WORKING PAPER NO.36

Trade Liberalisation and Child Welfare:

Assessing the Impact of a Free Trade Agreement between Peru and the USA

Javier Escobal
Carmen Ponce

January 2007

Young Lives
An International Study of Childhood Poverty

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- improve understanding of the causes and consequences of childhood poverty and to examine how policies affect children's well-being
- inform the development and implementation of future policies and practices that will reduce child poverty.

Young Lives is a collaborative partnership between research and government institutes in the 4 study countries, the University of Oxford, the Open University, other UK universities and Save the Children UK.

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Trade Liberalisation and Child Welfare: Assessing the Impact of a Free Trade Agreement between Peru and the USA

JAVIER ESCOBAL AND CARMEN PONCE

Summary

Peru is in the process of negotiating a free trade agreement (FTA) with the USA which would eliminate trade concessions on most goods and services. This paper analyses the potential impacts of such extensive trade liberalisation for Peru. The focus is on possible short-term welfare impacts and especially on child related welfare outcomes. The effects of a full and abrupt elimination of tariffs as part of a FTA are estimated in a general equilibrium framework - a branch of theoretical microeconomics which seeks to explain production, consumption and prices in a whole economy. Using this framework the connection between domestic prices and household welfare are modelled. Additionally, the demographic profiles of the most vulnerable population groups are analysed to assess whether children will be at an increased risk. The modelling exercise identifies potential negative short-term impacts of a FTA particularly for households in rural areas. Based on these findings the authors suggest a gradual reduction of tariffs to allow time for policies to be developed to boost rural productivity and the ability to withstand external competition. The authors conclude that a FTA could have different negative short-term effects on children's welfare, such as increased child labour and school drop-out rates. Therefore they recommend the creation and strengthening of social safety nets and welfare programmes as a measurement to protect children from negative effects of a FTA with the USA.

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Contents

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List of Abbrevations and Acronyms

APTA	Andean Trade Preference Act
ATPDEA	Andean Trade Programme and Drug Eradication Act
ENAHO	Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza (National Household Survey of Living Conditions and Poverty)
ENDES	Encuesta Nacional de Demografía y Salud (National Demographic and Health Surveys)
FONCODES	Fondo de Cooperación para el Desarrollo Social (National Compensation and Development Social Fund)
FTA	Free Trade Agreement
GTAP	Global Trade Analysis Project
INEGI	Instituto Nacional de Estadística, Geografía e Informática (Nacional Institute for Statistics, Geography and Computing, in Mexico)
INEI	Instituto Nacional de Estadística e Informática (National Institute of Statistics and Computing)
LSMS	Living Standards Measurement Study
MERCOSUR	Mercado Común del Sur (regional trade agreement between Argentina, Brazil, Paraguay and Uruguay. Bolivia, Chile, Colombia and Peru are associate members)
MINCETUR	Ministerio de Comercio Exterior y Turismo (Ministry of Foreign Trade and Tourism)
PETI	Prevenção e Combate ao Trabalho Infantile (Child Labour Eradication Programme, Brazil)
PETT	Proyecto Especial de Titulación de Tierras y Catastro Rural (Programme for Land Registration and Titling)
PRONAA	Programa Nacional de Asistencia Alimentaria (National Programme for Food Assistance)
PRONAMACHCS	Programa Nacional de Manejo de Cuencas Hidrográficas y Conservación de Suelo (National Watershed Management and Land Consolidation Programme)

1. Introduction

Drastic changes in the Peruvian economy over the past 15 years began with a stabilisation programme to curb hyper-inflation. This was immediately followed by a far-reaching liberalisation and structural reform programme. Although these reforms succeeded in bringing the rate of inflation closer to international levels and stimulated growth, their social impact has been less impressive. They have not been able to reduce poverty and expand social services at a rate needed to reduce the extreme inequalities that prevail in Peru.

Peru is today much more open to the world than it was in the early 1990s, both in terms of trade and foreign direct investments. Some of the export-led growth that has occurred has resulted from unilateral trade concessions from the USA. Exports to the USA have been growing at an annual rate of nine per cent, raising the US share of total Peruvian export value from 20 to 25 per cent over the last decade. In December 1991, the US Congress endorsed the Andean Trade Preference Act (ATPA) which approved reductions in import tariffs. ATPA lasted between 1992 and 2001 and was pivotal in the strategy to promote broad-base economic development, diversify exports, defeat drug trafficking and consolidate democracy in Andean countries. From 2002 slightly improved trade privileges were granted to Peru under the Andean Trade Programme and Drug Eradication Act (ATPDEA), which will remain in place until December 2006.[1]

These trade concessions were unilateral and are about to end as the USA does not wish to renew them. Peru has thus entered into negotiations with the USA to sign a Free Trade Agreement (FTA) under which trade concessions will be extended to other products and become permanent. The additional benefits that this agreement may bring about will be contingent on Peru making reciprocal tariff reductions to allow US exports to enter the Peruvian domestic market.

Improved and sustained open export markets may generate sustained economic growth for Peru but their short-term impacts and the long-term distributional effects need to be carefully assessed. It is crucially important to compare the potential economic benefits – derived from exports growth and efficiency gains as some domestic firms adjust to international competition – with the potential losses that may result in firms unable to adjust to compete with cheaper imports. It is important to ensure that all Peruvians realise the opportunities of what is supposed to be an 'engine of growth' and to guard against the risk that the FTA will merely entrench existing inequalities in access to resources and economic opportunities.

This paper addresses the distributional impacts for Peru of deepening trade liberalisation through an FTA with the USA. We focus on the many potential impacts that it may have on children's welfare.[2] In

[1] The ATPDEA act has been extended, first until June 2007 and then for eight additional months to make room for the US Congress discussion and approval of the FTA.

[2] To begin with, both countries will formally comply with ILO Convention 182 *Concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour*. They will also introduce a minimum employment age.

the medium- to long-term it is expected that the growth brought about by bilateral trade liberalisation will increase wages and provide households with higher incomes that may be used to improve child welfare. However, if the FTA negatively affects some import-competing sectors incomes may be reduced, forcing people to search for other sources of income. These may affect schooling decisions and potentially expose children to hazardous environments. Even in export-oriented sectors likely to benefit from the FTA there may be child welfare concerns if their expansion leads to women working longer hours, reducing their time available for childcare and affecting intra-household distribution of work. Another potential impact of an FTA on child welfare may be a rise in the prices of pharmaceutical products as a result of changes in the protection period granted to patents.[3] Policy-makers need to be aware of the multiple and complex pathways by which the FTA could impact both household behaviour and child support mechanisms. Corrective measures are needed to reinforce the positive impacts and avoid potential negative effects.

This paper assesses the short-term welfare impacts of an FTA between Peru and the USA and discusses its potential child-related welfare outcomes. In Section 2 we briefly review the economic and social context in which the FTA will be implemented. Section 3 presents a brief review of the literature on the impact of trade liberalisation on child welfare. In Section 4 we estimate the distributional effects of the full and abrupt elimination of tariffs in a general equilibrium framework – a branch of theoretical microeconomics which seeks to explain production, consumption and prices in a whole economy. We model both the connection between trade policy and domestic prices, and the connection between domestic prices and household welfare. We also look at the demographic profile of those that are negatively affected in order to assess whether children will be at risk. Finally, Section 5 presents some issues policy-makers will need to address.

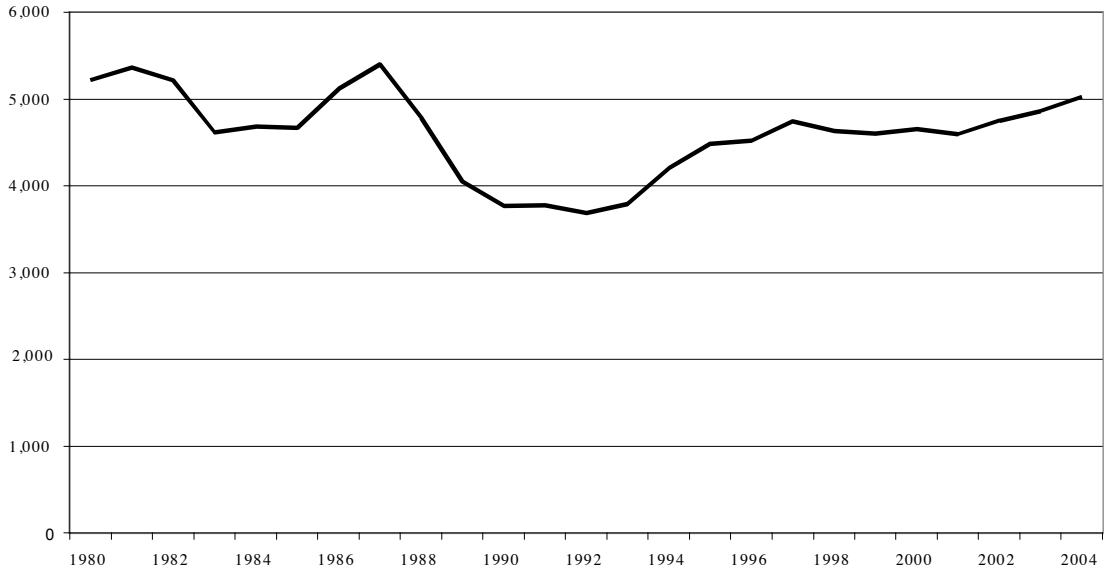
[3] There are several papers analysing the impact of extending the protection period granted to patents and testing data on pharmaceutical drugs prices. Some ideas about the impacts of the FTA with the USA on pharmaceutical drugs prices can be found in Valladares (2005) and Seinfeld and La Serna (2005).

2. The context

In order to understand the impacts of an FTA with the USA on Peruvian children's welfare it is necessary to trace the country's trade liberalisation process.

In 1990 Peru undertook a drastic programme of macroeconomic adjustment and structural reforms designed to overcome serious problems of hyper-inflation and stagnation. Structural reforms were aimed at trade liberalisation, enhancing competition in domestic products and factor markets and drastic reduction of state participation in the market economy. These reforms put an end to more than thirty years of an 'inwards' development scheme that discriminated against the agrarian rural sector in favour of urban industry. Enthusiasm for market reform prevailed until around 1996, after which many reforms ceased and progress towards expected 'second generation reforms' was halted. From the narrow point of view of macroeconomic stabilisation the outcome of the reform of the 1990s was undoubtedly successful for it controlled inflation and allowed recovery of export-oriented sectors. After 1996 the economy continued growing but the combination of financial crises and a weakening of the reform process slowed economic recovery (see Figure 1). Even though the country has faced numerous political crises in the last fifteen years, the economy has remained fairly stable. Eventually, however, this dissociation between political and economic cycles may come to an end, affecting investment and casting doubts on the chances of long-term economic growth.

Figure 1. Peruvian Economy 1980–2007 (Per Capita GDP)



Source: Central Reserve Bank

2.1 Impacts of early liberalisation

Domestic and external liberalisation was the cornerstone of Peru's economic reforms in the 1990s. Table 1 indicates how Peru has become a more open economy. Measured by the ratio of trade to GDP, trade openness has increased sharply from 20.6 per cent in 1991 to 32.7 per cent in 2004. Foreign direct investment (excluding short-term capital flows) has steadily increased from four per cent of GDP in 1991 to almost 20 per cent in 2004.

Table 1. Trade liberalisation and poverty in Peru

	Early 1990s (1991)	Late 1990s (1997)	Early 2000s (2004)[a]
Real GDP Growth (per annum)	2.1	6.8	4.8
Real GDP Growth per capita (per annum)	0.1	5.0	3.3
Export Growth (US$) (per annum)	5.0	16.0	39.0
Trade Openness (X+M /GDP)	20.6	26.0	32.7
FDI Stock / GDP	4.0	13.1	19.4
Inflation (% per annum)	132.0	8.6	3.7
Poverty Rate	54.5	42.7	48.0
Extreme Poverty Rate	23.5	18.2	14.9
Inequality Index (Gini)	0.388	0.386	0.403

Note: [a]All figures are for 2004 except poverty, extreme poverty and Gini coefficients which are based on 2000 figures to assure comparability with other estimates.

Sources: Central Reserve Bank, Statistics Institute (INEI) and Instituto Cuanto

Although the reforms promoted economic growth, trade liberalisation did not increase the real exchange rate. It fell drastically between 1990 and 1992 and, as indicated in Figure 2, did not then significantly increase. Even though exporters did not benefit from a favourable exchange rate trend, in general liberalisation improved global productivity and facilitated economic growth. This effect was particularly important in primary sectors like mining and agriculture, which grew at higher rates than the non-primary sectors, such as the manufacturing and processing industries.[4]

[4] In the case of agriculture, the end of the *Sendero Luminoso* (Shining Path) Maoist insurgency in the early 1990s brought peasants back to abandoned cropland, generating agricultural recovery.

