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Trade-Induced Changes in Economic Inequality:
Assessment Issues and Policy Implications for Developing Countries

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Abstract

The starting point of this paper is given by country situations where trade liberalization is expected to be poverty and inequality alleviating in the long run while inducing a short run increase in poverty or in inequality. The question we ask is what are the distributive aspects of trade which are worth documenting to better help governments integrate trade policies within a global policy framework so as to enhance growth and reduce poverty and inequality.

The method followed is a literature review, organized according to salient issues given by the three acceptations of fairness implied by the inclusion of the "Development" objective in the world trade liberalization agenda. A "pro-development" trade liberalization agenda should correct past unfairness in trade regime, which raises the broad issue of country level ex post assessment. It should equally reduce poverty, which point toward household level ex ante assessment. Last, because development is basically a dynamic process, the distributive-dynamic effects of trade liberalization are also considered. A synthesis of our ten main results concludes the paper.

1. Introduction

The Doha Development Round stresses the need to rebalance the expected gains from freer trade toward developing countries. The development dimension given to the Round echoes a double-meaning acceptation of fairness in the trade liberalization process. First, WTO member countries are now committed to design trade liberalization agreements such as to correct past unfairness, according to which developing countries were prevented to develop as much as they ought to through effective trade openness among their partner countries. Second, trade liberalization should be fair according to the consensual meaning given to "development" by international aid agencies and UN bodies for about the last ten years, which equates development with poverty reduction. A fair trade liberalization Round should hence equally reduce poverty.

Trade economists have spared no effort to check that under the various scenarios on the table before the WTO Hong-Kong Ministerial in December 2005, expected gains from freer trade provided by trade models actually matched the expectation of fairness placed on the Round in progress (Anderson and Martin, 2006 ; Hertel and Winters, 2006 ; Polaski 2006). CGE models highlighted the cost of protection and of distorting supports for the very countries that did resort to such policies, making the most protectionists countries the most beneficiaries from trade liberalization. Countries or regions such as the EU, Japan and the US hence came first out of the hat, which was not the kind of fairness or rebalancing effect one would have expected from a genuine Development Round. Estimates of poverty headcounts' possible changes induced by trade liberalization gave such tiny figures on their side – particularly when compared with the first assessments made about five years ago – that taunting comments started to burst, mocking Doha pro-development posture, when "much ado about nothing" would have conferred indeed a more convenient title on it (Ackerman, 2005 ; CEPR, 2005). Ironically, because of the wide-scale implication of trade modellers in the advocacy of trade liberalization since the onset of the Development Round, the uneasiness and awkwardness of the Doha round in fulfilling its development mandate seem to pervade to modellers, suggesting at least possible fallacies in the message conveyed by their estimates to trade negotiators, NGOs and the media (Panagaryia, 2004).

What indeed came out of nearly a decade of debate on the trade-growth-poverty-and-inequality nexus? Ex-post evaluations based on cross-country studies fuelled harsh methodological controversy ; they displayed weak evidence of a positive trade-and-growth linkage (Rodriguez and Rodrik, 2000), while the estimated impact of trade opening on income inequality turns out to be small even if trade liberalization seems to favor the relative demand for skilled labor (Anderson, 2005). On the ex ante modelling side, aggregate welfare changes' estimates of trade liberalization produced by static CGE models nourished blunt criticism for ignoring most – not to say all - market failures crippling developing economies (Stiglitz and Charlton, 2005).

Another sharp criticism of standard CGEs is their reliance on the representative agent hypothesis which impedes them from analysing the impact of trade liberalization on income distribution. Bourguignon, De Melo and Morrisson (1991) and Cogneau, Grimm and Robilliard (2003) proposed new methodologies to analyse the impact of policies on households which take into account households behavior. By linking CGEs with

microsimulation models, such methodologies permit to analyse the impact of trade liberalization on income distribution and poverty.

As a result, trade liberalization could be poverty-alleviating in the long run and on average, while it is acknowledged that trade liberalization brings about distributional changes that may make the poor even worse off in short term in particular countries, and notably, in the poorest ones (Winters, McCulloch and McKay, 2004). There come about a third acceptation of fairness in the trade liberalization process: according to whether a country faces short term or long term gains, her political capability to rally population's support for joining the liberalization project – and hence benefit in due time from freer trade effective gains – will differ dramatically. A fair liberalization Round should place them on an equal footing and hence take into account not only the distribution of gains and losses among countries and among households, but as well its distribution overtime. This raises the issue of dynamic modelling and its weaknesses, especially in the way expectations are treated.

The starting point of this paper is given by country situations where trade liberalization is expected to be poverty and inequality alleviating in the long run while inducing a short run increase in poverty or in inequality. We hence focus on trade-induced social injustice case, which is a different animal from the "loud losers", lobby-based explanation of government reluctance to move down the liberalization road we are used to finding in political economy analyses. In this latter case, short term gains do exist but they are politically risky to tap, which is not the case we embrace here. The question we ask is what are the distributive aspects of trade which are worth documenting to better help governments integrate trade policies within a global policy framework so as to enhance growth and reduce poverty and inequality. The method followed is a literature review, organized according to salient issues given by the three acceptations of fairness outlined above. Starting with country-level ex post assessment findings (section 2), we turn to household level ex ante assessment (section 3), before addressing market failures, adjustment costs and intertemporal dynamics. A synthesis of our ten main results concludes the paper.

2. Fairness acceptation one: country-level ex post assessment

The "ex post" empirical evaluation of trade liberalization's impact on inequality over the last decade provides interesting but no clear-cut results. Two main approaches have been followed, assessing:

(i) Wage inequality in the manufacturing industry between unskilled and skilled labor, using time series analysis ;
(ii) Aggregate inequality, measured by the Gini coefficient on various sources of revenue (land, capital, wages) on a cross-country basis.

