The largest headcount drop is recorded for the rural unskilled labour</li> <li>• Trade liberalisation tends to initially benefit the poor close to the poverty line</li> <li>• Tariff reduction will ultimately benefit the poor(est), but the trickling down process is uneven and requires time</li> <li>• Gradual approach to trade liberalisation with special sensitivity to agriculture and the rural poor</li> <li>• Other growth-enhancing policies need pursuing simultaneously</li> </ul> | <ul style="list-style-type: none"> <li>• Positive but relatively modest poverty impacts: decline in national poverty by 2.7 percent (11.2 mln) and 1.3 percent (5.4 mln), in the case of full trade liberalisation, and respectively, the Doha scenario (\$2 per day poverty line).</li> <li>• Aggregate urban poverty headcount decreases by 2.1 and 1.2 percent, in the case of full trade liberalisation, and respectively, Doha scenario</li> <li>• Aggregate rural poverty headcount falls by 2.7 and 1.3 percent, in the case of full trade liberalisation, and respectively, Doha scenario</li> <li>• The biggest poverty reductions occur in China's rural areas (due to higher agricultural prices)</li> <li>• The number of poor people falls even more when rural education reforms are combined with full trade liberalisation, i.e. 55 million people (though there is no interaction between the 2 reforms)</li> </ul> |

|                          | <b>Table 2 (continued): CGE Modelling of the Poverty Impacts of Further Trade Liberalisation. The Single-Country (Augmented) Approach Using Disaggregated Household Data</b>   |  |
|--------------------------|--|--|
|                          | Cororaton, Cockburn and Corong (2006)  | Annabi et al (2006)  |
| Country of Analysis      | Philippines  | Bangladesh   |
| Liberalisation Scenarios | <ul style="list-style-type: none"> <li>• Central Doha scenario (same as in Ferreira and Horridge, 2006 in table 4.2), with indirect tax for tariff revenue replacement</li> <li>• Rest of the world free trade, full domestic liberalisation and indirect tax as replacement tax</li> <li>• Rest of the world free trade, full domestic liberalisation and income tax as replacement tax</li> <li>• Rest of the world free trade, no domestic liberalisation and indirect tax as replacement tax</li> <li>• Full domestic liberalisation, no ROW trade reform, and indirect tax as replacement tax</li> </ul>  | <ul style="list-style-type: none"> <li>• Central Doha scenario (same as in Ferreira and Horridge, 2006 in table 4.2), with indirect tax for tariff revenue replacement</li> <li>• Rest of the World free trade</li> <li>• Unilateral (domestic) trade liberalisation</li> <li>• Full liberalisation of domestic and world trade</li> </ul>   |
| Poverty Impacts          | <ul style="list-style-type: none"> <li>• Slightly negative poverty impacts in the Doha scenario (with a compensatory indirect tax), particularly amongst the rural unemployed, self-employed and low-skilled poor. This is because consumer prices rise more than household incomes.</li> <li>• Full trade liberalisation (with a compensatory indirect tax) generally further increases poverty, particularly in rural areas compared to the Doha agreement (the poverty gap and severity increase significantly, whereas the incidence of poverty is marginally reduced). This is due to lower priced imports and adverse rural impacts.</li> <li>• Poverty increases even more when an income tax replaces the indirect tax that compensates for the lost tariff revenue.</li> <li>• Rest of the world free trade is poverty reducing and favours rural households, who benefit from increasing agricultural demand.</li> <li>• Domestic reforms favour urban households and poverty increasing.</li> </ul> | <ul style="list-style-type: none"> <li>• Minor negative poverty impacts in the Doha scenario, particularly in the short run (consumer, particularly food prices increase more than nominal incomes)</li> <li>• Large farmers emerge as winners from the Doha scenario</li> <li>• Rest of the world trade liberalisation has also negative but slightly larger poverty impacts. Overall poverty increases by 1% in the short run and 0.5% in the long run.</li> <li>• Domestic trade liberalisation: short-term adverse effects on poverty and long-term beneficial poverty impacts. Rises in unskilled wages, with the poorest households reaping most of the gains.</li> <li>• Favourable domestic trade liberalisation poverty effects outweigh rest of the world free trade adverse poverty impacts (large farmers benefit mostly from global trade liberalisation)</li> <li>• Remittances represent a powerful poverty-alleviating tool</li> </ul> |

Source: Authors' compilation