Figure 2. Real exchange rate 1992-2005 (1994=100)

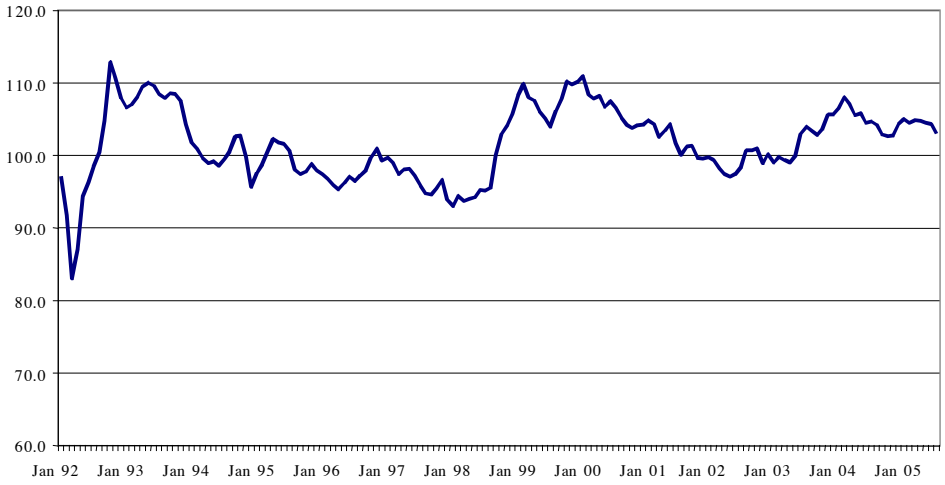
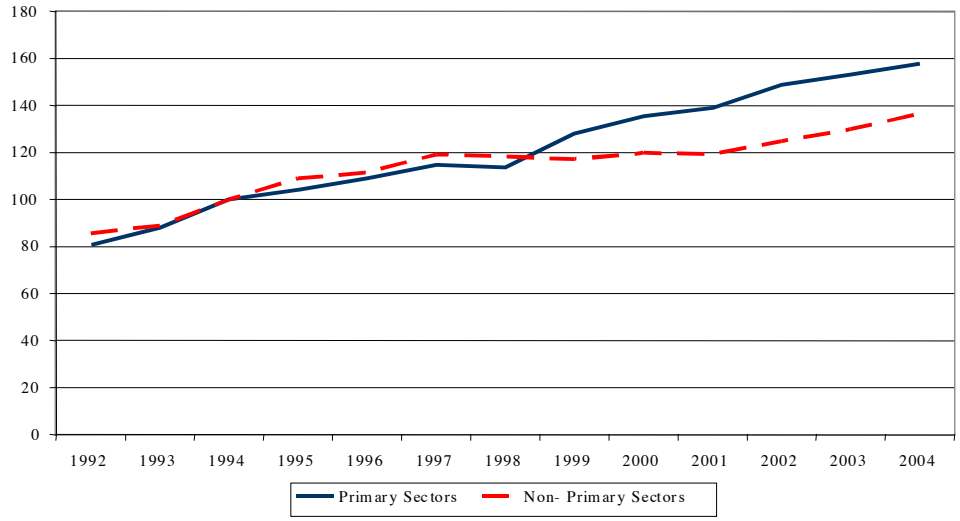


Table 2. Inflation, real exchange rate and price increases in tradable and non-tradable sectors - annual price increase (%)

Period	Inflation	Tradables	Non-tradables	Real exchange rate
Dec 1992 - Dec 1997	16.16	13.79	17.47	-2.73
Dec 1997 - Dec 1999	4.80	5.59	4.37	8.28
Dec 1999 - Dec 2002	1.70	1.83	1.60	-3.47
Dec 2002 - Dec 2004	2.98	3.07	2.91	2.96

Source: Central Reserve Bank and INEI

Figure 3. Evolution of primary and non-primary real GDP (1994=100)



Source: Central Reserve Bank

2.1.1 Impacts on employment, wages and poverty

After the stabilisation programme was implemented urban employment dropped, continuing a trend that started in 1990 (Pasco Font and Saavedra 2001). However, after two years of falling employment, urban employment started to grow. Most of this new employment was created under more 'flexible' conditions – insecure employment with long working hours, poor working conditions and income fluctuations. Temporary contracts rose sharply, especially between 1994 and 1997.

Although there was post-stabilisation growth in waged income in the urban informal sector this ceased after 1992. In the urban formal sector, however, wages kept growing after 1992 as more qualified workers obtained greater wage increases than those who were less qualified.

Agricultural incomes dropped during the first years after the adjustment but were partially compensated for by increases in waged and non-waged non-agriculture income. After the initial adjustment period, rural incomes recovered although they rose more rapidly in coastal areas and less in the *selva* (Amazonian region). In the rural *sierra* (Andean mountains), where the bulk of the rural poor lives, real income stagnated or fell, even during periods when the economy was growing (Escobal 2004).

According to Living Standards Measurement Study (LSMS) surveys,[5] poverty in Peru rose dramatically between 1985 and 1991 – from 41.6 per cent to 54.5 per cent. Extreme poverty (i.e. the number of people living below the food poverty line) rose from 18.4 per cent to 28.5 per cent. The rise reflected both the effect of the macroeconomic crisis that led to hyper-inflation in the late 1980s and the initial impact of the macroeconomic adjustment programme implemented in the early 1990s. Subsequent poverty trends are hard to discern because changes in the sampling frame, questionnaires and methodologies make it difficult to get comparable figures. Herrera (2002) and Escobal (2004) show that it is very likely that between 1994 and 1997 poverty decreased especially in urban areas and the rural coast and increased again between 1997 and 2000. According to the National Household Survey about Living Conditions and Poverty (ENAHO)[6], poverty increased from 48.4 per cent to 50 per cent between 2000 and 2002 and extreme poverty from 15 to 18.7 per cent.

Several studies (Herrera 2002; Escobal 2004) have shown that most of the changes in poverty which occurred during periods of economic expansion and slowdown were associated with growth effects, rather than being induced by redistribution mechanisms. Thus, macroeconomic swings continue to explain most of the changes in poverty. In the case of extreme poverty, however, there is evidence that a number of government programmes targeted at the poor achieved some success.

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5 A methodology deployed by the World Bank to explore ways of improving the type and quality of household data collected by government statistical offices in developing countries.

6 As referred to in Annex 2, these are surveys that gather information of living standards and poverty and are undertaken by INEI.

2.1.2 Public income and expenditure

Trade liberalisation drastically reduced import tariffs from an average of 43 per cent with great dispersion and effective protection rates[7] over 180 per cent, to lower tariffs of 17 per cent in average with smaller dispersion and average effective protection rates of 24 per cent (Pasco Font and Saavedra 2001). In addition, export taxes were abolished. After the initial tariff reduction, a further reduction took place in 1997, leaving the average tariff at 13 per cent. The combined effect of the rapid pace of growth of the economy and the reduction of import tariffs reduced the significance of import duties in total tax revenue. As can be seen in Table 3, import duties today represent less than nine per cent of total taxes collected by the government, a decrease (of around 15 per cent) from the levels reached during the early 1990s. Tax revenues as a percentage of GDP rose steadily from 1990 to 1997, were affected by the 1998-2000 economic slowdown but then started recovering.

Table 3. Peru: relative importance of taxes 1993-2004

Year	Income Tax	Property Tax	Import Duties	Sale Taxes	Selective Taxes 1	Other Taxes	Tax Deductions	Total	Taxes (in million soles)
1993	16.4%	3.0%	14.3%	41.2%	18.8%	7.4%	-1.0%	100%	5,416
1994	19.5%	0.7%	13.1%	45.9%	17.5%	7.2%	-3.8%	100%	8,589
1995	21.0%	0.2%	13.1%	46.5%	15.1%	8.3%	-4.2%	100%	12,979
1996	25.9%	0.0%	12.0%	44.6%	14.4%	7.5%	-4.3%	100%	19,256
1997	25.6%	0.0%	11.1%	46.4%	15.1%	8.6%	-6.8%	100%	22,304
1998	25.3%	0.0%	12.5%	47.8%	14.8%	7.7%	-8.2%	100%	23,144
1999	23.0%	0.1%	12.9%	50.0%	15.6%	8.1%	-9.7%	100%	22,072
2000	22.5%	0.0%	12.8%	52.8%	15.0%	9.0%	-12.2%	100%	22,769
2001	23.9%	0.0%	11.8%	50.2%	15.1%	11.1%	-12.1%	100%	23,541
2002	25.0%	0.0%	10.3%	52.4%	17.4%	7.2%	-12.4%	100%	24,062
2003*	29.1%	0.0%	9.3%	51.5%	16.5%	5.2%	-11.5%	100%	27,405
2004*	29.0%	0.0%	8.8%	52.0%	14.3%	6.9%	-11.1%	100%	31,144

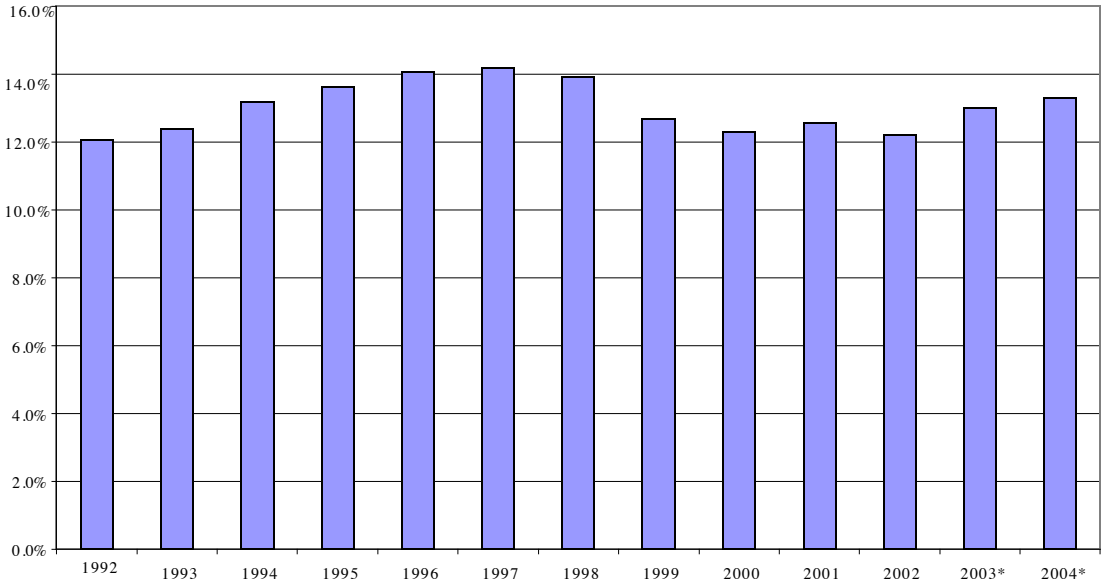
* Preliminary

Notes: 1 Includes special taxes to gasoline and luxury goods

Source: Statistics Institute (INEI) and Central Reserve Bank

[7] The effective protection rate takes into consideration not only the final product's import tariff (nominal protection) but also the import tariffs affecting the intermediate inputs used in its production. This measure is of course more accurate than the final product's import tariff to evaluate the protection the domestic producer receives as compared to its international competitors.

Figure 4. Tax Revenue 1990-2004 (Taxes/GDP)

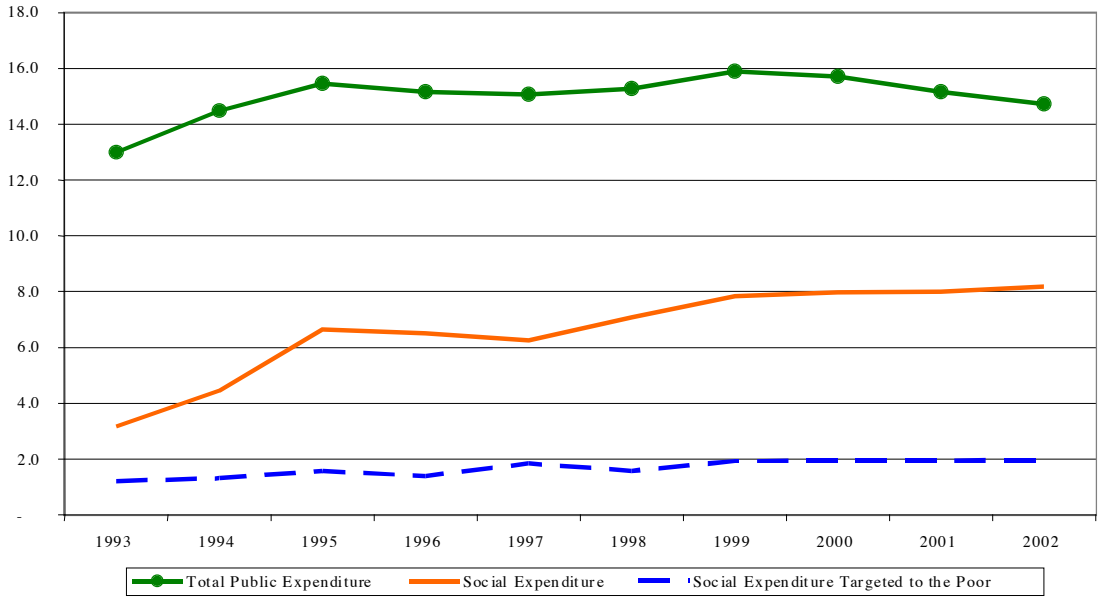


Source: Central Reserve Bank

2.2 Social and child welfare outcomes

Recovery of the economy, following macroeconomic stabilisation, increased tax revenues and allowed the government to increase expenditure.

Figure 5. Social expenditure (as percentage of GDP)



Source: Ministry of Economics and Finance

Even when social expenditure increased from 6.8 per cent to 8.3 per cent of GDP between 1997 and 2002, public expenditure targeted at the poor remained below 2 per cent of GDP. This includes expenditure incurred by the National Compensation and Development Social Fund (FONCODES), basic health care and birth control programmes, rural education, rural roads and by agriculture sector expenditure on such schemes as the National Watershed Management and Land Consolidation Programme (PRONAMACHCS), Programme for Land Titling (PETT); and supplementary feeding programmes like the *Programa Vaso de Leche* (glass of milk) and the National Programme for Food Assistance (PRONAA) – to name only the most important.

During the 1990s the Peruvian government significantly improved delivery of social services, especially primary health care. Cotlear (2000) argues this was the result of a reform focused on three areas: health provision, community participation and health financing. According to Jaramillo (2005), public and private health spending rose by over 50 per cent in real terms as a result of a growing economy.