These two approaches build upon the Heckscher-Ohlin (HO) model to test predictions in income inequality changes among developing countries. Assuming that unskilled labor is the relative abundant factor in developing countries, trade liberalization should increase its relative returns when compared to capital and skilled labor, and hence reduce inequality. The results of studies on wage inequality reject HO predictions for developing countries in Latin America in the process of trade reform. Results in Asia are more heterogeneous. Concerning aggregate inequality, the first studies on global inequality which basically test the impact of openness in developing countries do not exhibit robust results either, producing insignificant

effects, or rejecting the prediction, except in Calderon and Chong (2001). With both approaches, initial tests did not conform to the theory: namely the wage premium for skilled workers and overall inequality often increase in developing countries when trade is liberalized[1].

Faced with this puzzle, authors have improved their theoretical approach and empirical assessment methods[2]. Several routes are liable to explain the increase of the skill premium and the widening of global inequality. All deal with heterogeneity among developing countries, be it heterogeneity in human capital endowment, heterogeneity in natural resources endowment, heterogeneity in outsourcing and FDI, or heterogeneity in technology. For each of them, outcome and salient results are listed below. Unaddressed issues complete our review.

2.1. Heterogeneity in human capital endowment

We briefly review explanatory arguments as well as some test results that such arguments might have led to.

Argument one: one should consider heterogeneity in developing countries' human capital endowment, on the ground that some developing countries may not actually display a comparative advantage in unskilled-labor intensive goods.

Wage studies: To explain the difference of liberalization's impact on wage inequality between Latin American and Asian countries, a possible candidate seems indeed the timing of trade policy reform. At the time when Latin American countries started to liberalize, they were no longer unskilled labor abundant, contrary to East Asian countries which liberalized at a time when they were unskilled-labor abundant (Wood 1997). Several studies (Harrison and Hanson 1999) on wage inequality in Latin America provide evidence that unskilled-labor intensive sectors were protected with the highest tariffs prior to trade reform. Such industries have experienced the largest tariff reductions in the process of trade reform. Hence "the increase in the skill premium" matches trade theory predictions: provided that trade liberalization focused on unskilled-labor intensive sectors, the economy-wide return to unskilled labor predictably shrank.

Gini studies : When testing the impact of trade openness accounting for human capital endowment, Spilimbergo, Londono and Székely (1999) and Fisher (2001) show that developing countries which were relatively less endowed in human capital experienced lower inequality increase after trade liberalization. Gourdon, Maystre and De Melo (2006) do not reproduce these results when taking into account heterogeneity in data sources[3] and using

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[1] This result is a generalisation of salient outcomes of both approaches (Chabe-Ferret and Gourdon, 2005). Differences of course arise when looking at particular studies. The reason of difference between studies on wage and on income may be formulated as follows: the supply of skilled labor is much more inelastic than the supply of unskilled labor which is more likely to be forced into unemployment. This is what the evidence from Krivonos and Olerreaga (2006) shows in the Brazilian sugar sector. When the price of sugar goes up, wage inequality increases, but once employment effects are accounted for, income inequality decreases or at least remains stable. Thus, a large share of the gains accruing to unskilled workers comes from the move out of unemployment and not necessarily from higher wage.

[2] For an excellent review of findings, see Anderson (2005).

[3] Some Gini coefficients come from surveys on consumption or expenditure, other from surveys on revenue.

different indexes of trade liberalization. Nonlinearities in the relationship between human capital and inequality during trade liberalization seem to prevail.

To summarize, studies accounting for heterogeneity in human capital endowment do not refute the fact that trade liberalization benefit the relatively abundant factor in developing countries. They basically argue instead that all developing countries do not display a comparative advantage in unskilled labor, contrary to a widespread assumption.

Argument two: different types of unskilled labor coexist in developing countries (basically educated and uneducated), which requires detailed assessment of trade impact along them.

Wage studies : Wood (1994) argues that North-South manufacturing trade not only raises the wage of workers with basic education level relative to that of uneducated workers, but that it also raises the wage of skilled workers with basic education relative to uneducated skilled. This is mainly due to the impossibility for uneducated workers to be hired in export-oriented manufacturing activities.

Gini studies: Milanovic (2005) shows that trade liberalization increases income inequality in low-income countries but decreases inequality among middle income economies. Milanovic interprets this result as a trade-off between liberalization and education: openness in developing countries might increase inequality by helping those with basic education, and leaving even further behind those with no education. The lowest income deciles begin to benefit from increased labor demand only when the poor become reasonably skilled. Gourdon et al. (2006) differs from Spilimbergo et al. (1999), by showing that (relative) abundant endowment in uneducated labor increases inequality when a country opens to trade whereas (relative) abundant endowment in basically educated labor significantly reduces it.

To summarize, taking into account heterogeneity in human capital endowment across developing countries explains that increased openness will only lead to an increase in basically educated labor demand, and in turn in its remuneration, while the demand for uneducated labor will fall, magnifying the skill premium effect.

2.2. Heterogeneity in natural resources endowment

In the literature on inequality, natural resource endowment is viewed as a possible factor of inverting the basic HO prediction.

Wage studies: abundant endowment in natural resources may lead to wage inequality in manufacturing since processed industries of primary goods are more skill and capital-intensive than low-skill manufactures. Bourguignon and Morrisson (1989) corroborate this intuition on a set of countries from Asia, Latin America and Africa.

Gini studies: theory suggests that openness should lead to an increase in natural resource returns in countries where this factor is relatively abundant.

