E Distributional consequences of trade

Countries liberalize trade because they expect gains for their economy. Previous sections have provided detailed descriptions of the different mechanisms that allow countries to reap such gains from trade and have shown that the gains are likely to be significant. Why is it then that countries sometimes hesitate to reduce trade barriers and why is it that outright opposition to liberalization can sometimes be observed? This section provides some answers to these questions by focusing on the distribution of the gains from trade within countries.[1] Not all individuals within an economy necessarily become better off with trade liberalization and this section will pay particular attention to those individuals that may lose from trade liberalization, either temporarily or permanently. The last sub-section analyzes how to ensure that the most vulnerable individuals in an economy, i.e. the poor, are among those gaining from liberalization.

1. TRADE AND INEQUALITY

(a) What do trade models say about the distributional changes resulting from trade liberalization?

Trade liberalization provides new commercial opportunities for companies that are able to export and provides consumers, through imports, with access to cheaper and different goods. Those imports, however, may be in competition with local production and the relevant local producers may suffer from the new competitive pressure. New export opportunities and the increased competition from imports will lead to the expansion of some activities and the reduction of others and – as is often the case with changes resulting from policy reform – some individuals may gain and others may lose in this process. Since individuals do not necessarily know in advance whether they will be among the losers or winners, they may fear liberalization because of the uncertainty it brings. Others will focus on possible difficulties in the short term. For instance, they may be afraid of having to change jobs, even though they are likely to become better-off in the long term.

Regarding the long-term distributional consequences of trade reform, an important question is whether the relatively well-off or the not so well-off gain from

trade liberalization, i.e. whether trade liberalization is likely to increase or decrease inequality in societies. Economists today consider the answer to this question to be highly situation-specific, and economic thinking on this question has undergone certain changes over time.

The classical link between trade and income inequality is based on the Stolper-Samuelson Theorem developed in a traditional trade model (Heckscher-Ohlin) that assumed full employment. In this model, trade flows are determined by comparative advantage and the latter, in turn, depends on each country's resources.[2] As developing countries are typically well endowed with low-skilled labour relative to developed countries, the former were expected to start exporting low-skill labour-intensive goods to the industrialized world. Relative demand for low-skill workers would increase in developing countries and decrease in industrialized countries and the theorem predicted that inequality between high-skill and low-skill workers would probably increase in industrialized countries as a consequence of trade with developing countries.[3] Along the same lines, inequality would be expected to decline in developing countries.

A similar argument could be made with respect to the gains of capital compared with labour. If industrialized countries are considered to be relatively rich in capital, capital-labour inequality would increase in industrialized countries as a result of trade and decrease in developing countries. The Stolper-Samuelson Theorem thus predicted that trade would lead to changes in rewards that were factor specific. Certain factors were expected to gain, independent of whether they were employed in exporting or importing sectors, or companies, while others were expected to lose, again independent of their employment. The theorem applies to trade among rather different countries – for example, industrialized versus developing countries – and predicts that relative rewards move in opposite directions as a consequence of trade.

Traditional theory is less useful for predicting the distributional effects of trade among similar countries. This is a potentially important question since industrialized countries trade more with other industrialized countries than with developing countries. The predictions of traditional theory also

appear to be in conflict with the evidence from firm-level data indicating that companies differ significantly within sectors, that only a subset of companies within a given sector exports and that those companies tend to pay higher wages than non-exporting companies (Bernard and Jensen, 1999).

More recent contributions to the economic literature have analyzed how trade among similar countries, i.e. among industrialized countries, may affect factor prices. Matsuyama (2007) argues that the act of engaging in international trade may require the services of skilled labour, meaning labour with expertise in areas such as international business, language skills and maritime insurance. As a result, increases in trade can lead to a worldwide increase in the relative price of skilled labour. Epifani and Gancia (2006) argue instead that trade can benefit skilled workers because they can better take advantage of larger markets. They show that skilled workers, in any country, tend to constitute a minority of the labour force and tend to be employed in sectors with high plant-level fixed costs that produce highly differentiated goods that are gross substitutes for less skill-intensive products. In such a situation, trade will lead to a rise of the relative output of sectors characterized by economies of scale, i.e. the skill-intensive sectors. As a result, the relative demand for skilled workers goes up.

Another set of models, in which fixed costs also play a role, allow for differences between firms and a so-called continuous distribution of skills among workers (Manasse and Turrini, 2001; Yeaple, 2005). In these models there is no clear line of separation between "high skill" or "low skill" workers, but rather a large variety of workers with different skill levels. In both models, the highest-skilled workers will end up by working in exporting companies after trade reform and in Yeaple (2005) those companies use more productive technologies. Therefore, only skilled workers can take advantage of the increased opportunities provided by trade, and the difference between their wages and those working in other, non-exporting companies increases as a consequence of trade reform. This mechanism would not only work for trade between very different countries but also for trade among similar, for example, industrialized countries. It also predicts increased inequality in all countries participating in trade. The prediction that exporting firms pay higher wages than non-exporting firms also corresponds to the firm-level evidence mentioned above.