The Peruvian demographic and health surveys (ENDES) cite evidence of improvements in child-related outcomes. Infant mortality fell from 57/1000 to 33/1000 between 1991 and 2000.[8] Chronic malnutrition fell from 36.5 per cent in 1991 to 25.4 per cent in 2000. Maternal mortality also declined from 3/1000 in 1990 to 1.85/1000 in 2000 and to 1.52/1000 in 2002 (according to information from the Ministry of Health).

However, despite these positive trends, inequalities in access to infrastructure and public services continue to be significant. According to Valdivia (2002), for example, under-ones were more likely to die if they had young siblings, their mother was young and they lived in the *sierra*. In addition, the mortality rate was much higher among children whose mothers had not completed primary education and whose dwellings lacked piped water or sewer connections. These large inequalities also had a gender dimension: while 35 per cent of boys (below 14 years of age) in the poorest quintile were likely to receive some health service, only 29 per cent of girls in the same age range and distribution quintile were likely to do so. The gender gap was more marked in the richest quintile: 81 per cent for boys and 65 per cent for girls.

2.2.1 Child labour and schooling

According to official statistics, 28.6 per cent of the approximately two million young people between the ages of six and seventeen work for a wage or a non-monetary compensation. Boys comprise 54 per cent of these working children. Ninety per cent of working children are employed in the informal sector for over 45 hours per week and are paid less than the minimum wage (INEI, 2002). There is widespread under-reporting of children's work in national surveys because Peruvian law prohibits employment of children under the age of 14 and norms the type of jobs children between 14 and 17 are allowed to perform.

[8] Although the decline occurred in both urban and rural areas, average infant mortality in rural areas was almost double the rate in urban areas. (Infant mortality is calculated for children under the age of one).

According to the National Institute of Statistics and Computing (INEI 2005), the presence of children in the labour market has increased during the last decade.[9] Whereas 20.8 per cent of children between six and eleven years of age were reported to be engaged in the labour market in 1996, by 2001 26.9 per cent were doing so. More 12-17-year-olds are working but the upward trend is less pronounced: their participation increased from 30.3 per cent in 1996 to 32.5 per cent in 2001. These figures hide the real importance of child work, because they do not include activities performed by children helping their parents on farms or in small businesses.

In an earlier study, INEI (2002) reported information provided by parents about the economic activities undertaken by their children – helping in the family business, doing household chores, farming or animal husbandry. Under this broader definition (which is also subject to under-reporting), 42.4 per cent of children between the ages of six and 11 and 57.6 per cent of adolescents between the ages of 12 and 17 are reportedly involved in labour activities.

Table 4. Economic activities undertaken by children aged 6-13 years in Peru in 2001 (%)

Economic activity	Total	Urban	Rural
Total children (in thousands)	1,219,473	226,932	992,541
Helped in household business	11.0	43.1	3.6
Helped with household chores	3.7	10.0	2.2
Helped producing self-consumption goods	2.0	5.9	1.1
Helped in agriculture activity/animal husbandry	81.0	32.7	92.1
Helped with street vending	1.9	6.8	0.8
Helped with portering and brickmaking	0.4	1.6	0.1

Source: INEI 2002

Table 5. Economic activities undertaken by children aged 14-17 years in Peru in 2001 (%)

Economic activity	Total	Urban	Rural
Total children (in thousands)	767,692	378,786	388,906
Cook, waiter/waitress	2.3	3.5	1.3
Wholesaler, newspaper seller, market vendor	11.6	19.3	4.1
Weaver, spinner, brickmaker, baker, mechanics assistant	7.0	11.4	2.7
Street vendor	3.7	6.8	0.8
Bus fare collector	1.0	1.6	0.5
Maid, housekeeper	8.6	15.3	2.1
Launderer, cleaner	3.9	6.9	1.1
Service assistant	4.5	8.4	0.7
Farm labourer	48.7	13.0	83.5
Construction labourer	1.1	1.4	0.9
Porter	0.9	1.7	0.1
Other occupation	6.6	10.8	2.4

Source: INEI 2002

[9] Although data methodologies varied – and there is thus reason for caution – it seems very likely that child participation in labour markets increased in this period.

Gender roles are much more pronounced among 14-17 year-olds than among younger children. Girls tend to work as maids, market vendors and agricultural labourers while boys are mostly agricultural labourers and brick-makers. The proportion of girls employed in non-tradable sectors (which produces goods only for the domestic market) is increasingly important, whereas boys tend to be employed in the tradable sector (which produces goods for domestic use and export). The gender differences in child labour could be affected by an FTA and should therefore be taken into consideration in the analysis.

Table 6. Economic activities undertaken by children aged 14-17 years by gender in Peru in 2001 (%)

Economic activity	Total	Urban	Rural
Total children (in thousands)	767,692	428,593	339,099
Cook, waiter/waitress	2.3	1.4	3.6
Wholesaler, newspaper seller, market vendor	11.6	8.0	16.0
Weaver, spinner, brickmaker, baker, mechanics assistant	7.0	9.0	4.4
Street vendor	3.7	3.3	4.2
Bus fare collector	1.0	1.8	0.1
Maid, housekeeper	8.6	0.9	18.3
Launderer, cleaner	3.9	2.5	5.7
Service assistant	4.5	4.6	4.4
Farm labourer	48.7	56.0	39.5
Construction labourer	1.1	1.9	0.2
Porter	0.9	1.6	0.0
Other occupation	6.6	9.1	3.3

Source: INEI 2002

Agricultural and home-based work – far and away the most significant economic activities for young people – have their risks. Other enterprises which expose them to risks (either due to the activity itself or the environment in which it takes place) include: panning for gold, informal mining, work in slaughter houses, construction, fireworks manufacture, brick-making, solid waste disposal and coca leaf gathering.

INEI (2002) reports a much larger number of children who work and study than those who only work. It is interesting to speculate how liberalisation might affect children's school attendance. Escobal *et al.* (2005) found that economic shocks have an impact on the quality, rather than the quantity, of education. This is because parents living in urban areas are more likely to transfer a child from a private to a public school or reduce expenditure on educational materials and services, than to completely withdraw the child from school. However, there is some evidence that parental responses depend on the level of education already achieved by their children. Among children going from primary to secondary school withdrawal rates are much higher and the decision to work is reported as an important reason to withdraw from school.[10] We can expect that a family income shock would likely induce children to drop out from school if they have already finished the primary level. Additionally, shocks may generate a number of indirect responses that may reduce enrolment rates. For example, there is evidence that girls may be withdrawn from school to look after their younger siblings if new economic opportunities increase the opportunity costs of their mothers' time.

[10] More than 10 per cent of children between 12 and 17 report not attending school because they work. This figure is 0.2 per cent for children between 6 and 11 years (INEI 2002).

3. Trade liberalisation and children's welfare: a brief review of the literature

The first impact of trade liberalisation on children's welfare relates to labour participation. In addition, there may also be child welfare effects that arise through changes in food intake, access to health or education and new risks and vulnerabilities. Although there is an enormous body of research that deals with the effects of trade liberalisation on economic growth and household welfare, there is not much research on the effect of trade liberalisation on child welfare.

At the aggregate level, some studies relate economic globalisation with child poverty. In some cases (Cornia 2002), evidence of child poverty increases at a greater rate than overall poverty is reported. The explanation suggested by these studies focuses on the increasing volatility of economic growth as well as on the reduction of growth-elasticity of poverty alleviation (the rate at which poverty declines with economic growth which is affected by rising inequality.) Researchers suggest that increases in inequality measures and increasing volatility are both caused by globalisation. Some authors stress that trade liberalisation promoted by globalisation fosters economic growth as the key mechanism for poverty alleviation, minimising the role that redistributive policies may play in reducing poverty. For example, Aiguo and Zhong (2002) contend that China, where poverty reduction has been achieved mainly through export-led growth, has placed insufficient attention on increasing social expenditure and that redistributive policies to improve child welfare have been overlooked. Vandemoortele (2000) shows that under-investment in basic social services, even in countries in South Asia and Latin America where robust economic growth has occurred, provides strong evidence that growth *per se* cannot reduce the prevailing inequalities and reduce poverty in the absence of pro-poor policy interventions.

The most researched topic has been the impact of trade liberalisation on child labour. Kar and Guha-Khasnobis (2003) present a theoretical model that determines the demand for child labour in a small open economy and compare it to child labour supply determined by household decisions. The model emphasises the link between tariff reduction and wage and labour mobility when household labour decisions are characterised by relative risk aversion. If households face income risks they might be more likely to send their children to work in order to better manage such risks. The model highlights the fact that child labour may increase or decrease depending on key parameters. These include the degree to which adult labour can be substituted by child labour, the relative size of the export- and import-competing sectors and the wage elasticity of demand for, and supply of, child labour (i.e. the rate at which demand or supply of child labour changes as wages rise or fall).

As trade liberalisation has accelerated there have been growing attempts to ban child labour through the introduction of harmonised international child labour trade sanctions. Edmonds and Pavcnik (2005) note that under threat of such sanctions, export-oriented garment factories in Bangladesh significantly reduced child labour. Brown *et al.* (1999) discuss how the use of trade restrictions to deter the exploitation of foreign child labour may have had the opposite effect: children have been negatively affected as the worst types of child labour increased.

Edmonds and Pavcnik (2004) explore the relationship between trade liberalisation and child labour through a cross-country database. They found that countries that trade more have less child labour. This effect is mainly attributed to the relationship between trade openness and income. Although their results are robust to different specifications, their framework is not capable of evaluating changes in relative prices and the labour movements that may result.

In general, the effect of trade liberalisation on child welfare outcomes is ambiguous. The effect on child labour will depend on the changes in the opportunity costs of children's time and whether there is an income effect on child labour brought about by changes in employment or wages. Edmonds and Pavcnik (2006) show how trade reform in Vietnam may reduce the incidence of child labour through its income effects. Those producers who are net producers of rice, the main export commodity, employed less child labour as rice prices increased. This means that even in sectors experiencing liberalisation-led growth income effects can offset potentially higher child wages derived from increases in the demand for child labour. However, Melchior (1996) shows if child labour serves as a specific factor of production for the export sector then lowering the tariffs may increase the returns to child labour and therefore increase its supply. This argument presumes that child labour will continue to be used as a factor of production in the export sector. This may not be the case, however, if exports come from a trade agreement that provides disincentives for the use of child labour. In this case, child labour may move away from the export sector to less-regulated sectors.

Two key topics that have been researched in relation to the impact of trade liberalisation on child welfare are child labour and schooling decisions when credit constraints and female labour participation increase due to trade liberalisation. Ranjan (2001) presents a theoretical model that highlights the channel through which trade policy may affect child welfare when credit is constrained. He argues that trade sanctions against commodities associated with child labour will reduce the unskilled wage and increase the skilled wage through the standard Stolper-Samuelson effect (i.e. that trade raises the real wage of the most abundant factor of production, in this case skilled labour, while protection from trade lowers it). In such circumstances the income of unskilled parents will be lowered, which may increase the proportion of their children engaged in labour, especially if credit is hard to obtain. Edmonds and Pavcnik (2005: 21) report that '... several recent studies confirm that credit market imperfections can cause children to work when all other aspects of their economic environment suggests they should not be working.'

Increased female labour participation, either because of new access to labour opportunities opened by trade liberalisation or because of a need for additional income due to the negative effect of trade liberalisation, may have important effects on child welfare, especially for girls. Watkins (1997) shows that in cases where labour opportunities are negatively affected rural households may respond to reduced employment opportunities by encouraging male labour migration, thus increasing the workloads of women and children left behind. Elson and Evers (1997) (quoted in Winters *et al.* 2004) note that a positive export supply response may generate a greater demand for female labour time that may have damaging repercussions for the health and well-being of children. In particular, '... increasing workloads of women have led to a decline in breast-feeding and worsening child care practices and food insecurity has been intensified' (*ibid:* 91). Jenkins (2005) shows in the cases of Kenya, Vietnam and Bangladesh that labour-intensive exports of manufactures and agricultural products have created employment opportunities for low-income women, especially for migrants from rural areas. However,

it has also affected the security and vulnerability of their livelihoods. Since children are not permitted in factories, mothers must make use of childcare services which may be costly. In some cases, childcare may become the responsibility of older siblings, reducing their chances of attending school.

If trade liberalisation reduces the likelihood of school attendance there may be implications for intergenerational transmission of poverty. Thomas *et al.* (1999) showed that rural families responded to the Indonesian financial crisis in 1997 by reducing expenditure on education, child nutrition and/or health. However, in Peru, Ray (2000) showed that when families fall into poverty children are not withdrawn from school. This result contradicts what Ray found for Pakistan, but is consistent with Escobal *et al.* (2005). They found no evidence that shocks cause more over-age students (i.e. students who are at least one year older than the age expected for their grade) and therefore there may not be an effect on the school drop-out rate. However, even when a shock does not induce changes in time spent on education, they found that it does reduce the effective accumulation of human capital through cuts in expenditure on education. Levison and Moe (1998) show for Peru that domestic and market work equally compete with schooling. If this is the case, as trade liberalisation expands opportunities for women in the labour market it may negatively affect schooling decisions.

Although there do not seem to be policies specifically addressing child-related vulnerabilities in trade liberalisation, there are some policies that have shown positive impacts. Recent studies evaluate the direct link between conditional cash transfers and the probability of staying at school as well as the link between these transfers and additional child-related welfare outcomes. Examples of these policies are increasingly common in developing countries. They include the Child Labour Eradication Programme (PETI) and the *Bolsa Escola* programme (a means-tested cash transfer to poor households provided their children attend school) in Brazil, the Midday Meals programme run in schools in India and the *Progresa/Oportunidades* programme in Mexico. Schultz (2004) found that *Progresa/Oportunidades* significantly reduced children's market work, increased their school attendance and increased school attainment from 6.8 to 7.4 years of age.