Leamer, Maul, Rodriguez and Schott (1999) show that an increase in primary commodities exports is positively correlated with income inequality, but they do not control for country's relative abundance in natural resources. Large export volumes in primary commodities may indeed reflect high endowment in unequally distributed natural resources and cause inequality

upsurge independently of trade openness. Spilimbergo et al. (1999), and Fisher (2001) control for relative abundance in natural resources endowments. Their results indicate that while natural resources significantly increase inequality, trade liberalization in a land-abundant country has no clear effect. The fact is that the distribution of natural resources is as important as their relative abundance. For instance, in a country like Brazil where land is unequally distributed, openness might lead to an increase in inequality. Such a phenomenon is much less likely to occur in countries where land was equally distributed at the onset of liberalization (South Korea for example). So if one wishes to determine the impact of natural resources endowment on inequality under the process of trade reform, one has to account for inequality in the distribution of this asset[4]. When properly taken into account, inequality in land distribution seems to lead to unequalizing effects. This result is confirmed by Gourdon et al. (2006) who test the impact of endowment in mining and fuel, which are often unequally distributed. They find that endowment in mining and fuel increases inequality as does trade liberalization in mining and fuel-abundant countries.

To summarize, the studies accounting for heterogeneity in natural resources endowment do not refute the fact that trade liberalization benefit the relatively abundant factor in developing countries. They basically argue instead that some developing countries display a comparative advantage in natural resources which might be unequally distributed among individuals. Whereas the effect concerning arable land (land for agriculture) is not clear and depends on the distribution of land, the effect of mining and fuel endowment leans towards increasing inequality during trade liberalization.

2.3. Outsourcing and FDI

Trade liberalization is expected to benefit unskilled labor intensive industries in developing countries. In the meantime, it is likely to lead to a move of unskilled labor industry from North to South, notably through outsourcing and FDI, which in turn should affect inequality.

Wage studies: Two effects are to be considered, which could cause an increase in the demand for skilled labor in developing countries. The *Industry effect* deals with the shift of skill-intensive intermediate goods production from developed to developing countries. Such products can be characterized as unskilled-labor-intensive from a developed country perspective, but they appear to be skilled-labor-intensive when considered from a developing country's point of view[5]. The *Occupation effect* deals with the fact that the rapid pace of change in an economy under reform increases the demand for individuals capable to enact change, such as managers and professionals, whatever is the industry. Cragg and Epelbaum's (1996) report that occupation effect seems more relevant than industry effect to explain wage inequality in Mexico.

In brief, studies on outsourcing and FDI (Feenstra and Hanson, 1996) assume that trade liberalization leads to a shift of unskilled intensive industries from developed to developing countries, though such industries are not unskilled intensive from a developing country perspective and/or require skilled workers to manage the liberalization process.

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[4] Thanks to the Gini on land as in Lundberg and Squire (2003) and in Rama (2001)
[5] See Feenstra and Hanson (1996, 2003) on NAFTA.

2.4. **Heterogeneity in technology**

Last, trade patterns do not only depend on differences in factor endowment but also on differences in factor productivity, amounting to difference in technology. The inclusion of difference in technology and appearance of technological change seriously complicates the prediction of trade-induced inequality.

Wage studies: The main alternative explanation is the inclusion of technological change which complicates seriously the prediction. The inclusion of difference in technology in the wage literature deals with biased technological change. An additional effect of trade liberalisation is a rapid inflow of foreign technology as a result of both FDI and increased imports. As different recent models show, skill-biased technological change can be indirectly and partly induced by trade policy[6]. Many authors argue that trade liberalization can increase wage inequality through capital goods imports. These imports raise the demand for skilled labor capable to use imported capital goods (machines for instance), thereby improving the productivity of skilled workers. Such an outcome is comparable to what occurs with skill-biased technical change (Harrisson and Hanson 1999, Gindling and Robbins 2001, Pavcnik 2003). Zhu and Trefler (2004) show that the technological catch up (measured by an increase in labor productivity) does not affect directly wage inequality but by allowing developing countries to specialise in more skill intensive products, it nonetheless leads to an upsurge in wage inequality.

Gini studies: Easterly (2004) tried to explain global income inequality by differences in productivity. He shows that the predictions regarding the impact of trade openness on inequality are unclear once technological differences have been taken into account. If relative labor scarcity of rich countries is sufficiently offset by higher relative productivity, then rich countries can be considered as "labor abundant", exporting thus "labor-intensive" goods. Liberalization in such a setting can generate an increase in inequality in developing countries. Heterogeneity in technological achievements among developing countries then affects factors relative abundance, causing some developing countries not to display comparative advantages in labor-intensive goods.

To summarize, studies stress basically two points. First, technological differences change the relative abundance of factors, causing some developing countries not to display the otherwise expected comparative advantage in labor. Second, trade liberalization changes the use of technology in a way that favors skilled labor.

2.5. Summary of issues

The developing country puzzle, according to which inequality increases with trade liberalization in spite of relatively abundant unskilled labor, has received renewed attention over the last decade. Explanatory factors mostly revolve around heterogeneity in factor endowments taken in a broad sense (e.g. human capital and natural resources included). A cycle of empirical studies aiming at reconciling HO predictions with (controlled) facts seems now to be ending, from which a list of issues can be outlined.

Examining and controlling for endowment heterogeneity changes into one single model reduces the magnitude of the developing country puzzle to the poorest deciles of developing

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[6] see for instance Thoenig and Verdier (2003), Acemoglu (2003) and Aghion et al. (2003)

countries population, which are the most likely to incur significant losses either in income or wage. This is an issue as such.

A second issue pertains to the mapping of the different types of unskilled labor in developing countries, and accordingly, to the respective contribution of educated and uneducated workers' wage changes to changes in inequality.

Third, controlling for technological change leaves room for further work. Understanding trade's contribution to technological change, and in turn, trade-induced technological change effect on the demand for labor (either for intermediate goods or final goods provision) is of foremost importance to predict possible changes in trade induced inequality.

Last, identifying and comparing South-South trade inequality channels with North-South trade inequality channels, and then assessing South-South trade liberalization impact on inequality, would be two complementary issues, South-South trade liberalization being promoted as the most promising vehicle for trade-induced efficiency gains and possible growth.