Yeaple's model uses a "new new" trade theory framework based on the so-called Melitz model discussed above.[4] Davis and Harrigan (2007) use this to build a model that allows them to explain why, in the opinion of the public, globalization threatens "good jobs at good wages". In their model, firms differ in two aspects that determine their competitiveness: their productivity and their ability to monitor workers. Firms with a lower ability to monitor workers have to pay higher wages to prevent workers from underperforming. The authors consider jobs at these companies to be "good jobs" since they are better remunerated than the economy-wide average for identical workers. Yet the fact that firms with a lower monitoring ability have to pay higher wages also renders them less competitive compared with other firms with similar productivity levels. Trade liberalization triggers the selection effect known from the Melitz framework, but implies in Davis and Harrigan's (2007) model that particular pressure is put on what are considered to be "good jobs". While trade tends to raise the real average wage, it leads to a loss of many "good jobs" and a steady state increase in unemployment.

The increased practice of international outsourcing of services inputs has led to an increased interest in the distributional effects of offshoring. Outsourcing is expected to affect wages through potentially three channels (Baldwin and Robert-Nicoud, 2007; Grossman and Rossi-Hansberg, 2006b).[5]

First, the outsourcing of tasks will lead to cost savings that have positive repercussions for all domestic wages. Second, the fact that tasks are outsourced will allow workers to look for jobs elsewhere. In the relevant literature, this effect is sometimes called the "labour supply effect" and tends to have a negative effect on the wages of workers performing tasks that are being outsourced. Third, offshoring may affect the terms of trade in large countries with repercussions for wages. If, for instance, a country is a net exporter of high skill-intensive products, and outsourcing takes place in the low skill-intensive sector, the expansion of production in the low skill-intensive sector will improve the country's terms of trade, with positive effects on high-skill wages and negative effects on low-skill wages. In these circumstances, two of the three channels could thus have a negative effect on low-skill wages, while the third channel, i.e. the productivity channel, has a positive effect on low-skill wages. The overall effect is ambiguous, but is

more likely to be positive for low-skilled workers the larger the cost savings (or productivity) effect generated by offshoring in the sectors in which low-skilled workers are intensively used.[6]

The wage effects of offshoring will also to a large extent depend on which type of jobs will actually be offshored. Much of the empirical literature on offshoring has focused on this question. In particular, it has been argued that "routine jobs" can be more easily offshored than "non-routine" jobs. Some studies indicate that routine jobs are often medium skilled. This may explain why contributions to the empirical literature on globalization and labour markets in industrialized countries have increasingly moved away from the distinction between two types of workers – high- versus low-skilled – and include a group of medium-skilled workers in the analysis or even a higher level of differentiation. The relevant literature will be discussed in more detail in the next sub-section.

With respect to the short-term consequences of trade, models based on recent theories also lead to different predictions from the more traditional approaches. In the above-mentioned Hekscher-Ohlin model, production factors are supposed to be able to change employers and, in particular, sectors instantaneously. In reality, this is not the case, as it takes time for production factors to adjust to a policy reform. This is taken into account in the so-called "specific factor model" that is also based on traditional modelling approaches. This model assumes that, in each sector, there is one factor that is sector-specific and cannot change the sector of employment. In this model the sector-specific factor in the import-competing sector will lose from trade liberalization. This model has been interpreted as reflecting the short-term distributional impacts of trade reform.

Krugman and Obstfeld (2006) give the following example. Assume that a country produces food and textiles with the production factors of land and labour. Assume also that the country finishes by importing textiles and exporting food after trade liberalization. In the long term, this is good news for landowners and bad news for workers. However, in the short term, the owners of the land that is currently being used for textile production may suffer, while workers who are currently producing food may gain. Such short-term gains and losses often seem to determine political positions in debates over trade policy.

In this traditional approach, who wins and who loses from trade reform in the short-term is expected to depend on the sector of employment. The "new-new" trade theory has challenged this prediction. It predicts that both net-exporting and net-importing sectors will be characterized by expanding high-productivity firms and shrinking low-productivity firms (Bernard et al. 2007b). As a result, this approach predicts that trade reform will trigger job creation and job destruction in all sectors. For policy-makers, this implies that significant reshuffling of jobs takes place within sectors.[7] This may be good news, since it is generally expected that it is more difficult for workers to move across sectors than for firms to change within the same sector. A move across sectors may, for instance, imply higher retraining costs for workers and longer search periods. On the other hand, the fact that adjustment occurs in all sectors implies that a wider range of jobs are at risk. While traditional trade models would suggest that policy-makers who wish to assist workers focus on so-called comparative disadvantage sectors, i.e. those that can be identified as import-competing sectors, more recent research suggests that such targeted intervention is not necessarily effective.

(b) Empirical evidence on trade and inequality

Although trade models differ widely in their predictions about how precisely the gains from trade will be distributed, they all predict that those gains will not be distributed equally within an economy. This is not necessarily a cause for concern. Given that trade leads to gains for the economy as a whole, everybody can be made better off if appropriate domestic policies are put into place. Nevertheless, the fact that trade may in some circumstances lead to increased inequality has received much attention in the public debate and also in the empirical trade literature.

In the context of increasing inequality in most regions of the world (see Table 15), a large amount of relevant empirical trade literature in the 1980s and 1990s focused on the question of whether trade is one of the main drivers of changes in inequality or only one among many others. Towards the end of the 1990s this literature converged to the view that international influences only contributed to about 20 per cent of rising wage inequality (see Box 16). Very recent literature reaffirms that other forces –

Table 15
Evolution of Gini coefficients by region, 1970-2000

Years	OECD	LAC	EAP	SAS	AFR	ECE
1970	0.352	0.561	0.444	0.380	0.649	0.298
1980	0.339	0.556	0.489	0.384	0.631	0.301
1990	0.353	0.552	0.485	0.381	0.651	0.307
2000	0.368	0.572	0.520	0.334	0.668	0.428

Note: LAC: Latin America and the Caribbean; EAP: East Asia; SAS: South Asia; AFR: Africa; ECE: East and Central Europe.
Source: Dikhanov (2005) "Trends In Global Income Distribution, 1970-2000, and Scenarios For 2015", Human Development Report 2005.

such as technological and institutional innovations, demographical changes and cyclical fluctuations – are more important than trade in driving changes in income distribution (Lawrence, 2008). This section focuses on two other issues that still leave economists puzzled.