In Peru, a similar conditional transfer programme called *Juntos* (together) could, if properly managed, help to reduce the vulnerabilities that a free trade agreement with the USA might bring about.

4. Assessing the welfare impacts of an FTA between Peru and the USA

In order to assess the likely impacts of an FTA, given the complexities of this modelling exercise, first we estimate the distributional effects of the full and abrupt elimination of tariffs in a general equilibrium framework. In particular, we evaluate the impact across several income sources in rural and urban areas, as well as the welfare effects driven by changes in prices. Next, we extend this exercise to address two questions: (i) the likely timeline of welfare impacts in the event of a negotiated gradual reduction of imports tariffs and (ii) the anticipated welfare effects of an elimination of import tariffs if rural households were more educated or had better access to markets and public infrastructure. These analyses provide evidence to feed into policy debates around measures to protect highly vulnerable households and enable them to reap the opportunities and potential benefits of new economic conditions.

The basic idea of the model used to perform our analysis is that the welfare impact of a reduction in import tariffs is two-fold. The tariff reduction affects the price of consumption goods traded internationally and this impact is transmitted to the prices of all tradable goods, the prices of goods that are traded only domestically (non-tradable goods) and the hourly labour income of all sectors of the economy. The model analyses the welfare impact on both household consumption and household income. These changes in relative prices and household income may induce a reallocation of household members' time between income generating activities and domestic work as well as change the consumption of goods and services.

In order to address child-specific welfare impacts we extend the analysis in Section 4.2 in several directions. Special attention is placed on the potential impacts that the FTA would have on children's school attendance as well as on children engagement in domestic and labour market activities. Poor households, especially in rural areas, may be compelled to reallocate children's time away from school towards work to offset any reduction in household income. However, children living in households whose income rises due to the FTA may increase spending on goods and services directed towards improving child well-being (e.g. investing in better quality education). Finally, older children, especially girls, may be compelled to shoulder more domestic and childcare responsibilities if the FTA induces an increase in labour opportunities for the caretaker.

The following two sections explain in detail the technicalities involved in the analysis. Readers unfamiliar with economic jargon may wish to skip the econometric and modelling details and focus on the main ideas and results.

4.1 Simulating the short term welfare effect of a Peru-USA FTA

Modelling exercises that evaluate the economic impacts of trade liberalisation tend to focus on the long run impacts that such a change may generate, paying less attention to short-term impacts. A number of such simulations regarding the potential impacts of bilateral or multilateral liberalisation

on the Peruvian economy have recently been developed. The most important one, developed by the Ministry of Foreign Trade and Tourism (MINCETUR), uses a Global Trade Analysis Project-based Computational General Equilibrium Model (CGE)[11] to evaluate the direct and indirect impacts of the FTA on the Peruvian economy. In this model, the additional impact of the FTA (over ATPDEA) on the Peruvian economy represents approximately one percentage point of GDP growth compared to the current situation (with includes advantages already obtained from ATPDEA), and two percentage points of GDP compared to a situation without ATPDEA. These are important positive effects that can affect growth of the Peruvian economy in the next 20 years.

Cuadra *et al.* (2004) and Fairlie (2004) report results of simulation exercises based on a variant of the MINCETUR GTAP model. They incorporate key modifications to allow for unemployment, capital accumulation and productivity increases through trade-related externalities. The base scenario reflects a standard GTAP model which assumes full employment, a fixed exchange rate and an endogenously determined trade balance. Results are more optimistic than those reported by MINCETUR and may hint at the potential additional gains (over those already obtained through ATPDEA) that could be generated if complementary policies are put into place to allow for productivity increases.

These kinds of models share several common features. Significantly, they assume perfect mobility of production factors. This implies that trade liberalisation triggers changes across all sectors of the economy in a way that all production factors (including labour and capital) are instantaneously reallocated in the most efficient way (i.e. changing from one sector to another, according to how each sector's relative profitability has been affected by the FTA). These modelling exercises thus tend to over-estimate the impacts of markets liberalisation, as they do not introduce structural restrictions that may lower the speed of adjustment of the economy. Results should therefore be regarded with caution as they represent long-term potential gains that an FTA with the USA may bring about. In addition, these models are based on a 'representative agent' setting, so they cannot give answers about the impacts on poverty or income distribution.

Because of these limitations, there is a need to complement these models with others that may show the short-term impacts and potential welfare distribution effects of the Peru-USA FTA. If we make the more realistic assumption that the most mobile production factor (labour) reacts in the short-term, while other factors (like capital) take more time to be reallocated towards more profitable sectors, and if we are more realistic about the likely speed of response to the new economic environment, we will find less reason for optimism.

[11] This model is based on a GTAP Model (Hertel 1997), which is a static multi-regional, multi-sector model which assumes perfectly competitive product and factor markets, producing under 'constant returns to scale' (this term refers to a production technology that allows to produce twice the output by doubling the quantity of all inputs used in the production process). The aim of these models is to simulate the effects of trade policy and resource-related shocks on the medium-term patterns of global production and trade.

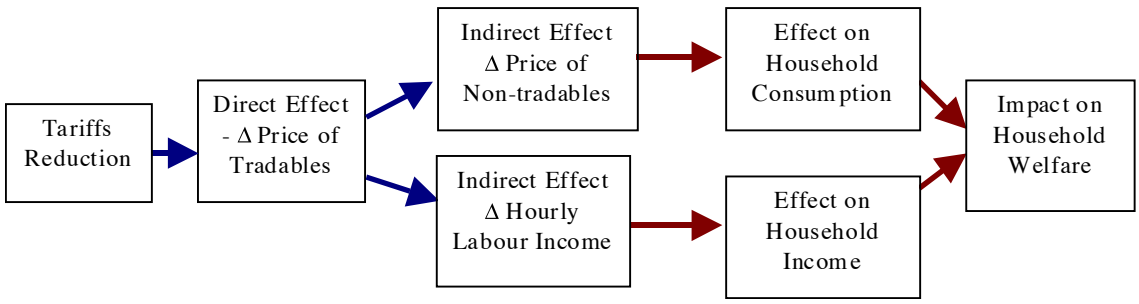
4.1.1 The simulation

This section analyses the potential impacts of a free trade agreement with the USA, particularly the impact of tariff abolition on household welfare. The methodology used here is based on the model that Porto (2003) developed to analyse distributional effects of MERCOSUR on Argentinean households. The model assumes that there is only one mobile production factor, labour, while other factors, such as capital, cannot be reallocated to other sectors. In this sense, this is a short-term analysis. The welfare impact of the FTA is measured here as the negative value of the income transfers (expressed as a percentage of households' expenditure) that would be required to compensate households for the welfare loss induced by trade liberalisation. If compensating variation estimates are negative (or positive), the FTA would induce a welfare loss (or gain), since it would indicate that compensation is needed to guarantee households the same welfare level they had before the liberalisation occurred.

The welfare effects are modelled through two links (see Figure 6). A first link consists of the impact of trade liberalisation on domestic prices. Since Peru is a small open economy, there is a direct effect on prices of tradable goods due to its direct equalisation to exogenous international prices (i.e. we assume perfect and symmetric pass-through). In turn, this change in prices of tradable goods induces changes in prices of non-tradable goods. Also, the change in prices of consumption goods induces a change in hourly labour income.

The second link consists of the effects that these price changes (consumption good prices and hourly labour income) have on both household consumption and household income. A more formal presentation of the model can be found in Annex 1.

Figure 6. Short-term effects on well-being: transmission channels



Modelling micro-economic channels by introducing some rigidity into the economy, as we do in this section, allows construction of estimators that are more robust to short-term responses. This is because of the assumption that some factors in the economy are specific to certain sectors, and cannot be easily or rapidly reallocated to other sectors that suddenly become more profitable. The approach we take assumes labour to be the only mobile factor in the economy – as capital and land are sector-specific. It is worth emphasising that we analyse rural and urban areas separately. Thus, there is no labour mobility between these areas as the model permits no rural-urban migration. However, labour mobility is allowed within both urban and rural areas. We take into consideration two types of urban labour: self-employment and wage labour, and four types of rural labour – wage agricultural, non-agricultural, agricultural self-employment and non-agricultural self-employment.

Table 7 shows the result of our modelling exercise. We use the post-ATPDEA composition of Peruvian imports as the baseline scenario from which we simulate an abrupt elimination of tariffs imposed on US imports. It is worth emphasising that this approach provides an idea of the most negative impacts (or less positive, depending on the geographic area) we might expect, taking into account the rigidities in Peruvian factor markets. For instance, one change that is likely to occur once the FTA takes place is that new investments may arise in areas where export markets have expanded. These new investments, which may trigger domestic employment and income effects, are not considered in this simulation exercise.

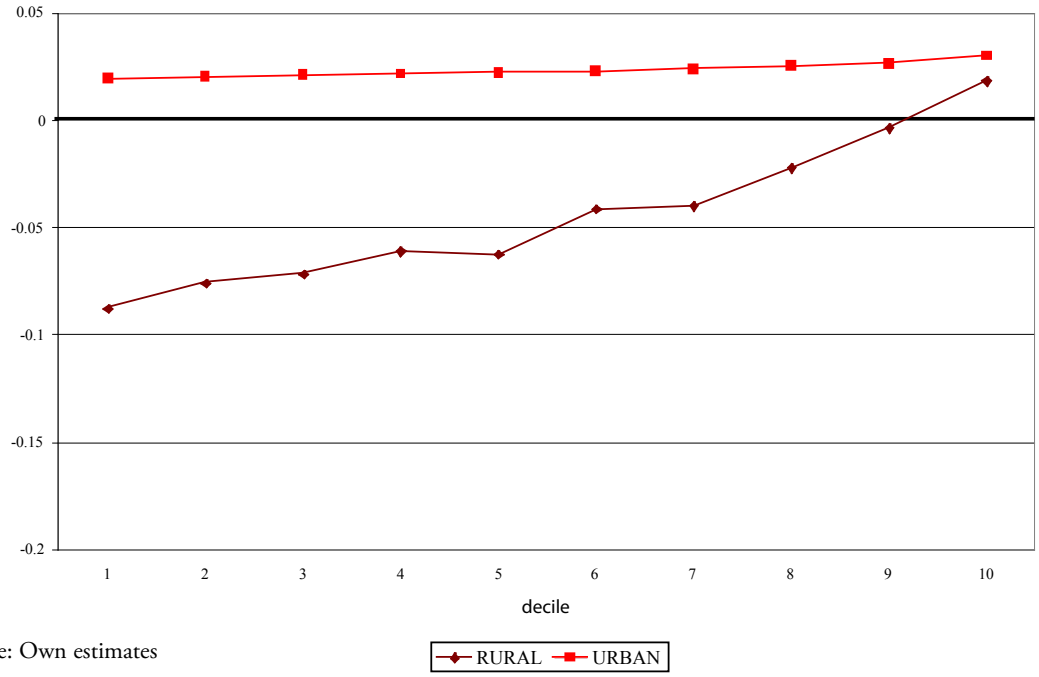
Our modelling exercise shows that an FTA with the USA may generate an aggregate welfare gain of about US$417mn. However, welfare gains and losses are unevenly distributed within the country. In particular, urban households gain an aggregate of US$575mn, while rural households suffer a welfare loss of US$158mn. At the regional level, urban coastal areas and Lima are the regions where welfare gains are the largest, while s*ierra* and *selva* are the regions that show the largest welfare losses.

Table 7. Impact of tariff elimination on US imports on Peruvian households' well-being

	Impact on household well-being (% of household expenditure)			
Indicator	**Estimator**	**Confidence interval (95%)**		**US$ (millions)**
Rural Peru	-3.36	-3.87	-2.85	-158.2
Costa	-1.45	-2.70	-0.20	-13.0
Sierra	-3.53	-4.24	-2.82	-100.2
Selva	-4.60	-5.57	-3.62	-45.0
Urban Peru	2.54	2.49	2.59	575.1
Costa	2.29	2.26	2.33	112.2
Sierra	2.30	2.25	2.34	80.5
Selva	2.09	2.02	2.16	31.1
Lima Metro	2.75	2.86	2.81	351.3

Mapping the results across the income distribution is very revealing (Figure 7). The results show that most of the urban sector obtains a welfare gain equivalent to two per cent of their household expenditures, with the richest deciles doing slightly better than the poorest. Differences in the rural sector are much more striking. While the richest rural decile may get a welfare gain of about two per cent of their household expenditure, the poorer deciles increasingly lose out. The poorest ten per cent of the rural population will have a welfare loss equivalent to almost nine per cent of their household expenditure if an abrupt reduction of import tariffs is agreed between Peru and the USA.

Figure 7. Welfare effects in rural and urban areas



Source: Own estimates

What is driving these results? A summary of the intermediate impacts is presented in Table 8. Rural and urban areas show similar positive impacts through the consumption channel. This channel, as mentioned before, works through a change in prices of consumption goods. This price effect is positive when looking at consumption of tradables and non-tradables separately. On the other hand, the income effect is negative for both urban and rural areas. In Figure 7, in rural areas, the welfare gains derived from the decrease in the price of tradable goods are outweighed by the income losses from the reduction in tariffs. In urban areas, however, the welfare losses derived from the income effects is outweighed by the welfare gains derived from cheaper products.

According to our estimates, the most important component of the welfare loss suffered by rural households is the negative impact on self-employment agricultural activities. As seen in Annex 1, this effect may be driven by: (i) the share of household income obtained from this source; (ii) the elasticity of hourly income in this sector with respect to changes in each of the tradable goods prices and (iii)

the change in prices of tradable goods and their corresponding tariffs. When looking at these factors, it becomes clear that the first drives the result, since self-employment agricultural income constitutes, on average, almost 45 per cent of rural households' income.[12] Non-agricultural activities show a significant positive impact from trade liberalisation. The distributional differences in welfare impacts across deciles (Figure 7) result from the differences in the composition of household income in rural areas. Since richer households obtain a larger proportion of income from non-agricultural sources than poorer households, the aggregate income effect is less significant.[13] As for urban households, the wage employment sources of income are not significantly affected but self-employment sources are negatively affected.