3. Fairness acceptation two: household level ex ante assessment

At the household level, the consequences of trade liberalization are very difficult to disentangle from other sources of variation of income. That is why the micro studies of trade liberalization often rely on ex-ante evaluations. They model explicitly what would have been the consequences of trade liberalization on household welfare using pre-liberalization samples and hypotheses linking price and wage variations to trade reforms. This renders the results of these studies dependent upon these hypotheses and on a relevant modelling of household decisions.

Some studies try to overcome this difficulty by directly linking household welfare (proxied by hourly wage) to tariff variation at the industry level. Results from these studies have been described in the preceding section. A related approach is to proxy trade reform by time variation. When a country experimented dramatic changes in trade policy through time, along with a relative stability in the rest of its economy, this approach remains valid. Litchfield, McCulloch and Winters (2003) study the extent to which people escaped poverty in Vietnam between 1992 and 1998, based on their 1992 characteristics. Between these two periods Vietnam undertook dramatic trade reforms, including liberalization in rice and coffee prices. Farmers producing coffee and rice in 1992 escaped poverty at a much higher rate than the rest of the population. But these results are of limited scope and validity. First, McCulloch and Winters cannot separate the consequences of trade liberalization per se from that of the bulk of reforms that Vietnam experienced between the two surveys (land reallocation, price and investment liberalization). Second, they cannot interconnect their measure of liberalization with household characteristics that changed between the two dates, because such a change is likely to be endogenous.

We report here the results from ex ante studies trying to infer the consequences of trade liberalization on household welfare, using micro data.

3.1. Theoretical channels and methodological options

There are different kinds of trade liberalization, and they each have different consequences on domestic prices. We shall refer below to the following types:
- Unilateral liberalization (UL): removal of tariff barriers (non tariff barriers are not studied in the literature dealing with developing countries) or export subsidies. UL implies a decrease in domestic prices in the small country case, which is the case we shall consider throughout the paper.
- Export liberalization (EL): removal of export taxes. EL implies an increase in domestic prices.
- Trade liberalization in the rest of the world (TLROW): mainly removal of developed countries agricultural policies (DCAP). TLROW implies an increase in domestic prices.

The domestic price variation induced by trade liberalization has short run and long run effects.

(1) Short run consequences: an increase in domestic prices implies a short run increase (resp. decrease) in the welfare of net producers (resp. consumers) of the good affected by trade liberalization (Deaton, 1989). To infer the distributional consequences of trade liberalization, one has then to locate net producers and net consumers on a real income scale (Deaton, 1997).

(2) Longer run consequences: a price increase implies an increased demand for the mobile factor used in the production of the good (Ricardo-Viner effect), mainly labor, or for the factor intensively used in the production of the good (Stolper-Samuelson effect). This change in factor returns can magnify or counter the direct welfare impact of the price change (Porto, 2001).

The short run effect (1) on welfare of UL and TLROW is positive for every good that is only consumed by the household. For goods both consumed and produced by the household (mainly agricultural goods, where domestic production is an important part of the household's consumption), one has to locate net producers and net consumers on an income scale. The total welfare effect of liberalization is measured by the sum of the net marketed surpluses of each good weighted by the expected price variation due to liberalization.

Longer run effects (2) can only be measured by assessing the consequences of trade liberalization on factor returns (mainly wages). Two techniques have been proposed: linking household micro models to computable general equilibrium models, or estimating directly the general equilibrium relationships linking factor returns to border prices.

For a typical poor rural household that is a net consumer of agricultural products, and that derives income from agricultural wages, the net welfare effect of UL is ambiguous. The decrease in prices increases its welfare as a consumer. Meanwhile it decreases demand for agricultural labor, decreases agricultural wages and thus rural household's income.

The net effect of liberalization for a typical poor household hinges on the relative magnitude of these two opposite effects. These, in turn, critically depend on empirical estimates of the following quantities and elasticities:

- The direct price effect (1) depends on the size of the household's marketed surplus and on the magnitude of the price changes due to trade liberalization,

- The indirect factor returns effect (2) depends on the elasticity of the agricultural wage with respect to border prices and on the share of wage component in household's income.

Determining which of these two effects dominates is thus an empirical matter.

3.2. Empirical evidence

An overview of empirical results is given in table 1.

Direct price effect (1): the studies mentionned in table 1 document that all around the world, the poor are mainly net consumers of goods that are protected by tariff barriers. Thus, UL would be beneficial to them and on the contrary, TLROW would be detrimental. As for goods whose exports are taxed (cocoa, coton, coffee), the poor do not consume them. EL would not increase poverty, and could decrease poverty in some cases.

Indirect price effect (2): the poor are mainly net sellers of agricultural labor. UL, decreasing agricultural prices, would decrease wages and thus the poor's income. The evidence is scarce (Porto, 2004), but this income effect seems to dominate the direct price effect. There is a magnifying effect: the elasticity of wages with respect to the prices of tradable goods is superior to one.

As a conclusion, if the existence of a magnifying effect is confirmed in other countries and studies, UL would be poverty increasing, while TLROW would be poverty decreasing. A less controversial result is that EL would be poverty decreasing, as both direct and indirect effects go the same way.