The first issue relates to the relationship between trade and inequality in developing countries. It was originally expected that trade would lead to decreases in inequality in developing countries. This was good news because trade was therefore expected to reduce poverty through two mechanisms: its positive impact on growth and its favourable impact on income distribution. Empirical research has, however, shown that the second mechanism has not always been triggered by trade reform and numerous studies have examined why this has been the case.

The second issue concerns the question of who is likely to suffer from trade liberalization in industrialized countries, either in relative or in absolute terms. The focus of the debate on this question has changed quite significantly over time. Whereas the question was posed in terms of "high-skilled" versus "low-skilled" workers in the 1980s and 1990s, more recent studies make a distinction between "high-", "medium-" and "low-skilled" workers, reflecting some concern about the evolution of wages of medium-skilled workers. Other studies try to make even more nuanced distinctions between different types of skills. There has also been an increased interest in the evolution of the relative income of the "super rich" and in the evolution of the labour – as opposed to capital – share of income.

i) Has trade led to decreased inequality in developing countries?

Traditional trade theory predicted that North South trade leads to increased inequality in the North (capital and skilled labour gain, while unskilled labour loses) and decreased inequality in the South. In particular, it was expected that globalization would help the less skilled, who were presumed to be the locally relatively abundant factor in developing countries.

Empirical research has used different measures for inequality, as described in Box 16. Studies analyzing the link between trade and wage inequality in developing economies have produced mixed results. Most of the empirical evidence from early liberalizers in East Asia confirms the predictions of traditional trade models, while in Latin America, evidence suggests that trade liberalization has often coincided with an increase in both income inequality and wage inequality between high- and low-skilled workers. The same observation has been made for India after its liberalization measures in 1991 (Goldberg and Pavcnik, 2007). A large body of empirical literature has tried to explain this phenomenon and finds that the timing of trade liberalization, the tariff schedules in place before liberalization and technological change are some of the elements which explain why certain developing countries have experienced an increase in inequality after trade liberalization.

Measuring inequality

Different measures of inequality have been used in the empirical literature analyzing the distributional effects of trade reform.

Wage inequality between high-skilled and low-skilled labour

Much of the empirical literature in the 1980s and 1990s focused on changes in the so-called skill premium, i.e. the wage difference between high- and low-skilled workers.

The measurement of skills varies depending on the kind of data available. Plant- or firm-level datasets typically differentiate between production and non-production or blue-collar and white-collar workers. Studies using these data consider the wage difference between white- and blue-collar workers to reflect skill differences. Although this categorization is rather imprecise, Goldberg and Pavcnik (2007) note that "cross-tabulations of matched worker and employer surveys at the plant level in the United States and the United Kingdom indicate a close relationship between the production/non-production status of workers and their educational level".

The measurement of skills is sometimes based on occupational classification data. Some occupations require more skills than others, and based on this consideration, economists have attempted to match occupations with skills. Hijzen et al. (2005), for example, use the New Earnings Survey Panel Dataset (NESPD) in a study of the effects of offshoring on relative rewards. Measures based on occupational datasets score high in terms of international comparability because standardized classifications like SOC (Standard Occupational Classification) exist. Unfortunately the availability of datasets distinguishing workers based on their occupations is limited.

Another commonly used measure is wage data providing information on educational attainment – based on the assumption that the higher the level of education, the more skilled the worker. Internationally comparable data for educational attainment based on the International Standard Classification of Education (ISCED) exist

and economists often use this classification to distinguish three skill levels: low (up to primary education), middle (up to upper secondary education) and high (tertiary education).

Labour share of income

In recent years, empirical work on the impact of trade or globalization on inequality has become increasingly interested in the contrast between labour and capital income. One measure used to capture this difference is the labour share of income, i.e. the ratio of total compensation to workers over national income (International Monetary Fund, 2007b). Its measurement is subject to a number of methodological problems, especially how to define workers and what to include in compensations. One of the difficulties is how to deal with the income of the self-employed (Gomme and Rupert, 2004).

Gini coefficient

The Gini coefficient gives more detailed information on the entire income distribution of households in an economy and takes into account the fact that an individual household may have several sources of income. It is a measure of statistical dispersion, defined as a ratio with values between 0 and 1. A low Gini coefficient indicates more equal income or wealth distribution, while a high Gini coefficient indicates more unequal distribution. 0 corresponds to perfect equality (everyone having exactly the same income) and 1 corresponds to perfect inequality (where one person has all the income, while everyone else has zero income).

Percentile shares

Some studies, like International Monetary Fund (2007a), use the relative income shares of different income groups as the relevant measure of income inequality. The quintile share, for instance, is defined as the cumulative income of one-fifth of the population divided by the total income. The income distribution is perfectly equal if all the income shares are equal. A related measure is the ratio of the top 20 per cent of the population

versus the bottom 20 per cent. This could be interpreted as a measure of income polarization. Recent years have witnessed an increased interest by economists in measures of polarization in the light of evidence that growth in US inequality since 1990 has been concentrated in the top end of the distribution (Lemieux, 2007).