Table 8. Components of welfare gains and losses

	Rural		Urban	
Indicator	**Estimate (%)**	**US$ (millions)**	**Estimate (%)**	**US$ (millions)**
Self-employment agricultural income effect	-7.76	-365.7		
Self-employment non-agricultural income effect	1.43	67.5		
Self-employment income effecta			-0.16	-37.1
Wage agricultural income effect	-0.86	-40.4		
Wage non-agricultural income effect	1.95	91.9		
Wage income effecta			-0.03	6.8
Labour income effect	-5.24	-246.7	-0.19	-44.0
Price effect	1.88	88.5	2.73	619.0
Total welfare effect		-158.2	2.54	575.1

[a] For urban areas the sources of labour income are divided into two types: self-employment and wage employment activities.

[12] It is worth mentioning that the negative sign is derived from a general equilibrium adjustment of prices and wages, where the price changes of the tradable sector of house equipment and maintenance account for most of the elasticity effect.

[13] In rural *costa*, 20 per cent of poorest households obtain 82 per cent of their annual income from agricultural sources (both wage and non-wage), whereas the richest 20 per cent obtain only 52 per cent of their income from agricultural sources. Similarly, the poorest quintile in *sierra* obtains 75 per cent, and in *selva,* 86 per cent, of their income from agricultural sources, compared to the following shares among households in the richest quintile: 34 per cent and 41 per cent, respectively.

It is important to emphasise that if some sectors are able to respond in the short-term through increases in productivity, some of the welfare losses may be less pronounced. Because of this, these results should be read together with results of long-term impact evaluation (typically done by using CGE modelling) to better assess the FTA's overall impacts. In addition, it is important to fully acknowledge the limitations of the analysis resulting from insufficient information. The model captures first order effects only (because of the difficulty of estimating own price and cross price demand elasticity). Since we had access to prices in Lima only, we could not capture the regional differences in the speed of price transmission.

We, nevertheless, believe that our results shed light on the potential welfare losses that a FTA with the USA may create for some segments of the Peruvian population. We also explored the distribution of the welfare impacts over time by performing several simulations that assume gradual reductions of import tariffs over the next two decades. It is worth noting that since the tariffs' reduction schedule used here is the second proposal that Peru took to the negotiation table when the FTA talks started, it does not accurately reflect the actual schedule approved by the Peruvian Congress.

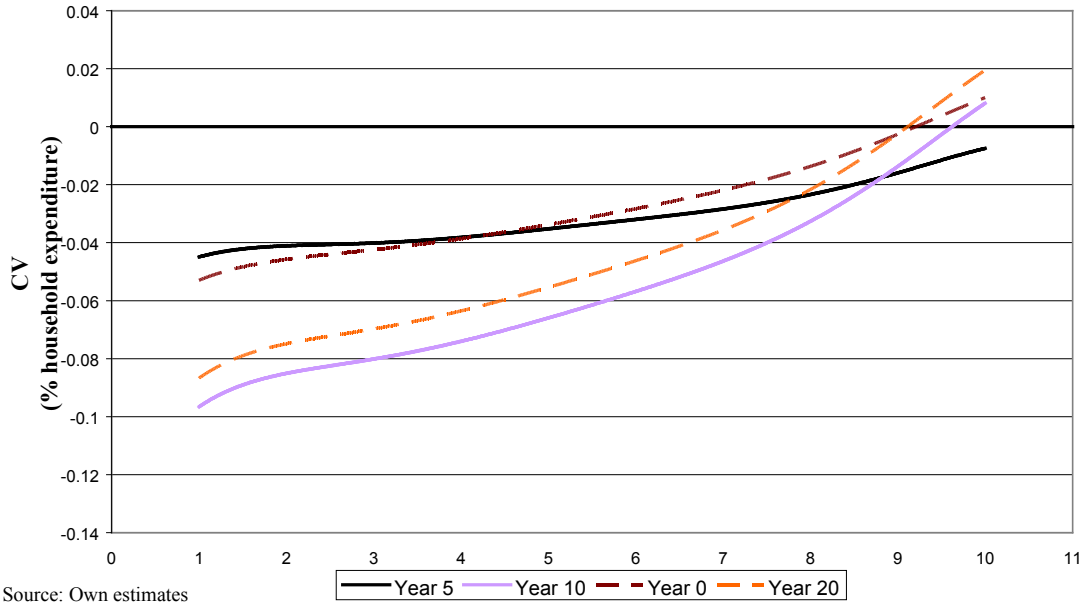
According to the simulations, if we consider a gradual tariff reduction – based on Peru's second proposal, more ambitious than the final one – households in urban areas would benefit from the very beginning, especially in the capital city, whereas rural coastal areas would not be significantly affected, and rural *sierra* and *selva* would be the first to feel negative impacts (see Table 9).

Table 9. Impact of a gradual reduction of US import tariffs on well-being of Peruvian households in the first year of implementation of the FTA

Indicator	as % of household expenditure	US$ (millions)
Rural Peru	-2.1%	99.6
Costa	-0.9%	-8.4
Sierra	-2.2%	-63.4
Selva	-2.8%	-27.9
Urban Peru	1.4%	314.9
Costa	1.3%	63.9
Sierra	1.3%	45.7
Selva	1.2%	18.6
Lima Metrop	1.5%	186.7
Peru		215.3

A closer look at the distributional impacts in rural areas reveal that differences in welfare impacts are set to become increasingly important. This would suggest that the pervasive distributional impacts of liberalisation could be reduced, or even avoided, with timely public intervention. Indeed, Figure 8 shows that most negative impacts in rural areas would occur from year ten onwards.

Figure 8. Welfare impact of a gradual reduction of US import tariffs



Source: Own estimates

We additionally explored the potential impacts of eliminating tariffs under different scenarios of public investment in key asset endowments. The following simulations were performed:

(a) Base simulation: zero-tariffs for US imports. This is the base simulation because all households show the private and public assets to which they actually have access. (The following scenarios assume changes in at least one asset endowment for at least some of the households. These changes allow us to perform simulations with better-endowed households and compare the resulting impacts of the FTA with the base scenario)

(b) Base simulation except that all rural households have at least one member with complete secondary education (this scenario is labelled *Sec* in Figure 9)

(c) Base simulation except that all rural households have access to electricity (this scenario is labelled *Elec* in Figure 9)

(d) Base simulation except that all rural households have improved market access, taking a maximum of two hours to travel to the nearest town with 75,000 (or more) inhabitants (this scenario is labelled *MktAccess* in Figure 9)

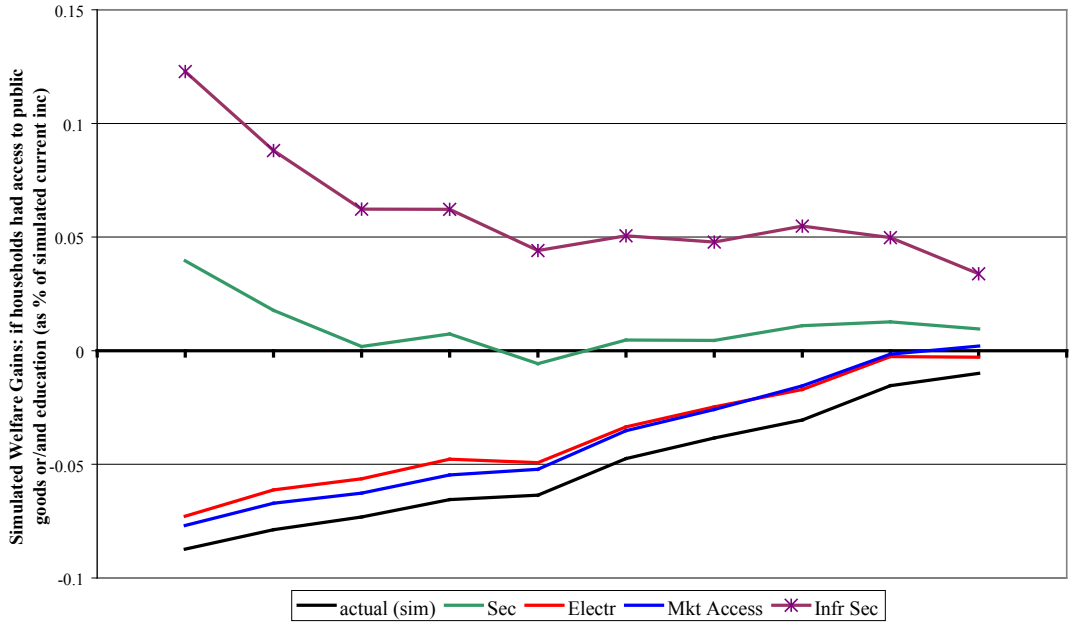
(e) Base simulation except that simultaneous access to (b), (c) and (d) (this scenario is called *InfrSec* in Figure 9).

The econometric specification used to model household labour income depends not only on the price-vector of tradable goods, but also on the usual demographic controls such as age and gender of the head of household, maximum education level achieved by a household member, household size, non-labour income, proximity to markets and access to water, sewerage, electricity, health

and education services.[14] The simulations performed here can be regarded as exogenous improvements in access to public services.[15]

As shown in Figure 9, any transfer of public assets or education reduces the welfare loss caused by the elimination of tariffs across the whole distribution, as education is the individual asset that most reverses the unequal distribution of proportional welfare losses. It is also clear that better access to education, electricity and markets not only reverses the unequal distribution of proportional welfare loss, but actually enhances households' capacity to overcome the perverse effects of the tariff elimination.

Figure 9. Simulating effects of improved access to public assets and education on welfare impact of liberalisation



Source: Own estimates

4.2 Some child welfare impacts

We now attempt to assess whether these gains and losses are evenly distributed across:

a) households with different numbers of children

b) households with different numbers of children attending school (including those where children dropped out to perform either domestic or market work)

14 See equation 9 in annex 1 where the full model is described.

15 No assumptions are made about how these changes (in better endowed households) could be financed. In particular, with respect to public funding, we do not include the negative transfers that would be required from households in order to fund these changes in household endowments. This is because the main idea here is to provide a picture of the impact of an FTA if Peruvian households were better endowed than they actually are (rather than trying to show a policy programme of public investment, which is a more complicated issue than the one explored in this exercise).

c) households whose female head works in waged employment compared to those where the female head is not working outside the home or is self-employed. ('female head' is understood here as the 'female head of household' or the 'spouse' of a male head of household).

In addition, we explore the potential impacts of the household's welfare gain/loss on the probability that a child keeps attending school after the FTA, and on the probability that the female head enters the wage labour market, which may have an indirect effect on children's time use (especially girls who may substitute for their mothers in childcare activities).

Table 10 compares per capita welfare gains and losses between households that have no children and households that have at least one child aged 13 or younger. Results show that in urban areas, Peruvian households with no children gain more than households with children. Differences are particularly strong in Lima.

Table 10. Comparison of per capita welfare impacts between households with and without children (in US$)

Regions	Household with no Children		Household with Children	
	impact (US$)	% of hh Expenditure	impact (US$)	% of hh Expenditure
Urban				
Costa	42.5	27.9%	22.9	72.1%
Sierra	40.4	31.7%	21.9	68.3%
Selva	36.5	20.4%	19.7	79.6%
Lima	91.9	30.9%	40.1	69.1%
Rural				
Costa	-30.6	29.0%	-5.4	71.0%
Sierra	-36.9	28.8%	-15.4	71.2%
Selva	-34.0	19.1%	-22.8	80.9%
Peru	31.4	28.5%	13.6	71.5%

In rural areas, however, the results are different: households with children tend to have lower welfare losses than households with no children. It seems that households with children tend to protect themselves better from a negative shock. It is very likely that this has to do with the fact that children may be perceived as 'productive assets' in rural areas. If this is the case, we may expect that in households where children are very young and not part of the household labour force, urban and rural households would be equally exposed to a negative shock. However, if the children are old enough to work, the parents may opt to send them to work in order to better manage such risks.

Tables 11, 12 and 13 show some evidence that it is precisely this behaviour that might explain the differences in welfare losses between those households that have children and those with no children. Table 11 shows that among households that have at least one under-five child those with more children have larger losses than those with fewer children (a similar trend to that observed in urban areas). However, in households of the rural *sierra* and *selva* regions with at least one child between 6 and 13 (Table 12), or a 14 to 17 year-old (Table 13), this pattern is reversed: households with more children have fewer losses.

Table 11. Per capita welfare impacts on households with children aged 0-6 (in US$)

	1 Child	2 Children	3 or more Children
Urban			
Costa	20.5	20.2	13.8
Sierra	22.2	13.9	10.5
Selva	20.0	13.6	11.4
Lima	37.5	37.2	20.8
Rural			
Costa	-1.9	-15.9	-0.8
Sierra	-12.6	-17.3	-9.6
Selva	-20.6	-22.7	-27.3
Peru	13.9	3.2	-1.8

Table 12. Per capita welfare impacts on households with children aged 6-13 (in US$)

	1 Child	2 Children	3 or more Children
Urban			
Costa	24.1	18.9	12.6
Sierra	22.6	18.3	10.8
Selva	19.6	16.3	10.2
Lima	40.9	29.6	20.3
Rural			
Costa	-2.8	-9.4	-12.7
Sierra	-14.6	-12.0	-16.9
Selva	-20.8	-16.4	-22.5
Peru	17.5	8.3	-4.7

Table 13. Per capita welfare impacts on households with children aged 14-17 (in US$)

	1 Child	2 Children	3 or more Children
Urban			
Costa	22.8	18.7	15.2
Sierra	22.0	16.6	13.0
Selva	19.9	13.7	13.4
Lima	36.8	28.5	17.8
Rural			
Costa	-11.7	-1.2	-21.5
Sierra	-15.5	-7.6	0.8
Selva	-20.9	-18.5	-20.8
Peru	12.5	9.8	8.8

It should be noted that these results are only descriptive. They are, however, consistent with other evidence that contends that a rural child is regarded as an important asset to be called upon in response to shocks. If this is the case, the opportunity costs of attending school may increase after a negative shock, thus reducing school attendance.