Table 1: List of papers studying the distributional consequences of trade liberalization

Authors	Country	Products	Distributional impact of a price decrease
Short run effects (1)			
Deaton (1989)	Thailand	Rice	Slight decrease in poverty The income of intermediate households decreases
Ravallion and van de Walle (1991)	Indonesia	Rice	Decrease in poverty
Budd (1993)	Côte d'Ivoire	Rice	Decrease in poverty
Porto (2004)	Argentina	Agricultural products	Decrease in poverty
Porto (2005)	Mexico	Maize	Decrease in poverty
Nicita (2005)	Mexico	Agricultural products	Decrease in poverty
Chabe-Ferret (2005)	Brazil	Maize and rice	Decrease in poverty
Benjamin and Deaton (1993)	Côte d'Ivoire	Coffee and cocoa	No impact on extreme poverty Decrease in the income of intermediate households
Rapsomanikis and Sarris (2005)	Ghana	Cocoa	No impact on extreme poverty Decrease in the income of intermediate households
Balat and Porto (2005)	Zambia	Cotton	Increase in poverty
Long run effects (1) + (2) (Estimated wage/price elasticities)			
Porto (2004)	Argentina	Agricultural goods and clothing	Increase in poverty (the negative wage effect dominates negative price effect)
Porto (2005)	Mexico	Maize	Increase in poverty (the negative wage effect dominates negative price effect)
Nicita (2004)	Mexico	Agricultural goods and clothing	Decrease in poverty (the negative wage effect is dominated by the positive price effect) Increase in inequality
Long run effects (1) + (2) (Combining CGEs to household surveys)			
Ianchovichina, Nicita and Soloaga (2001)	Mexico	All products	Slight decrease in poverty (the negative wage effect is dominated by the positive price effect) Increase in inequality
Arndt (2005)	Mozambique	All products	Increase in poverty (the wage effect dominates)

3.3. Remaining gaps

We review in this section the main knowledge gaps to be filled in order to provide a better and clearer overview of the poverty consequences of trade liberalization.

The importance of imported inputs. An often overlooked consequence of UL is cheaper access to imported inputs for agricultural households. Litchfield, McCulloch and Winters (2003) document that trade liberalization in Vietnam induced a decrease in input prices that contributed to poverty alleviation.

The extent of the passthrough from tariffs to producer and consumer prices. Much of the literature reviewed here hypotheses a perfect passthrough from border prices to producer and consumer prices. Nicita (2004) shows that transaction costs are high, and that the farther the border, the thinner the impact of border prices on producer and consumer prices.

The problem of missing markets. Much of the literature reviewed here hinges on the hypothesis of perfectly functioning markets. But developing countries are characterized by highly imperfect markets (de Janvry, Fafchamps, Sadoulet (1991)). In the long run, failure to accessing the market for inputs, outputs or labor can prevent the households from grasping the consequences of trade liberalization. A thorough study of the transaction costs faced by the households is needed to conclude that they will benefit from liberalization in the longer run. In the short run, non separable households are neither harmed nor favored by liberalization, since they do not perceive the price change liberalization implies (Singh, Squire and Strauss, 1986). But when adjusting to the price change, the additional constraint of missing markets reduces the welfare impact of a price change. As the poorest households are the most likely to face transaction costs and imperfect markets, improving our knowledge on these topics is crucial in assessing the poverty consequences of trade liberalization.

Is there a magnifying effect of trade liberalization? Mixing various kinds of studies to accurately evaluate the impact of trade liberalization on wages and factor returns would add valuable information. The impact of trade liberalization on the poor critically hinges on the size of the wage effect relative to that of the direct price effect. The elasticity of wages to border prices is thus critical to evaluate the poverty consequences of trade liberalization. This is very difficult to measure, and has only been estimated by Porto (2003) for Argentina and Porto (2005) in Mexico. Porto estimates a reduced form linking border prices to wages, at a very aggregated level. Estimates of these effects could also come from studies using variation in protection across sectors to estimate the elasticty of wages to trade liberalization.

Are corner outcomes important? This question raises the issue of the impact of trade liberalization on unemployment and entry and exit into the informal sector. To assess the poverty consequences of trade liberalization, it is critical to consider the existence of unemployment. Price variations could induce a shift in or out of the labor force. That is documented by Krivonos and Olarreaga (2006): in Brazil, an increase in the price of sugar increases the likelihood that an individual works. Thus, an increase in sugar prices due to TLROW would increase the welfare of the poor mainly by increasing their participation in the labor market. Their gain through an increase in wages is less important. On the contrary, UL would decrease prices and deter entry into the labor force, thus decreasing the poor's welfare. A general modelling of the household's work allocation decision is thus needed in order to adequately infer the consequences of trade liberalization.

4. Fairness acceptation three: market failures, adjustment costs and intertemporal dynamics

Market failures have a long record in development economics, though their emergence in policy makers and policy advisers' discourses is fairly recent, dating back to the lukewarm performance of the structural adjustment programs in developing countries in the 1980s. Market failures crippling developing economies have provided a renewed interest for targeted intervention by donor agencies ever since, with a marked focus in aid programs for the financing of public goods or public-good-like services such as education, health and infrastructure. World Bank's Poverty Reduction Strategic Programs epitomize this focus. Incompleteness in factors market (labor and capital - eg risk market) gained a more measured momentum, though it was directly linked to imperfect information problems which made the core of the market failure literature at this time (Stiglitz 1986, Greenwald and Stiglitz, 1988). Imperfect competition and externality issues lagged far behind, such market failures being of much higher concern in transition and industrialised economies. Ironically and as shown below, trade liberalization impact models, when considering market failures, restrict to the latter in their majority, seldom exploring the basic features of developing economies.

The connection between market failures and trade is not that obvious yet. The Bhagwati and Ramaswami (1963) argument for free trade in presence of market failure should have kept the two strands of literature separated, enabling developing governments to pursue free trade objective while correcting for market failures at home. Unless market failures occur in international markets, the nexus between market failure and trade hence is weak. It however gained high profile after poverty reduction and development got into the picture and became key objectives of developing countries, donor agencies and WTO members altogether. The connexion followed two different directions, depending on whether market failures were considered as perennial or amendable features of developing economies.

In the first case, the efficiency losses induced by perennial market failures, superimposing on the distortions generated by trade protection, blurred the expected gains from freer trade in a second-best world (Stiglitz and Charlton, 2005). In this strand of literature, perennial market failures in developing countries relate mostly to factors and information markets, possibly degenerating in pareto-inferior trade (Newberry and Stigliz, 1984). Trade liberalization may not be the good question, nor the right answer for such countries. Selective and temporary protectionism can be part of the second-best policy set (Greenwald and Stiglitz, 2006). Policy consequences can be summarized as market-failure-correction-before-liberalization, the magnitude and sequencing of trade liberalization depending on the second-best policies available to mitigate the market failures at stake.