Information on labour shares, percentile shares and Gini coefficients tends to be based on household income statistics. Atkinson (2003) points out that certain types of capital gains are typically not captured in such statistics which may have led to inequality being increasingly understated. In the United States, for instance, capital gains from the sale of stock holdings are not included in the income measure, nor is the net imputed return on equity in one's own home.

It has, for instance, been argued that the recent entry of China and other low-income developing countries in world markets has shifted the existing patterns of comparative advantage of middle-income countries, such as Argentina or Colombia. Wood (1999) postulates that, while in the 1960s and 1970s middle-income countries had a comparative advantage in goods of low-skill intensity, in the 1980s and 1990s, when low-income developing countries started exporting to the rest of the world, the comparative advantage of middle-income countries shifted to goods of intermediate skill intensity.

The effect of trade reform on income distribution may also depend on initial income levels, as argued by Milanovic (2002). His findings suggest that at very low average income level, it is the rich who benefit from openness. As income level rises, that is around the income level of Chile, Colombia or Czech Republic, the situation changes and it is the relative income of the poor and the middle class that rises when compared with the rich. It seems that trade openness makes income distribution worse before making it better – in other words, the effect of openness on a country's income distribution depends on a country's initial income level.

Another explanation for the increasing wage difference between high and low-skilled workers, i.e. the so-called skill premium focuses on the pattern of protectionism prior to trade liberalization in many developing countries, and on the skill intensity of the sectors that were the most affected by trade reforms. Several studies on countries including Colombia, Mexico and Morocco have noted that, contrary to expectations, it was the unskilled labour-intensive sectors that were protected the most prior to trade reform. As a consequence, when protection was lifted, wages of the unskilled went down.

It has also been argued in the trade literature that technological change and trade should not be treated as separate phenomena as they are likely to have an impact on each other. Several recent papers have postulated that, even though technological change may have played a greater role than particular trade policy changes in increasing inequality, technological change was itself a response to more trade openness so globalization was indirectly responsible for the increase in inequality. It could, for instance, be the case that the previously mentioned entry of low-income countries into world markets may have led to faster technological change in middle-income countries in their efforts to remain competitive. Goldberg and Pavcnik (2007), however, point out that the empirical evidence on the interaction between trade openness and technological change and their effect on inequality is so far mixed and inconclusive.

The "new-new" trade theory framework may provide another explanation as to why inequality increases have been observed in both developed and developing countries. As discussed in previous sections of this report,[8] the main idea of the relevant trade models is that trade openness leads to an "upgrading" of firms, with the most productive firms expanding their operations while less productive firms reduce their operations. In order to establish a connection between compositional changes within an industry and the inequality debate, it would be necessary to show that "higher-quality" firms have a higher demand for skill so that "firm upgrading" triggers an increase in inequality (Goldberg and Pavcnik, 2007). Empirical evidence from the United States suggests that exporting is a skill-intensive activity (Bernard and Jensen, 1997). Harrison and Hanson (1999) also find that exporters employ a higher share of white-collar workers than non-exporting plants in Mexico.

Certain models analyzing the phenomenon of offshoring predict that it will trigger increased

inequality in developing countries. Antras et al. (2006) show that "globalization leads to the formation of international teams in which northern managers supervise teams of southern workers: offshoring". Offshoring thus permits the geographic separation of production and problem solving and the relocation of physical production in the South. It leads to the creation of routine jobs and an increase in production in the South, and to the creation of knowledge-intensive jobs or firms and a decrease in production in the North. This implies that the pattern of trade is such that the South is a net exporter of physical goods while the North is a net exporter of knowledge services. Globalization also affects the level and structure of earnings of individuals, both in the North and in the South. In particular, globalization leads to an increase in "within-worker" wage inequality, that is wage inequality among non-managers, in the South. This is the case because globalization improves the quality of managers with whom certain southern workers are matched, thus raising the productivity of these workers and increasing their wages.

Overall it appears that the particular mechanisms through which globalization affects inequality are country, time and case-specific and that the effects of trade liberalization need to be examined in conjunction with other concurrent policy reforms.

ii) How are the gains from trade distributed in industrialized countries?

With the increasing importance of the phenomenon of offshoring, the focus of the empirical literature analyzing the relationship between globalization and inequality has changed. A number of recent studies, for instance, analyze the relative importance of different aspects of globalization. In that literature a distinction is typically made between trade, offshoring and migration. As offshoring often implies cross-border movement of capital, there has been an increased interest in the gains of capital as opposed to the gains of labour from trade liberalization. The variables used to measure inequality have also changed. Recent literature has increasingly moved away from comparing the wages of blue- and white-collar workers and instead uses data based on occupational classifications or micro-level datasets that allow researchers to evaluate the "tradability" of different types of tasks or the extent to which tasks are repetitive and can easily be computerized.

Also in recent empirical studies, technology continues to be included as a factor affecting inequality and is typically found to be the main driving force of distributional changes (see Box 17).

Box 17
Inequality: how much is technology, how much is trade?

Much of the empirical work on trade and wage inequality for industrialized countries in the 1980s and 1990s focused on the relative importance of trade liberalization and technological change for explaining inequality in developed countries. Inequality was typically measured in terms of wage inequality between skilled and unskilled workers, where white-collar workers were supposed to represent skilled workers and blue-collar workers represented unskilled workers. The estimated impact of trade on the rise in inequalities differs widely across the various studies, some giving an overwhelming role to technological change and others claiming that trade was mostly responsible. Towards the end of the 1990s, Cline (1997) concluded in his overview of the relevant literature that international influences contributed by about 20 per cent to the rising wage inequality.