Another way of splitting the sample is to divide it between households where children attend school and households where they do not. Such a division is presented in Table 14, where we show welfare impacts in households with children according to their school attendance. It is evident that welfare gains are lower in urban households where boys and girls do not attend school, while losses are slightly higher for rural households where girls do not attend school. It is highly unlikely that these households will have any incentive to send their children back to school. In the case of rural households with boys aged six or older, it is interesting to note that welfare losses are slightly larger in households where boys attend school. These differential impacts are consistent with the idea that the child labour force (especially for boys aged six and above) may be a way by which rural households cope with negative shocks – but also a way that transmits intergenerational poverty.

Table 14. Per capita welfare impacts on households with children who attend and do not attend school (in US$)

Age Ranges	Urban		Rural	
	Attends	Not Attends	Attends	Not Attends
3 to 5 years				
(Preschool)				
Girls	31.4	22.1	-10.3	-17.3
Boys	29.8	20.4	-13.8	-18.7
6 to 11 years				
(Primary)				
Girls	26.8	21.5	-15.7	-15.9
Boys	23.7	20.5	-16.5	-14.3
12 to 17 years				
(Secondary)				
Girls	23.6	22.8	-9.4	-14.3
Boys	26.8	24.0	-15.0	-13.4

Regarding time for childcare, the estimates show that households with women working in waged activities have lower losses in rural areas and larger gains in urban areas (Table 15). This may reflect the distributional differences in female occupation as much as the relatively positive income effect of waged labour, but may hide the negative impact of reduced childcare time of mothers and the substitution of time from older siblings, especially girls.

Table 15. Comparison of per capita welfare impacts on households with and without the caretaker working in a waged job

Age Ranges	Caregiver works in waged labour?			
	Rural		Urban	
	No	Yes	No	Yes
Children 0 to 5 years				
Per capita welfare impacts	-17.0	20.5	25.4	36.1
% of households	93.4%	6.6%	82.4%	17.6%
Children 6 to 13 years				
Per capita welfare impacts	-17.1	14.4	24.2	37.1
% of households	92.0%	8.0%	80.3%	19.7%
Adolescents 14 to 17 years				
Per capita welfare impacts	-15.7	3.4	24.1	34.6
% of households	91.8%	8.2%	79.9%	20.1%
Fot those having children or adolescents (between 0-17)				
Per capita welfare impacts	-18.0	13.9	27.2	40.2
% of households	92.2%	7.8%	80.2%	19.8%
No children in household				
Per capita welfare impacts	-46.0	40.9	61.3	77.4
% of households	87.9%	12.1%	79.8%	20.2%

4.2.1 A complementary modelling exercise

To further explore the connection between the welfare impacts of an FTA and possible behavioural responses, we have estimated the factors affecting school attendance for children aged 6 to 17 (Table 16) and the factors affecting the female head's decision to engage in waged activities (Table 17). To avoid endogeneity problems, each of these probit estimations was estimated using instruments for income. In the case of schooling decisions, the chosen instruments were a variable related to wealth (total value of durable assets) and a variable related to whether there is a room in the dwelling assigned to income-generating activities. In both cases we assume that these variables do not affect directly schooling decisions but have only indirect effects through income. Similarly, in the case of the labour decisions of female household heads we used as instrument for family income the maximum education available to the household. We assume this does not directly affect female labour decisions, but only operates indirectly through its effect on income.

It is worth emphasising the importance of properly instrumenting income in both these equations. Both tables show the corresponding Wald tests[16] for exogeneity, which indicate that income is clearly endogenous in both estimations.

[16] A statistical test, typically used to test whether an effect exists or not between two variables.

Table 16. Factors affecting the probability of school attendance (Probit model- with instrument for income)

	Rural[a]		Urban[a]	
Total Income	0.138	***	0.053	***
Age	-0.091	***	-0.064	***
Gender	-0.206	***	0.013	***
Age*Gender	0.026	***	-0.001	**
Hh member between 66 -99 years of age	-0.104	***	-0.026	***
Siblings aged 5 and below	-0.046	***	-0.049	***
At least one hh member self employed	-0.158	***	-0.024	***
Costa - *Coastal Region* (except Metropolitan Lima)	0.057	***	0.048	***
Sierra - *Andean Region*			0.164	***
Selva - *Amazonian Region*	-0.063		0.131	***
Overall Fit				
Wald chi2(9)	131860.34		132992.63	
Prob > chi2	0.000		0.000	
Wald test of exogeneity:				
Chi2 (1)	100.07		10.88	
Prob > chi2	0.000		0.001	

Note:[a] In rural areas the reference category is the Andean region, while in urban areas the reference category is Metropolitan Lima (capital city).

Source: Own Estimates based on ENAHO 2003

Results in Table 16 show that, as expected, increases in income increase the probability that children attend school, once we control for other key factors like the household's demographic characteristics, individual characteristics (gender and age) and regional differences. It is worth noting that in both urban and rural areas, children are less likely to attend school when they have younger siblings (children of five or younger) who need to be taken care of.

Table 17. Factors affecting the probability that caretaker engages in waged labour (Probit model-with instruments for total income)

	Rural[a]		Urban[a]	
Total Income	-0.779	***	-0.099	***
Hourly wage - Agric waged jobs	0.314	***	-	
Hourly wage - Non-agric waged jobs	-0.111	***	-	
Hourly wage - Agric non-waged job (farmers)	0.382	***	-	
Hourly wage - Non-agric non-waged jobs	-0.782	***	-	
Hourly wage - waged jobs	-		0.063	***
Hourly wage - Non-waged jobs	-		-0.246	***
Children in 0-5 age range	-0.113	***	-0.097	***
Children in 6-13 age range	0.022	***	0.012	***
Girls in 14-17 age range	0.046	***	0.066	***
Boys in 14-17 age range	0.184	***	0.111	***
Education	0.118	***	0.096	***
Hh members between 66 - 99 years of age	-0.136	***	-0.311	***
Gender of the head of Hh	-0.499	***	-0.203	***
Costa - Coastal Region (except Metropolitan Lima)	0.744	***	-0.388	***
Sierra - Andean Region	-		-0.408	***
Selva - Amazonian Region	0.821	***	-0.380	***
Overall Fit:				
Wald chi2 (14 for Rur, 13 for Urban)	70566.3		186606.1	
Prob > chi2	0.0		0.0	
Wald Test of exogeneity:				
chi2(1)	6643.8		2204.4	
Prob > chi2	0.0		0.0	

Notes:[a] In rural areas the reference category is the Andean Region, while in Urban areas the reference category is Metropolitan Lima (capital city).

Urban: 8,052 observations (households with children and adolescents under 18, total sample: 11,133 households), rural: 5641 observations (households with children and adolescents under 18, total sample size: 7,775 households)

Marginal effects are reported.

Source: Own Estimates based on ENAHO (2003)

In addition to the estimation of an income effect, in the regressions in Table 17 we attempt to capture a substitution effect by incorporating exogenous hourly income for different types of labour that female heads could perform in the labour market. We compiled hourly income figures using the same classification of activities as the one used when estimating the welfare impacts of the FTA. The hourly wages were calculated as the median of the hourly income paid to a woman – who is the household's only income earner – distinguishing by region of residence and education level.[17] The variable 'hourly income' was assigned to each potential caretaker in both regressions according to their education level and region of residence. These variables try to capture the effect that changes in the market wage, and thus in the opportunity costs of the caretaker's time within the household, have in the decisions regarding engagement in waged labour.

[17] Three education levels were considered: (i) less than 6 years of formal education (did not finish primary school), (ii) more than 6 and less than 11 years of formal education (did not finish secondary school), and (iii) 11 or more years of formal education (finished secondary school).

Results in Table 17 show that increases in family income reduce the probability that the female head works in waged labour activities (when we control for other key factors like a household's demographic characteristics, years of formal education, regional differences and relevant market wages). Since women in waged employment are typically unable to take their young children to work, the probability of engaging in this type of activity decreases when the woman has young children to take care of, and increases when there are older children who can take care of their younger siblings while she is away.

Hourly income estimates are revealing. Increases in market hourly income for agricultural waged activities increase the probability that women work in waged activities, while similar increases in non-agricultural non-waged activities decrease this probability (since it becomes more attractive to be self-employed). As for agricultural non-waged activities estimates – accounting for 45 per cent of rural households' average income – it is important to note that this activity is usually the best strategy to ensure a minimum consumption level. It is usually complemented by other income-generating activities (which are typically more profitable than the farming). When the family farm becomes more profitable, the effect is not necessarily to intensify agricultural activity, but, rather, the release of family labour to other activities – usually non-agricultural – which are even more profitable. Thus, it is not surprising that as hourly income for the household farm's activities rises, the probability that the female head engages in waged activity similarly rises – either because her work is no longer needed or because it is more efficient for the household to hire a waged agricultural labourer. In urban areas, the interpretation is more straightforward as we only include two sectors. As the hourly wage rises, the probability that a female head works rises. As the other sector's hourly wage increases, that probability decreases since she will prefer to move to self-employment.

We are interested in the question of whether the probability of children's school attendance and the probability that the female head engages in waged labour will change as a result of the FTA. Graphs 10 and 11 show the results of our simulations based on the regressions in Tables 16 and 17 and the welfare impacts estimated previously. Graph 10 shows the comparison between the probability of school attendance predicted by the model using the actual average family income of each decile, and the probability predicted using the average family income which that decile would have if the FTA was implemented (according to estimates discussed in Section 4.1). Graph 11 shows the comparison between the probability that the female head engages in a waged job predicted by the model – using the actual market hourly income for each type of activity and the actual average family income of each decile – and the probability using the market wages and total income that would prevail after the FTA. It is worth noting here that the new market hourly income captures general equilibrium changes in market wages due to changes in tradable and non-tradable prices, according to the model described in Section 4.1. However, it does not capture the impact on labour markets that new investment flows would have (since these new investment flows are not incorporated in the general equilibrium model).

Graph 18 shows a positive impact on the probability of school attendance in urban households and a negative impact among rural households (except for the richest decile). This result derives from the positive income effect shown in Table 16 and the welfare impacts shown in Figure 7. In rural areas the impact is negative except for the richest decile, which shows an increase in the probability of children attending school.

Graph 19 is more difficult to interpret since there is more than one variable changing values across deciles. For rural areas, we have a negative estimated parameter for total income (Table 17) and a negative impact on household welfare for most of the households (Graph 7). Correspondingly, the income effect of an FTA would be positive on the probability of the female head's involvement in waged activities. This income effect, however, is more than outweighed by the negative effect of changes in the market hourly wage. As shown in Table 8, there is a negative income effect channelled through agricultural non-waged and waged activities. According to Table 17, increases in the hourly income of these two activities increases the likelihood that a female head works in a waged activity, so the effect of the FTA would be negative. A similar argument can be made regarding the other two income sources.

To summarise, the decrease in the probability of being engaged in a waged activity is driven by the effect of the FTA on the relative prices of the mobile production factors (labour activities). It is worth noting that, for rural areas, the richest decile shows a sharper reduction in the probability. This is because, besides the negative effect induced by changes in labour income, as shown in Graph 7 this decile would be positively affected in the aggregate so the total income effect would be negative as well. For urban areas, however, the situation is different. The probability that the female head is employed in a waged activity increased slightly as a result of the FTA. This effect is driven by the hourly income changes in non-waged activities (see Table 8).

It is worth emphasising again that these simulations do not incorporate the effects on labour markets of new investment flows and capital reallocations towards more profitable sectors. Also, as we have shown in Section 3, the international literature points out that FTAs have increased job opportunities for women, so we may expect an increase in the proportion of waged women. This suggests that the opportunity costs of children attending school might increase so that some would stay home performing activities previously carried out by their mothers. This hypothesis needs further analysis.