On the second case, correcting for amendable market failures leave room for the so-called efficient redistributive policies provided that these were discriminatory against the poor, namely policies reducing inequality while improving market efficiency (Piketty, 1997). Public-good like services (education, health, infrastructure) rank first in this respect, their provision increasing presumably both the aggregated gains from freer trade and the income share captured by the poorest. Trade-own liberalization remains in this case a priority objective. Policy consequences can be summarized as market-failure-correction-cum-liberalization. To benefit the poorest, trade liberalization is to be accompanied indeed by "complementary policies" (Nicita, Winters) and "flanking measures" (EC SIA) which all

would help turn short term losses into long term gains. A pure redistributive version of the argument substitutes lump-sum transfers (cash compensations) to market failure corrective policies among the complementary measures to be implemented.

At first glance, these two directions seem reasonably compatible and converging toward the same and long run development target. They moreover share the same rationale, according to which adjustment costs induced by trade liberalization do exist and require compensating mechanisms for trade to benefit the poor – as long as these bear such costs. They differ however onto one single point which relates to the inclusion of dynamic and time in the adjustment of economies. In the perennial market failures case, adjustment is not a temporary shift of the economy toward a long run, steady state equilibrium, but a permanent feature of development – recall that they single out developing countries among other countries. There are costs to trade-liberalization induced adjustment. These costs are created by market failures, notably on capital and labor markets. These being unlikely to vanish, adjustment costs remain as long as the economy develops. Assessing who bears the cost over time and whether this cost can be mitigated and/or shifted toward the wealthiest or toward the future turn market failures into a genuine political economy issue. The case is different for amendable market failures. The adjustment costs they involve are transitory and likely to vanish once the market failures have been overcome. Development means moving from one production frontier to a broader and encompassing one. Adjustment costs provide there a rather static idea of the path involved in between.

In the following subsections, we dwell upon the adjustment cost literature, before turning to methodological issues involved by perennial market failure in the dynamic adjustment of developing economies.

4.1. Adjustment costs and inequality in developing countries

Trade liberalization causes the previously-protected sector of a country to shrink and thereby causes reallocation of resources between industries. Owners of resources initially employed in the protected sectors may hence incur income and wealth losses, depending on real price changes of the factors they are endowed with. In a static view of the economy, and with perfectly competitive markets, no adjustment cost occurs as such, except those induced by the transfer and compensation schemes – if any – set by the government to compensate losers. The distributive consequences of trade liberalization at country level are not altered by any hypothetical cost incurred by such country's move toward free trade. Market failures in labor and capital markets, causing workers and capital to lie idle for a period, create two kinds of problems. They generate supplementary costs (when compared to the perfect markets situation) whose magnitude will affect the net gains from trade. The distribution of such costs among households will in turn dramatically affect the distribution of trade-induced inequality.

The literature on trade liberalization with costs of adjustment has mainly focused on the optimal path of liberalization, gradual liberalization being presented as a reasonable means for government captured by "loud" losers to ease their pain, win political support for reform and tap long term (e.g. post-adjustment) gains. Gradualism was moreover the mere proof that adjustment costs did exist, governments being otherwise expected to cooperate at free trade levels (Furusawa and Lai, 1999).

Existence of adjustment costs in the process of trade reform is not disputed. Several empirical studies attempting to define and quantify them have been reviewed by international organizations such as WTO or UNCTAD over the last couple of years[7]. A critical review of major findings provides the following results:

(1) No single economic definition of adjustment cost prevails. No normative prediction of what adjustment costs are expected to be in a purely competitive economy prevails either.

(2) In spite of loose definitions, consensus emerges to isolate unemployment, e.g. market failure, as a primary source of adjustment costs. Interestingly, adjustment cost pervades into government and policy makers discourses, providing a comfortable and serious-sounding catch word substituting for "unemployment" in trade liberalization debates.

(3) A second consensus seems to arises over the fact that adjustment costs – whatever their definition – are short term. As a consequence, they are likely to become another comfortable catch word, substituting this time to what turns out to be short term welfare net losses for particular countries.

(4) Whatever their magnitude and distribution among income groups, adjustment costs lead to policy recommendations broadly in line with Bhagwati and Ramaswami (1963) recommendations: "trade liberalization may lead to adjustment costs and may affect domestic income distribution. But we do not believe that concerns about adjustment costs and income distribution are meaningful arguments against trade liberalization. We do believe that with appropriate domestic policies and institutions in place, everyone can gain from trade liberalization" (WTO DG Mike Moore, Geneva, 18 March 2002).

(5) Concession of *possible* short term losses are accompanied with marked assertion on *certain* long term gains. The conclusion of de Cordoba et al. (2006) is representative of such a line of thought: "Finally, addressing adjustment problems directly, by making markets work better and through redistributive mechanisms as well as by providing adequate, well directed finances and transition periods, would enable developing countries to opt for policies that would allow them to capture the larger long-term gain from trade" (p. 73).

Readers will have recognized the common belief stated by Samuelson in his 2004 JEP article: "Yes, good jobs may be lost here in the short run. But still total U.S. net national product *must, by the economic laws of comparative advantage, be raised in the long run (and in China, too)*. The gains of the winners from free trade, properly measured, work out to exceed the losses of the losers. This is not by mysterious fuzzy magic, but rather comes from a sharing of the trade-induced rise in total global vectors of the goods and services that people in a democracy want. Never forget to tally the real gains of consumers alongside admitted possible losses of some producers in this working out of what Schumpeter called "creative capitalist destruction." Correct economic law recognizes that some American groups can be hurt by dynamic free trade. But correct economic law vindicates the word "creative" destruction by its proof [sic] that the gains of the American winners are big enough to more than compensate the losers" (p. 135). In his paper, Samuelson demonstrates that "sometimes free trade globalization can convert a technical change abroad into a benefit for both regions; but sometimes a productivity gain in one country can benefit that country alone, while permanently hurting the other country by reducing the gains from trade that are possible

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[7] Bachetta and Jansen (2003) for empirical studies on developed countries, published by the WTO. Fernandez de Cordoba, Laird, Maur, Serena (2006) for UNCTAD on developing economies.

between the two countries. All of this constitutes long-run Schumpeterian effects, quite aside from and different from transitory short-run harms traceable to short run adjustment costs or to temporary rents from patents and from eroding monopolies on knowledge" (p. 142).