More recent studies also find that technological change has a higher impact than trade on inequality. International Monetary Fund (2007a), for instance, finds that technology is the main driver of inequality, in terms of the Gini index. This, in particular, is the case in developing countries, whereas the study finds that technology and globalization (in this study defined as trade and FDI together) have a similar level of negative effect on equality in industrialized countries. Technology is also found to be the main force increasing the income share of the top 20 per cent of the population and decreasing the income share of the bottom 20 per cent. The effects of globalization on both are very small. International Monetary Fund (2007b) compares the effect of technological change and globalization on the labour share of unskilled workers and finds that technological change has a dominant effect. In that study the term "globalization" embraces trade, offshoring and immigration.

Skilled versus unskilled labour

Recent waves of offshoring of skilled jobs, for instance in the IT industry, have raised awareness that high achievements in formal education do not necessarily provide a guarantee for a bright professional future. Increasingly there is discussion about which types of skilled jobs will be maintained in open industrialized economies.

In fact, the empirical literature on the link between trade and changes in wages between high and low-skilled workers has never been very explicit as to the skill levels of those taking advantage of increases in wages for skilled labour. As mentioned previously, many relevant studies have used data on the wage difference between white-collar and blue-collar workers. White-collar workers do indeed include management-level employees who have probably a high level of education. But they also include administrative staff with relatively low levels of education. In contrast, blue-collar workers may well include employees with an engineering degree. The white- versus blue-collar distinction thus only gives a rather rough approximation of skill differences and is not a very useful indicator for those wishing to adjust skill supply to changes in skill demand.

More recent studies have used data based on educational or occupational classifications, or micro-level datasets that allow researchers to evaluate the "tradability" of different types of tasks or the extent to which tasks are repetitive and can easily be computerized. Ekholm and Hakkala (2006) and OECD (2007c) are two examples of studies that define skill groups according to educational attainment. Ekholm and Hakkala (2006) analyze the effect of outsourcing on skill demand in Sweden and OECD (2007c) performs a similar exercise for Japan. Both studies distinguish three skill levels:[9] lower secondary, upper secondary and tertiary education. Both studies find that outsourcing has shifted demand away from the intermediate skill level, i.e. workers with upper secondary education.

Hijzen et al. (2005) show different results for the United Kingdom and find that international outsourcing has had a negative effect on the demand for the most unskilled workers. These authors, however, base their three skills groups on an occupational classification. In particular, they consider managers, administrators and professional occupations to be high skilled. The semi-skilled group comprises associate professional and technical occupations, clerical and secretarial occupations, craft occupations, personal and protective service occupations and sales occupations. The unskilled group comprises plant and machine occupations and "other occupations" that are considered unskilled.

A third strand of literature uses micro-level datasets and focuses on the type of tasks performed by workers. This approach and the terminology used is linked to recent theoretical work analyzing the phenomenon of offshoring in terms of "task trade" (Grossman and Rossi-Hansberg, 2006b). So far the relevant empirical work has mainly attempted to define which types of tasks can be traded and may potentially be offshored. Whether a country ends up importing, i.e. and thus offshoring, these tasks or exporting them, will – as in the case of "ordinary" good trade – depend on aspects like comparative advantage.

Van Welsum and Reif (2006) and van Welsum and Vickery (2005) argue that tradable services are characterized by four features: IT intensity, output that is IT transmittable, tasks that are codifiable, and tasks that require little face-to-face interaction.[10] Such tasks may include high-skilled jobs, such as security analysts, or low-skilled jobs, such as switchboard operators, and are not necessarily sector specific. Blinder (2007) approaches the question of tradability in a somewhat different way and focuses on two questions. First, does a worker need to be in a specific location in the home country to perform the job (for example, child care worker). If the answer is yes, the relevant job is qualified as highly "non-offshorable". If the answer is no, the second question asks whether workers have to be physically close to their work unit to perform their job. If the answer to that question is no, the relevant job is classified as highly "offshorable".[11] Van Welsum and Vickery (2005) estimate that 20 per cent of total US employment is offshorable and Blinder (2007) considers 22-29 per cent to be offshorable. Neither study provides straightforward insights into how many jobs have been or will actually be offshored.

At this stage, trade economists do not appear to have clear answers as to how trade and offshoring will affect the demand for skills in the near future. It has been argued that trade and offshoring flows may change continuously and thus lead to frequent changes in the demand for skills. This argument seems to be confirmed by signals from employer

organizations indicating that it is increasingly hard to predict which skills their members will need in only two to three years' time.

Labour versus capital

Labour income represents only a fraction of total income and studies focusing on wage inequality, such as the ones discussed in the previous paragraphs, therefore only provide limited information on changes in income inequality. Developments in the agricultural sector, which still plays a predominant role in many developing countries, are not reflected in data on manufacturing wages. In addition, wage data do not give any information on possible additional revenues of workers – for instance, through investments in shares. More importantly, changes in the returns to capital are not captured by the evolution of wage inequality. This is an important shortcoming in a time where capital is expected to obtain a disproportionately large share of the gains from globalization, leading to some concern about the divergence between capital and wage income. One of the reasons for this evolution is that with the increasing integration of very populated economies, such as China and India, the global supply of labour has significantly increased, thus exacerbating the relative scarcity of capital. As a consequence the value of capital is bound to go up (Rogoff, 2005).