Figure 10. Changes in the probability of school attendance of children in urban and rural areas

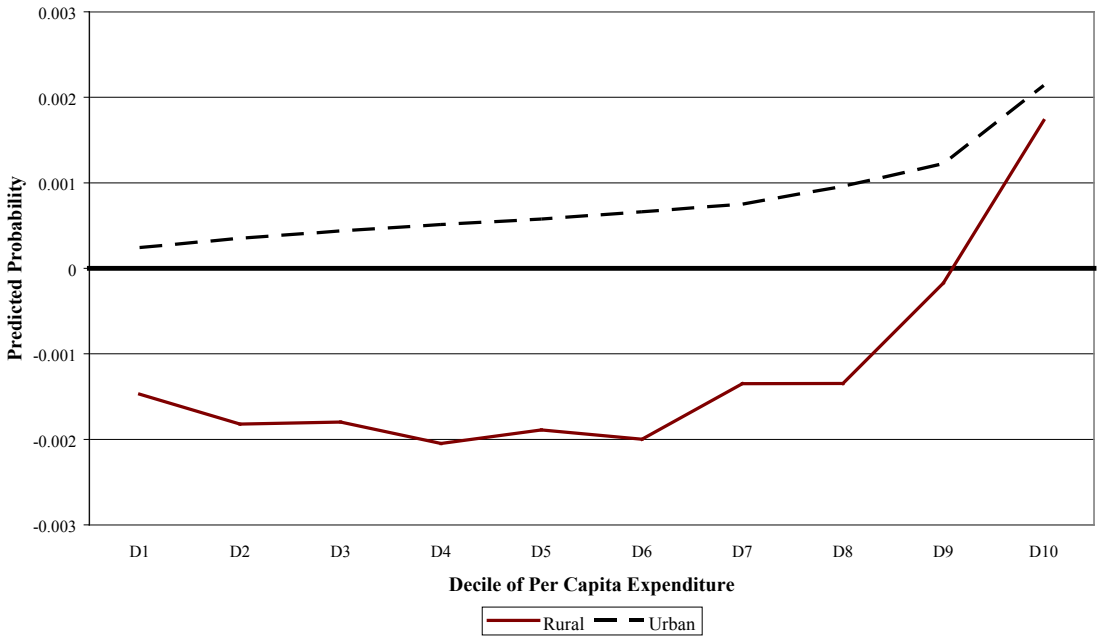
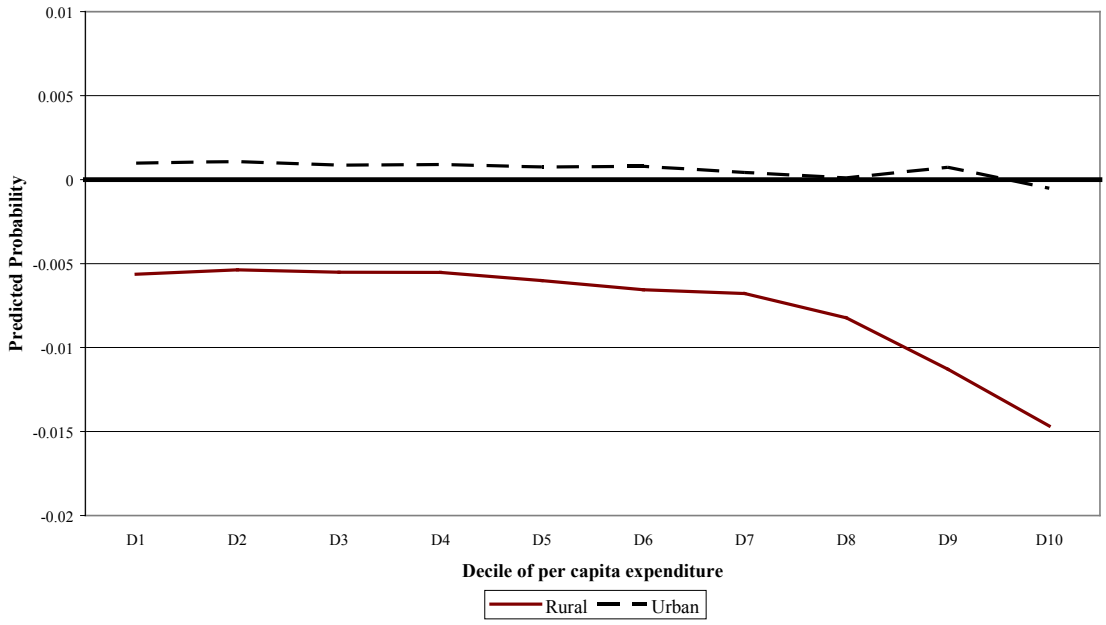


Figure 11. Changes in the probability that caregiver is employed in a wage job in urban and rural areas



5. Policy implications

Although there is evidence that there may be important long-term positive economic impacts of an FTA with the USA, the short-term impacts may be quite diverse. Rural areas may be negatively affected in the short-term. These consequences may be partially offset if there is a gradual reduction in tariffs to allow time to develop policies to boost rural productivity and ability to withstand external competition.

There might be a number of child-related welfare impacts that the government has not foreseen and which it must address. Before suggesting possible policies, we briefly present some evidence of the child welfare impacts experienced in Mexico – a country that has followed a similar trade liberalisation pattern.

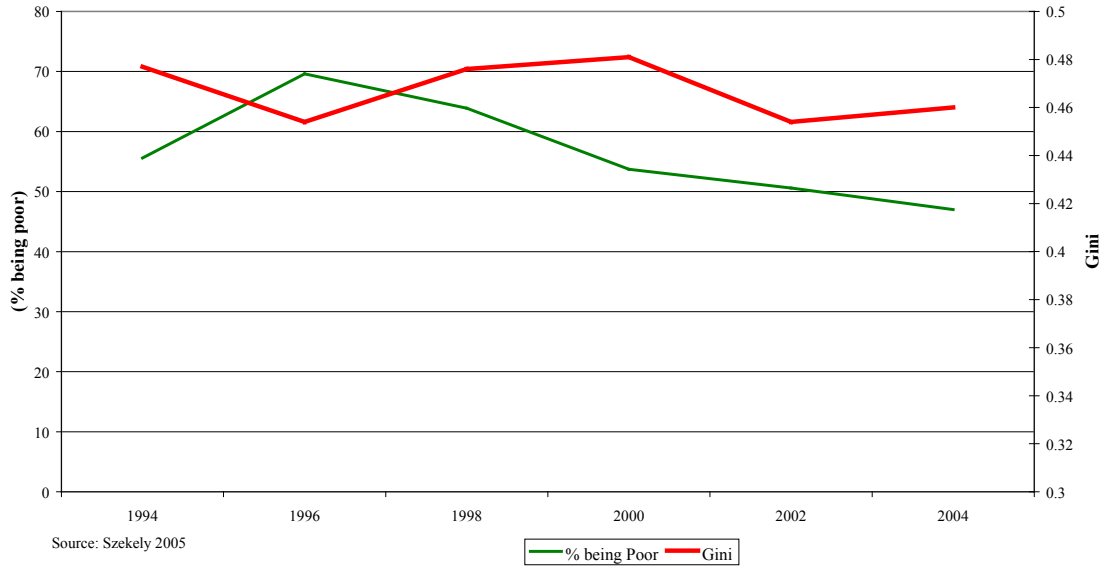
5.1 Evidence from recent policy choices in Mexico

In 1992 Mexico, Canada and the USA signed the North American Free Trade Agreement (NAFTA). Since it took effect in 1994 the Mexican economy has grown significantly, apart from a short blip after the signature of the trade agreement.[18] Despite the positive macroeconomic effects, the welfare impacts have differed across regions (particularly between the northern and southern states of Peru) depending on households' access to public assets (such as infrastructure or education) and where policies have been implemented to counter-balance the negative impact.

Recent evidence from Szekely (2005) shows that, after an initial increase just after 1994, poverty has been declining in Mexico (see Figure 12). In the case of income distribution, the pattern is less clear, with an increase in inequality during the first years and a reduction between 2000 and 2002. Initial assessments of the impacts of the FTA show that, after controlling for changes in returns to education and demographic variables, the deteriorating conditions in rural communities in Mexico's southern states account for around one-quarter of the increase in post-trade reform inequality (Bouillon *et al.* 2003).

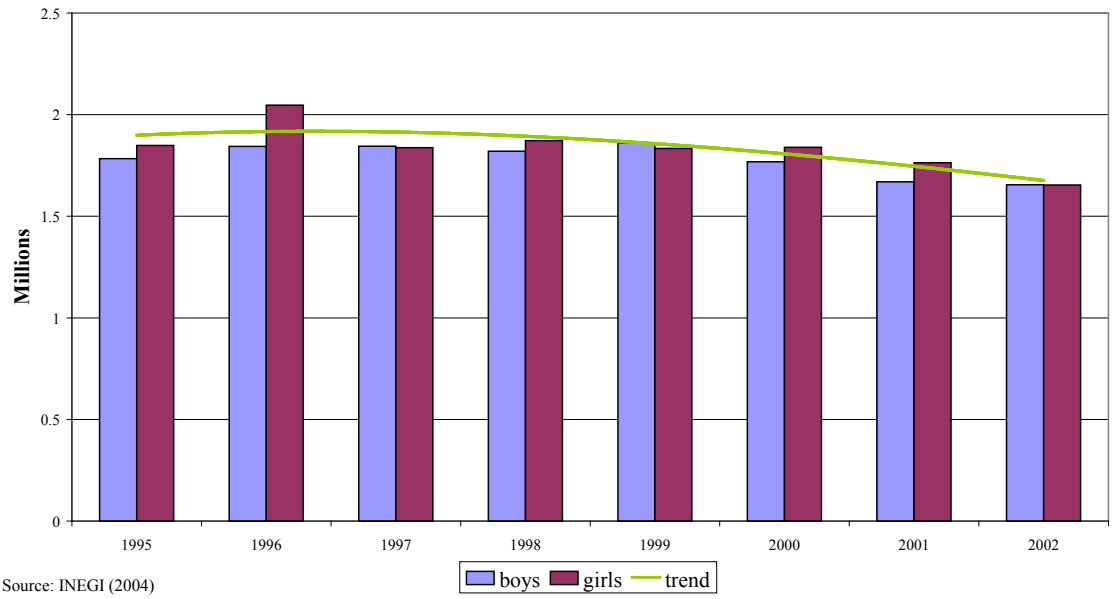
[18] There was a sharp drop in the real value of the peso due to the 'Tequila Crisis' – the failure of the Mexican government in 1994-1995 to control the growing supply of pesos and bolster the weakening demand for pesos while at the same time trying to maintain the peso's value in terms of the dollar.

Figure 12. Poverty and inequality in Mexico (1994 -2004)



Source: Szekely 2005

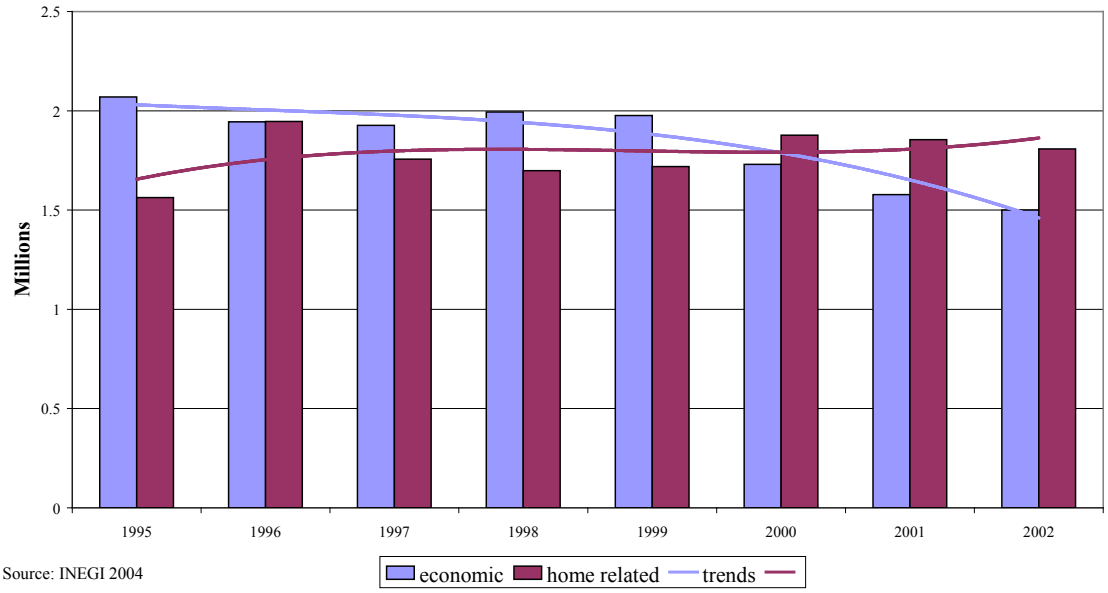
Figure 13. Child Labour in Mexico (by gender)



Source: INEGI (2004)

The first six years of NAFTA did not see pro-child welfare benefits. However, since 2000 waged labour participation, especially of 12- to 14-year-old boys and 15- to 17-year-old girls, has declined. As shown in Figure 14, less children are engaged in the labour market but more are active in home-based labour.

Figure 14. Child Labour in Mexico (by type of activity)



Source: INEGI 2004

The effect of the agreement on child labour outcomes showed in Figures 13 and 14 can be traced back to changes in the opportunity cost of children's schooling and changes in the opportunity cost of their mother's time. Such changes are, in turn, derived from shifts in market demand for child or adult female labour. Expansion of labour-intensive export crops such as strawberries, vegetables, avocados and mangoes have drawn female labour into picking, processing or packaging.

Several studies have shown how policies to mitigate negative impacts have played an important role in reducing the opportunity cost of schooling of boys and girls. The programme *Progresa/Oportunidades* provides conditional cash transfers that increase as the child gets older in order to compensate the family for the increasing opportunity cost of sending their child to school. Also, in order to reduce the gender gap in secondary school attendance, the programme provides extra cash payments to families sending girls to secondary school. It appears that *Progresa /Oportunidades* has played an important role in counteracting the higher demand for child labour in Mexico City and the northern states of Chihuahua, Sonora and Nuevo León, and the higher child labour supply (resulting from increasing family income vulnerabilities) in the southern states of Guerrero, Oaxaca and Chiapas.

As Edmonds and Pavcnik (2005) highlight, conditional cash transfer programmes not only raise family income, but also lower the costs of schooling, multiplying the effects of keeping children in school. According to Edmonds and Pavcnik (2005: 218):

'The advantage of this type of positive programme that indirectly discourages child labour through increasing schooling is that it also addresses the agency problems, credit market imperfections and difficulty in monitoring most forms of child labour that may interfere with the efficacy of other child labour related interventions such as child labour bans, compulsory schooling laws, etc' (2005:218).