When admitting short run losses and ascertaining for long term gains, one takes for granted the systematic and positive impact of trade openness on productivity and growth. Such a relationship is not supported either by economic theory, as reminded by Samuelson, nor by empirical evidence. Weaknesses in the positive relationship between trade and growth hence makes dubious any assertion on the systematic mitigation of adjustment costs by opened economies and on "the larger long-term gains from trade".

4.2. Modelling liberalization's dynamic effects

One of the most popular tools for trade liberalization impact assessment undoubtedly is computable general equilibrium models (CGE). We review in this section their performance in accounting for the various adjustment costs issues mentioned above, and particularly, market failures and dynamic effects.

Since the first generation of CGE models developed in the seventies, modellers have amended the basic Walrasian framework to introduce imperfect competition and increasing returns to scale, dynamics and imperfect factor markets (especially labor) and heterogeneous household behavior (mainly through microsimulation techniques[8]). These improvements are however still far from being satisfactory to allow for a relevant analysis of the impact of trade liberalization on income distribution.

Imperfect competition and increasing returns to scale issues

Harris (1984) has been the first to model imperfect competition and increasing returns to scale within CGE models, while the first applications on developing countries are those of Devarajan and Rodrik (1989; 1991). The main critic addressed to these models is that they overestimate the positive impact of trade liberalization. Indeed, the rationale behind these models is that when a country reduces its trade barriers, competition with foreign firms induces a lower mark-up which means lower prices and higher supply by local firms, and thus an increase of domestic welfare. This phenomenon is called the pro-competitive effect of trade liberalization. However, there is no empirical evidence supporting the existence of such an effect. Moreover, as stressed by Slaughter (2000), if the labor intensive industries are the most protected in a given developing country, the pro-competitive effect could induce an increase of inequality and poverty, as outlined in section 2.

Are the links between trade liberalization and imperfect competition reduced to a lower mark-up? And are we really sure that mark-ups will be lower? If the product differentiation increases, mark-up could actually increase. Should we not instead focus on how product market imperfections impede small firms in developing countries from taking advantage of trade liberalization? Indeed, we see in many developing countries the constitution of new joint-ventures between big local firms and multinational corporations which allow the former to strengthen their domination on the domestic market with trade liberalization. We could

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[8] See section 3.

better capture the consequences of trade liberalization on income distribution if we were able to model in a more relevant way markets functioning in developing countries.

Imperfect factor markets issues

CGE models which do not take into account imperfect capital and labor markets are irrelevant for analysing the economic and distributional impact of trade liberalization. The absence of these market failures is certainly one of the main reasons explaining the gap between models' predictions and observed outcomes. Indeed, one of the main issues of trade liberalization is the intersectoral reallocation of resources. The more segmented and inefficient factor markets are and the more costly this reallocation is.

Concerning capital markets, the distributional consequence of credit rationing is very important. Small firms and informal entrepreneurs have a very difficult access to credit markets, which reduces significantly their capacity of intertemporal arbitrage. Decaluwe and Nsengiyumva (1994) have shown in the case of Rwanda how the policy impact is modified when taking into account credit rationing. This feature should be included systematically in any model dealing with trade liberalization in developing countries.

Labor market imperfections have been more often included in CGE models, even if the most influential ones in international trade negotiations still represent labor markets as working perfectly. Labor market imperfections could be divided in two categories: those linked to wage setting mechanisms and those dealing with firing/hiring mechanisms. The literature has mainly focused on the former[9]. The first generation of imperfect labor market CGE models have introduced labor market imperfections trough minimum wages. The second generation of models relied on wage curves (De Santis, 1998), labor union behavior modelling (Devarajan et al., 1997), matching models (Maechler and Roland-Host, 1995), or efficiency wage theory (Thierfelder and Shiells, 1997; Marouani, 2000 and 2006). The presence of these imperfections allows for tackling the issue of unemployment but also give different results in terms of income distribution.

However, even if these models are often built on solid theoretical foundations, their empirical validation is still weak, because it is a very difficult task. How would one estimate empirically the power of negotiation of a trade union or the probability for a shirker to be caught by his supervisor?

Finally, the last issue we would like to raise is labor mobility. In CGE models, intersectoral labor mobility is costless. CGE models in their current design do not have the possibility to analyse labor mobility. They just give the stock of labor demand of each sector, without looking if the employees were former unemployed or working in other sectors. As we said previously, trade liberalization involves significant resource reallocation, and the cost of labor mobility (training, assistance programmes, etc.) should be one of the main factors taken into account to analyse the impact of trade liberalization.

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[9] See Marouani (2002) for a literature review on imperfect labor markets and CGE models.

Dynamics issues

The first generation of dynamic CGE models are called recursive or sequential. These models are actually static models linked by jumping variables (mainly capital accumulation). Households are characterized by myopic expectations which is obviously unrealistic. However these models are popular (especially within policy research circles) because they at the same time give the impression of tackling the issue of dynamics (since they explicitly model the evolution of variables from a period to another) and are very easy to handle.