In a recent study, the International Monetary Fund (2007b) analyzes the effect of globalization on labour shares (as opposed to wage inequality or income distribution). "Globalization" is measured in this study as the combination of trade, immigration and offshoring. The study also differentiates between employees in skilled sectors and those in unskilled sectors.[12] The study finds that technological change and globalization have had a negative impact on the share of workers in unskilled sectors and that the effect of technological change was stronger. The study also finds that the impact of globalization was greater on the share of workers in skilled sectors than in unskilled sectors and that this effect was mainly driven by offshoring activities.

Ochsen and Welsch (2005) analyze the factors determining the distribution of functional income in West Germany for 1976-94. They find that the shares of capital and high-skilled labour benefited from technological progress, whereas the share of low-skilled labour was adversely affected by technological progress. The effect of technology

on the two labour shares was enhanced by the substitution of intermediate inputs for low-skilled labour. To the extent that this substitution involves imported intermediates, increased trade openness hurts low-skilled labour. That is, trade seems to have hurt low-skilled labour mainly by imported intermediates taking the place of low-skilled labour. However, the overall contribution of trade to changes in income distribution was small, as the year-to-year variation in the low-skilled labour share can be attributed to input prices, technological progress and trade-induced structural change in the proportion 19:77:4.

Changes in earnings distribution: increasing dispersion at the top end

A phenomenon that has received a great deal of attention in very recent literature on income distribution is the one of increasing earnings dispersion at the top of the distribution. Lemieux (2007) describes that growth in US inequality since 1990 has been concentrated in the top end of the distribution, while inequality in the low end of the distribution has declined, at least for men. These recent developments are not consistent with standard models of technological change that were suggested as the leading explanation for the growth in inequality in the 1980s.

Atkinson (2007) examines evidence for 12 OECD countries and finds that the evolution of the income of the bottom 10 per cent of the population between 1980 and 2005 differed significantly across countries. Leaving aside eastern Europe (Poland and Czech Republic in his sample), the data do not show a general pattern of decline in the bottom 10 per cent. In France, the income of the bottom 10 per cent in the income distribution even increased. Much clearer is the rise in top earnings since 1980, and the fanning out of the upper part of the distribution. The income of the top 10 per cent rose by more than 15 per cent in the United Kingdom and the United States, by close to 10 per cent in Western Germany and by close to 40 per cent in Portugal (since 1982).

Atkinson argues that these changes at the upper-end of the income distribution can not be explained by technological change. He provides other explanations, one of them referring to the so-called superstar theory, that is associated with Rosen (1981) and has also been explored in trade literature

(Manasse and Turrini, 2001). According to this theory, technological change and trade openness give the most talented individuals the possibility to exploit their talents more widely. Accordingly their earnings rise exponentially, while less brilliant individuals experience a declining demand for their services, because technology and openness allow for demand to be redirected to the exceptional individuals. Lawrence (2008) also makes reference to the same argument when stating that "globalization more broadly construed has played some role in increasing the size of relevant markets and thus incomes of CEOs, sports stars, entertainers, and software producers". He further argues that what he calls super rich inequality has to a large extent been driven by factors of domestic origin, such as technological changes, institutional developments such as financial deregulation, changes in US corporate practices and rising asset markets.

(c) Trade, inequality and calls for protectionism

If some individuals lose or expect to lose from trade liberalization, they may want to push policy-makers towards protectionism. Those expecting to gain from trade liberalization, on the other hand, are expected not surprisingly to be in favour of trade liberalization. Depending on how policy-makers take their decisions, distributional consequences of trade reform rather than overall welfare effects may affect policy decisions. If policy-makers want to win an election and expect a majority of voters to be in favour of trade liberalization, they are more likely to pursue pro-trade policies. If policy-makers are heavily dependent on campaign contributions, their decisions may depend on whether the better-organized and better-paying lobbies are in favour of or against liberalization.

The discussion in previous sections has shown that traditional trade theory provides varying views on who would vote in favour of free trade. The Heckscher-Ohlin (H-O) framework, where there is free movement of labour across sectors, predicts that production factors that are relatively abundant in a country will gain from trade liberalization, while those that are relatively scarce will lose. In labour abundant countries, for instance, labour will gain from trade liberalization, while other owners of other factors – like capital or land owners – will lose. In the Ricardo-Viner (R-V) model, rewards tend to vary by industry of employment. In the latter set-up,

some or all employees cannot move across sectors and those employed in import-competing industries are expected to lose from trade liberalization, while those employed in exporting industries are expected to gain. The R-V model has often been considered to reflect the short-term effects of trade liberalization, while the H-O framework reflects the long term.

If trade policy is determined by a majority vote, the tariff will be determined by the sources of income of the average voter. In economies that are not perfectly egalitarian, i.e. in all economies, median voters' capital/labour endowment is lower than the relative capital/labour endowment of the overall economy (Alesina and Rodrik, 1994). Mayer (1984) has shown that in this case and if trade is of the Heckscher-Ohlin type, median voters will be in favour of positive tariffs in countries that import labour-intensive goods, i.e. industrialized countries, and will be in favour of import subsidies in countries that import capital-intensive goods, i.e. developing countries.