In Peru it is expected that growing sectors such as exports will draw on female labour, boosting family income and positively changing power relationships within households. This, however, might generate an increase in domestic work for younger members of the household, especially girls, inducing reduction in school attendance and other child welfare indicators as well. Gender-focused incentives to send girls to school introduced by public programmes like *Juntos* may help to counteract this trend. In addition, care centres for young children (like the *Wawa Wasi* programme) may help facilitate the insertion of female labour without jeopardising the educational opportunities of other children of the family. In sectors where an increase in the demand for child labour is expected (where there is no substitution between child and adult labour), it would be beneficial to explore the possibilities for developing less labour intensive technologies.

5.2 The way forward

To date, the Peruvian government has done little to analyse the projected social impact of the FTA with the USA, except for some work related to changes in the cost of medicines. There is a need to understand the impacts the FTA could have on child welfare. Young Lives seeks to alert policy-makers about the indirect impacts the FTA could have on groups without representation in public decision-making – particularly children – and to suggest social policies that could compensate for increased vulnerabilities resulting from the FTA.

The cost of sending children to school is a significant factor affecting schooling decisions and child labour. Parental expectations of economic returns on their children's education can also be important; such returns will ultimately depend on both the quality of the education their children receive and the market conditions their children will face in the future. The FTA could increase expected returns to education and school attendance. However, it could also reduce parental incomes, thus leading to reduced school attendance and increased child labour at home or in the waged economy.

Although international experiences and national studies suggest that the long-term effects of an FTA should be positive for Peruvian living standards, in the short run there will be both winners and losers. Trade liberalisation tends to increase flexibility and instability of job contracts. The incomes of already vulnerable female-headed households may decline, forcing more children to work. Policy-makers need to increase awareness of such vulnerabilities and devise policies to prevent children dropping out of school and reduce their exposure to hazardous labour environments. Policies must be based on an understanding of household vulnerabilities and the needs of the marginalised and not determined by focus on productive sectors and the influence of their lobbyists. Policies need to create and strengthen safety nets and welfare programmes (especially those focused on children). Labour standards also need to be enforced, especially for small and medium companies, as part of interventions to promote a more inclusive pattern of economic growth.

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Annex 1

The model

Porto (2003) proposes a methodology to empirically estimate the first order distributional effects of trade policy in a general equilibrium framework, modelling both the connection between trade policy and domestic prices and the connection between domestic prices and household welfare (in relation to consumption and income).

Under the assumption of a small open economy, changes in prices of tradable goods are set exogenously by international markets, so the domestic price of tradable good *i* is:

$p_i = p_i^*(1+ \tau_i)$ (1)

where τ_i is the tariff and p_i^* is the international price of the good *i*. Assuming constant returns to scale and competitive markets, the price p_i is equal to the unit production cost:

$p_i = c_i$ (vector of factor prices) (2)

In this model, the only mobile factor is labour, so 'wage' is the only factor price that adjusts to changes in tradable goods prices. In the case of rural areas, because of the typically diversified portfolio of economic activities among rural households, we classified the labour factor as (i) agricultural wage labour, (ii) non-agricultural wage labour, (iii) agricultural self employment (or non-wage labour) and (iv) non-agricultural self employment (or non-wage labour), and the unit of analysis is the household. In the case of the urban sector, we classified labour factor as (i) wage labour and (ii) self employment (or non-wage labour). Thus, 'wage' adjustments are introduced in the analysis as adjustments in hourly household income derived from each type of labour (ie adjustments in 'hourly income' for self-employment and in 'hourly wage' for wage activities). Regarding the tradable goods, this study included the following groups: (i) food and beverages, (ii) clothing, (iii) house equipment and maintenance and (iv) other goods and services. It is worth emphasising that the model is estimated for urban and rural areas separately. In this sense, there is no labour mobility between these areas. (No rural-urban migration is allowed in the model[19] although labour mobility is allowed *within* urban areas and *within* rural areas.)

It is worth noting that this model incorporates at least as many traded goods (four) as production factors (four in the model for rural areas, and two in the model for urban areas). Consequently, the system of equations in (2) fully determines the prices of production factors as a function of the tradable goods. Nevertheless, since the present study considers more than two tradable goods sectors,

[19] As expected, the simplest way to include the assumption of labour mobility (assuming that total labour force in urban and in rural area is fixed) may be either by assuming that changes in prices induce adjustments in the proportion of the labour force employed in each sector (with labour income remaining the same for both sectors) or assuming that changes in prices induce adjustments in the relative labour income paid in each sector, with the proportion of labour force employed in each sector remaining the same. We take the second approach, so adjustments in this model operate through prices (with quantities remaining fixed).

the predictions on the correlation between prices of goods and factor prices is not as general as the Stolper-Samuelson Theorem predicts for two-good-two-factor models.[20]

With respect to non-tradable goods in the domestic economy, this study identified four groups: (i) health; (ii) transportation and communication; (iii) education and leisure; and (iv) housing and utilities. The equilibrium prices of non-tradable goods are derived from the general equilibrium condition of demand – supply equality in domestic markets – given by the following condition:

$$\Sigma_j [\partial e^j(P_T,P_{NT},u^j) / \partial p_k] = \partial r(P_T,P_{NT},v) / \partial p_k \quad (3)$$

Where the subscript *k* denotes a non-tradable good, P_T and P_{NT} refer to the price vector of tradable and non-tradable goods, respectively; and *v* refers to the vector of factor endowment of the economy. In the lhs, e^j is the household *j´*s expenditure function that describes the minimum amount of money required to get a utility level of u^j given price-vectors P_T and P_{NT}. In the rhs, *r(.)* stands for the GDP function of the economy. Thus, this equation equals the demand for a non-tradable good *k* (derived following Shepard´s Lemma in the lhs), and the supply of k (derived following the Hotelling Lemma in the rhs of the equation).

Summarising, given that factor endowments of the economy and prices of tradable goods are exogenous to the model, and given that the 'zero-profit condition' holds in the non-tradable sectors as much as it holds in the tradable sectors and given that prices of tradable goods fully determine factor prices (as discussed in (2), equation (3) implies that prices of non-tradable goods are endogenously determined by the function:

$$p_k = p_k \text{ (vector of prices of tradable goods)} \quad (4)$$

This is an important corollary of Porto's model because it implies that neither factor endowments nor demand conditions affect equilibrium prices of non-tradable goods. This means that we can estimate the welfare impacts of trade liberalisation in two separate steps (once we define the new price vector of tradable goods). So, first we estimate the general equilibrium response of non-tradable goods prices. Second, we estimate the general equilibrium response of factor prices (hourly labour income). We discuss the estimation of welfare changes based on these two steps. The first step allows us to estimate the consumption effects of the FTA induced by changes in both tradables' and non-tradables' prices, whereas the second step accounts for the labour income effects.

In order to estimate household welfare changes due to trade liberalisation, accounting for both price and income effects, let us first look at the household budget constraint evaluated at optimal bundles of consumption goods and labour allocation (dual):

$$e^j (p_T,p_{NT},u^j) = x^j_0 + \Sigma_s y^j_s + k^j + \psi^j \quad (5)$$

[20] In the two-good-two-factor model, according to the Stolper-Samuelson Theorem: 'an increase in the relative price of a good will increase the real return to the factor used intensively in that good, and reduce the real return to the other factor' (Feenstra 2004: 15).

where y^j_s is household *j*'s labour income from source s (s=wage agricultural, self employment agricultural and so on), k^j accounts for capital income, x^j_0 for exogenous income, and ψ^j represents government transfers. In order to calculate the compensating variation required to outweigh the welfare effects of the FTA on household *j*, taking into account the general equilibrium responses operating in the aggregate. Porto totally differentiates equation (5) and obtains the following measure of compensating variation[21]:

$$CV=-dx_0^j/e^j = -(s_i^j + \Sigma_K [s_k^j (\partial \ln p_k / \partial \ln p_i)] - \Sigma_s [\theta_s^j \varepsilon_{ys\,pi}]) (\partial \ln p_i / \partial \ln \tau_i) d\ln \tau_i \quad (6)$$

where s_i^j and s_k^j represents the share of household expenditure spent in tradable goods and non-tradable goods respectively; θ_s^j is the share of household labour income obtained from labour source *s*; the elasticity $\partial ln p_k / \partial ln p_i$ measures the proportional change in non-tradable price *k* induced by a change in tradable price *i*, whereas the elasticity ε_{yspi} accounts for the proportional change in hourly labour income from source *s* induced by a change in tradable price *i*; and $(\partial ln p_i / \partial ln \tau_i)\, \partial ln \tau_i$ measures the price change of tradable goods induced by changes in tariffs. Thus, three sources of welfare change are modeled here: (i) the direct consumption effects, induced by changes in prices of tradable goods, (ii) the indirect consumption effects, induced by changes in prices of non-tradable goods and (iii) the labour income effects weighted by the relative importance of each labour income source in the total labour income of the household. As stated before, a positive estimate of CV implies welfare gains due to FTA, whereas a negative estimate implies welfare loss.

Two restrictions derived from the theoretical framework were imposed in the econometric specifications: (i) homogeneity of degree one in prices for the labour demands (derived from the assumption of constant returns to scale in the production of tradable goods) when estimating wage elasticities and (ii) homogeneity of degree one in prices and symmetry when estimating the elasticities of non-tradable goods' prices with respect to changes in tradable goods' prices.

The critical issues in the estimation procedure are summarised in five steps:

1. Calculate the price change of tradable goods induced by changes in tariffs - $(\partial ln p_i / \partial ln \tau_i) \partial ln \tau_i$. This estimation was approximated by:

$$d\ln p_i = \theta_{US}\, d\ln(1+\tau_{iUS}) + \theta_{RW}\, d\ln(1+\tau_{iRW}) \quad (7)$$

where $\theta_{US}\,(\tau_{iUS})$ *and* $\theta_{RW}\,(\tau_{iRW})$ represent the import shares (tariff) of tradable *i* from the USA and from the Rest of the World, respectively. Since the FTA with the USA does not involve changes in tariffs with the rest of the world, the second component of the rhs of (7) is zero. It is worth noting that τ_{iUS} was calculated as the weighted average of import tariffs of all the sub-groups belonging to group *i*, weighted by the import share of each subgroup in *i*.

In (6), Porto assumes there is no public transfer or capital income change after the FTA.

2. Estimate the elasticity of price of non-tradable goods with respect to changes in price of tradable goods - $\partial lnp_k / \partial lnp_i$. As equation (4) indicates, this elasticity will depend on the price of tradable goods only. The data used here consist of monthly price index series from January 1994 to December 2004 collected by the National Institute of Statistics INEI in Lima Metropolitana.[22] These price index series were available for the four groups of tradable goods: (i) food and beverages; (ii) clothing; (iii) house equipment and maintenance; and (iv) other goods and services, and the four groups of non-tradable goods: (i) health; (ii) transportation and communication; (iii) education and leisure; and (iv) housing and utilities. In order to get more stable non-tradable price elasticities, we generated an index for tradable goods p_T (based on the 4 subgroups referred to), and the econometric specification was:

$$\ln p_{kt} = a_0 + a_1 \ln p_{Tt} + a_2 \ln p_{Tt-1} + c_t' \gamma_c + \mu_t \qquad (8)$$

Equation (8) was estimated in first differences, and restrictions of homogeneity of degree one were imposed.

3. Estimate the labour income elasticity with respect to changes in the price of tradable goods - $\varepsilon_{ys\,pi}$. In order to estimate the labour income elasticities, the following specification was used:

$$\ln Y_s = \ln p_i \alpha_s + \delta \beta + \varepsilon \qquad (9)$$

where lnp_i is the price-vector of tradable goods in logarithms, δ is the (*nxk*) matrix of household characteristics that include the usual demographic controls such as age and gender of the head of household, maximum education level achieved by a household member, household size, non-labour income. It also includes indicators of local access to public goods like neighbours' access to water, sewerage, electricity, health, education and markets. The left hand side variable is hourly labour income, obtained from source *s* by household *j*. As mentioned before, the restriction of homogeneity of degree one was imposed in each equation. This estimation was performed using three national household surveys (INEI, 2001; 2002; 2003/4).

4. Calculate the compensating variation according to equation (6) for urban and rural households sampled in the survey carried out by INEI between May 2003 and April 2004.

5. Obtain confidence intervals for the compensating variation estimates. Since the procedure required the use of several data bases and intermediate estimates, it was not possible to obtain standard errors in an analytical way. The confidence intervals showed next were obtained using bootstrap procedures over the third and fourth steps.

[22] Regional price index series that were long enough and disaggregated into tradable and non-tradable groups were not available.

Annex 2

The Peruvian Household Survey Undertaken by INEI

The surveys used in this study were undertaken by El Instituto Nacional de Estadística e Informática (INEI) and provide information on the standards of living and poverty of Peruvian households across the country. These surveys collect information on consumption, income, health, education, access to public services, labour force participation, wages and salaries and a variety of other social and economic variables.

Three surveys were used to estimate labour income elasticity with respect to changes in price of tradable goods: (i) ENAHO 2001, collected during the fourth quarter of 2001, (ii) ENAHO 2002, gathered during the fourth quarter of 2002, and (iii) ENAHO 2003-4, gathered between May 2003 and April 2004. In order to calculate household compensating variations, we used the last survey only.

These surveys are representative of regional and national rural and urban levels of aggregation.

The Young Lives Partners

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Save the Children India

Sri Padmavathi Mahila Visvavidyalayam
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Instituto de Investigación Nutricional
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Grupo de Análisis para el Desarollo
(Group for the Analysis of Development Group), Peru

Centre for Analysis and Forecast,
Vietnamese Academy of Social Sciences, Vietnam

General Statistics Office, Vietnam

The Institute of Education,
University of London, UK

Child and Youth Studies Group (CREET),
the Open University, UK

Department of International Development
(Queen Elizabeth House), University of Oxford, UK

Statistical Services Centre,
University of Reading, UK

Save the Children UK
(staff from the Policy and Learning Department in London
as well as staff in India, Ethiopia and Vietnam).