The second generation of dynamic CGEs, namely intertemporal general equilibrium models are more popular within academic circles. They rely on a truly dynamic framework: households maximize their intertemporal utility given their intertemporal budget constraint and firms maximize their discounted value given their capital accumulation constraint. However the main shortcoming of such models is their treatment of expectations. Most of them rely on the rational expectations perfect foresight behavior. The absence of uncertainty is unrealistic and induces an overestimation of the positive impact (or a minimisation of the negative impact) of trade liberalization because households and firms are omniscient and are thus able to adapt their behavior to any future shock in an optimal way. Ballard and Goulder (1985) and Ballard (1987) have shown the impact of the adoption of different expectation models. However, given the difficulty of the task, this direction of research seems to have been abandoned.

An exception may be found in Boussard, Gérard, Piketty, Christensen and Voituriez (2004) and in Boussard, Gérard, Piketty, Ayouz and Voituriez (2006), who explicitly model expectations in a dynamic world CGE-model with imperfect information and incomplete risk market. Authors try to evaluate changes in welfare gains and their distribution due to trade liberalization with two versions of their model. In the first version, a standard world CGE approach is followed. In the second version, risk aversion, imperfect information and production lag in the agricultural sector are included. Impacts on agricultural production and income as well as on household welfare and GDP performance for selected countries are simulated. It appears that in case of imperfect information most of the gains related to comparative advantages vanish. Authors emphasize that their results are very sensitive to the way expectations are formalized. Because the imperfection information assumption relaxes the rational expectation hypothesis in its most restrictive acceptation (whereby prices are anticipated perfectly), price expectation has to be formalized in an ad hoc fashion (naive, adaptive etc.). Consequences of price expectation's formalization on price behavior are spectacular, price motion being random-like, chaotic or periodic according to the formalization selected. Such a model, which should preferably be called a computational general *dis*equilibrium model provides a first insight of adjustments involved by trade liberalization over time in a global framework, from one disequilibrium position to another.

Another shortcoming of intertemporal models, especially those dealing with developing countries is the hypothesis of a steady state growth. Francois, Nordstrom and Shiells (1999) note that this hypothesis is not acceptable, especially for countries facing a significant shock like trade liberalization. Dynamic models need to deal with transitional dynamics, not only at the macro but also at the sectoral level.

Finally, intertemporal CGE models usually include a dynamic optimization program for capital accumulation, but labor demand is modelled in a static way. Thus, adjustment costs on capital accumulation are taking into account but not those on labor demand. In other words it

is implicitly assumed that firms plan their investments on the long run to minimize capital adjustment costs and that labor demand adjusts to minimize the intra-period production costs. In reality firms plan both. Researchers should thus think at a way to model the demand of permanent workers in a dynamic setting and temporary workers could be the adjusting variable. The distributional consequences of trade liberalization would be different if we take into account the fact that temporary workers could be more affected by a negative shock, since those are often more vulnerable than permanent employees.

5. Conclusion

The starting point of this paper is given by country situations where trade liberalization is expected to be poverty and inequality alleviating in the long run while inducing a short run increase in poverty or in inequality. The question we ask is what are the distributive aspects of trade which are worth documenting to better help governments integrate trade policies within a global policy framework so as to enhance growth and reduce poverty and inequality.

The method followed is a literature review, organized according to salient issues given by the three acceptations of fairness implied by the inclusion of the "Development" objective in the world trade liberalization agenda. A "pro-development" trade liberalization agenda should correct past unfairness in trade regime, which raises the broad issue of country level ex post assessment. It should equally reduce poverty, which point toward household level ex ante assessment. Last, because development is basically a dynamic process, the distributive-dynamic effects of trade liberalization are also considered.

A synthesis of results would be as follows:

1) Empirical evidence shows that inequality rise when developing countries open up their trade. Hence poor get poorest, in relative terms. Simple HO predictions do not hold and the beautiful story the Doha Development Round should tell is likely to be wishful thinking unless trade-induced inequality is not anticipated and corrected from the onset.
2) Such empirical findings are based on ex post analysis. For this reason, they have much powerful and persuasive effect than ex ante assessment results which are based upon numerical simulations.
3) Most of knowledge gaps derived from such evidence are not new. Wage premium puzzle, technological-change induced inequality, missing markets effects on inequality, dynamic adjustments impact assessment, all these date back to the early structural adjustment periods.
4) Most of methodological gaps are not new either. Macro-micro models received renewed interest and technical improvement in the second half of the 1990s (with micro-simulation, labor market imperfection modelling) but the basis dates back as well to the late 1980s. This said, development and refinement of models, although insufficient, are not fully grasped by policy analysts who on average resort to static, perfect competitive simulation models to derive policy recommendations.
5) The Development goal stresses the shortcomings of available tools. Shortcomings are known: no market failure, no dynamics. Because development *is* dynamic *with* market failures, correcting for such shortcomings should be gaining momentum. We *have* to correct for such shortcomings, not for technical reasons, but on development grounds.

6) Disputed evidence arises: long term gains may not be "automatically" tapped and could vanish because of market failures. Evidence on long term gains remain elusive, though forcefully asserted.

7) Policy recommendations could follow three directions: education investment, factors market failure correction, and market access. Still one crosscutting recommendation – or issue – prevails, namely to identify losers.

8) How to identify losers? The task is difficult, because we have to disentangle at the micro level the impacts of trade openness on a wide array of channels: relative demand for skilled labor through induced technical change or import of new technologies, imperfect access to markets (credit, labor, inputs, education). This cannot be done by investigating only the macro consequences of trade openness (total factor productivity, sector allocation).

9) Methods have to be implemented to investigate at the micro level how these macro changes interact to determine household welfare. Such contributions as those of Duflo and Banerjee (2005) or Fafchamps, Zeufack and El Hamine (2006) improve our understanding of micro determinants of growth and exports, and of the reactions of firms to trade openness. Such improvements permit, in the long run, to understand which variables drive factor demands and relative factor returns.

10) Without such a thorough micro analysis, the study of the distributional consequences of trade liberalization may not deliver usable results. This is a wide opened array of research, to guide Alice-WTO out of Doha's Wonderland.

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