In practice, import subsidies are rarely observed. There are several possible explanations for this. One focuses on the fact that individuals often do not know in advance whether they will be among the winners or losers of trade liberalization. Fernandez and Rodrik (1991) show that in this case there is a tendency for voters to prefer the status quo. This occurs even in a model where everyone is perfectly informed about the overall gains and losses in each industry as the result is entirely driven by the assumption that individuals cannot predict their individual returns. Therefore, there is a tendency to apply tariffs to offset import competition and to preserve the status quo for income distribution.

Dutt and Mitra (2002) find quite strong empirical support for Mayer's median voter model based on another prediction generated by it. If the set-up is used to compare countries with varying degrees of inequality, the median voter model predicts that in capital-abundant countries increased inequality leads to higher tariffs, while in labour-abundant countries increased inequality leads to reduced tariffs. In other words, increased inequality is expected to be associated with more restrictive trade policies in industrialized countries, but with more open trade policies in developing countries. Dutt and Mitra (2002) find these expectations confirmed in their empirical analysis.

The notion that increased inequality in capital-abundant countries may lead to calls for higher tariffs also reflects the ongoing debate on protectionism in the United States. Dew-Becker and Gordon (2005) drew attention to the fact that median salaries and income in the United States had grown far less than average income in recent decades, because half of the income gains had gone to the top 10 per cent of the income distribution.[13] Scheve and Slaughter (2007) argue that stagnating or falling incomes explain the increasingly protectionist sentiment in the United States: "policy is becoming protectionist because the public is becoming more protectionist, and the public is becoming more protectionist because incomes are stagnating or falling".

There is also empirical evidence that voting or voting intentions within individual countries correspond to what the Heckscher-Ohlin framework would predict. Scheve and Slaughter (2001), for instance, find that in the United States lower skills, measured by education or average occupation earnings, are strongly correlated with support for new trade barriers.[14] Balistreri (1997) compares the predictions of the Heckscher-Ohlin framework with survey data on Canadians' views about the proposed Canadian-US Free Trade Agreement (CAFTA). He finds that individuals holding occupations that were relatively abundant in Canada were in favour of CAFTA, whereas the opposite was true for individuals in occupations that were scarce when compared with the United States.

The median voter approach applied to a Heckscher-Ohlin set-up fails to explain the frequently observed phenomenon that a relatively small industry that does not have support from the majority of eligible voters succeeds in gaining tariff protection. Mayer (1984) shows that the specific factor multi-sector model, i.e. the Ricardo Viner model, is more appropriate for studying such industry-specific efforts to raise a given tariff. In such a model, higher tariffs on a given import lead to significant gains for the average specific-factor owner in the protected industry but to rather small losses for average specific-factor owners in all other industries. The small number of big potential gainers, therefore, has much greater incentives to participate in the political process than the large number of small potential losers, whenever significant voting costs exist.

Mayda and Rodrik (2005) use cross-country datasets on attitudes towards trade to compare the validity of the Heckscher-Ohlin and the Ricardo-Viner predictions. They find that pro-trade preferences are correlated with an individual's level of education, in the manner predicted by Heckscher-Ohlin. But they also find support for the specific factors approach (Ricardo-Viner) as they find that preferences over trade are also correlated with the trade exposure of the sector in which an individual is employed. Individuals in non-traded sectors tend to be the most pro-trade, while individuals in sectors with a revealed comparative disadvantage are the most protectionist.[15]

Grossman and Helpman (1994) also use a specific-factor model in their commonly called "protection for sale" set-up. In this set-up, policy-makers care for voters' well-being but also for campaign contributions. Those involved in import-competing industries may choose to join forces and to try to influence policy decisions through campaign contributions. Grossman and Helpman (1994) show that tariffs will be higher in industries that are better organized, that have more political power (reflected in their model by a higher ratio of domestic output in the industry to net trade) and that have lower import demand elasticities (reflecting the fact that the demand for imports is less sensitive to price changes). Olson (1965) has shown that smaller groups will find it easier to organize collective action. This explains why relatively small sectors such as agriculture or textiles have received a lot of protection in industrialized economies (Krugman and Obstfeld, 2006).

Bombardini (2005) points to an empirical issue that is not explained by the Grossman and Helpman (1994) approach: data show that sectors with a larger firm size dispersion tend to have higher levels of protection. She develops a model that is able to explain this finding. In this model, firms differ in size and lobbying is costly. Her model predicts that what matters for the strength of a lobby (and therefore the equilibrium level of protection) is not the size of the sector *per se*, but the share in total sector output of those firms that make a contribution to the sector's lobby. This share of industry output produced by firms participating in the lobby, in turn, is a result of the coordination of individual firms and depends on the size distribution of firms within the sector. In other words, in sectors with larger firm size dispersion, the largest firms will hold a larger share of the total industry output and a set of lobbying firms will emerge that is in the position to appropriate a large share of the

benefits of protectionism. Their lobbying activity is behind the empirical regularity that sectors with a larger firm size dispersion have higher levels of protection.

In Bombardini's (2005) set-up, firm size determines the benefits from lobbying. "New-new" trade theory attributes an even larger importance to the notion of firm size as it links the benefits from trade reform to firm size. In particular, set-ups with fixed market-entry costs and firm variations (Melitz, 2003) yield the theoretical prediction that large firms in a given sector will support reciprocal trade liberalization while small firms will oppose it. By contrast, all firms will oppose unilateral liberalization of their final goods market. The reason for this is simple. Unilateral trade liberalization would raise the degree of competition in the local market (by allowing more firms to enter), thereby depressing market shares and profits. Therefore, all domestic firms – irrespective of their size – are expected to oppose it. When it comes to reciprocal trade liberalization, the story is starkly different. Such a liberalization yields selection and share-shifting effects that are favourable to large, export-oriented firms and detrimental to small, domestic-oriented firms. The former will support it, the latter will oppose it.[16]

2. TRADE AND STRUCTURAL ADJUSTMENT

Having an economy that is open to trade implies both the opportunity to sell goods and services to foreign markets as well as an additional source of competition from abroad. Trade openness, therefore, implies an additional source of economic "shocks" that can affect – positively or negatively – domestic firms, workers and other productive inputs. Trade liberalization and a continued openness to trade result not only in the growth of some domestic firms that take advantage of access to new markets but also the decline of other domestic firms that shrink and go out of business when confronted with a new source of competition. As firms grow or shrink, workers may leave one job to start another.

Until recently, empirical research in international trade has focused on industry-level adjustment – i.e. industries taking advantage of comparative advantage or scale economies would expand in response to export opportunities and withdraw resources from industries shrinking in the face of newfound competition from imports. However, new sources of data at the firm and worker level within these industries have allowed researchers to inquire into the adjustment process at a much more detailed level of analysis.

(a) How do import-competing firms adjust to trade reform?

One area in which there has been a recent increase in empirical research involving firms, plants and international trade is how import-competing firms respond to trade liberalization. According to standard comparative-advantage based models of trade, introduction of import competition through trade liberalization leads to a reduction in the size of one area of the economy as resources are shed and picked up in the growing sector of the economy. As observed in the earlier discussion on firms and exporters of various types, however, the theoretical predictions of representative firm models do not always match actual practice. What does the data suggest for the import-competition side of the market?

Economists have investigated a number of firm-level experiences across a variety of countries.[17] In order to address these questions, researchers have focused on countries for which firm or plant-level data was available over time and in which there was a relatively clean "natural experiment" via a trade liberalization shock.[18] Thus, there have been a number of studies assessing firm-level characteristics of the shock of trade liberalization in countries (and time periods) as diverse as Chile (1973-79), Turkey (1983-86), Cote d'Ivoire (1984-86), Mexico (1984-89), Canada (1988-96), Brazil (1991-94) and India (1991-97).

A central focus of the major studies in this literature is on what economists refer to as the "import discipline hypothesis", i.e. that an increase in trade openness forces previously shielded domestic producers to respond in ways that are efficiency- or welfare-enhancing from an economic point of view. For example, firms shielded from imports may not have faced much competition (acting as monopolists or engaging in collusive arrangements, for instance). This allowed them to charge high price mark-ups over marginal costs. Furthermore, firm-level productivity may improve for various reasons, including more competition leading to increased effort and increases in innovative activity,

with trade liberalization allowing access to imported inputs and technologies. Surveys of this literature, such as Tybout (2003), point to three central findings.

First, firm-level mark-ups of price over marginal cost tend to decline when firms are faced with increased foreign competition, a result that is consistently discovered across different countries and across differing measures of competition (for example, import penetration ratios, effective protection rates, tariff rates). The implication of these reduced mark-ups is not clear, however, and depends substantially on the underlying market structure in these countries. One potential implication of these reduced mark-ups is a reduction of market power by previously dominant domestic firms, and thus a reduction in monopoly profits. On the other hand, an alternative implication in more competitive market structures could be that reduction in the size of the mark-up creates negative economic profits for firms in high fixed-costs industries that had not anticipated that trade liberalization would lower prices to such an extent that they would not be able to cover their costs of entry.

As previously discussed in Sections C.3.c and C.4.b, a second common finding in this literature is that plants that survive the arrival of new competition from imports show a substantial improvement in their efficiency. For example, in Pavcnik's (2002) study of Chile, one-third of the increase in aggregate industry productivity following trade liberalization was associated with productivity improvements within plants, presumably as they reallocated existing resources to more productive activities.[19] A similar result is found in Trefler's (2004) research, which found that Canadian plants became more productive after increased import competition from foreign firms following Canada–US Free Trade Agreement tariff cuts.

A third result from this literature is that import-competing firms tend to shrink – in terms of output or employment – when foreign competition intensifies. For example, studies on countries as diverse as Canada (Head and Ries, 1999), Chile and Colombia (Roberts and Tybout, 1991) present evidence that an increase in import competition (evidenced by tariff reductions, reductions in effective rates of protection or increased import penetration ratios) is accompanied by a reduction in the size of very large plants in these countries.[20]

Nevertheless, there remain many unanswered questions associated with the impact of trade liberalization on the behaviour of domestic firms competing with imports. First, while the result of trade liberalization may be a substantial increase in industry-level productivity and lower prices that generate across-the-board gains to consumers, Erdem and Tybout (2003) point out that researchers have not yet addressed the question of the short- and long-term costs associated with this efficiency gain. Knowledge about the associated costs is important because it has implications for domestic policy-makers when it comes to designing complementary adjustment policies that may help workers find new jobs. This is a severely under-examined area in the research literature.

Second, there has been relatively little formalized examination of the idea that increased openness – involving increased access to varieties of inputs – leads to firm-level productivity gains. Finally, as has been made clear regarding the evolution of the literature on exporting firms described earlier, it is highly likely that researchers do not even know what information is missing. It is only through additional access to increasingly detailed data and creative empirical approaches to difficult measurement and estimation issues that research will be able to provide additional insights.

Another line of research has also examined how other countries have responded to different types of changes in economic conditions that have affected their import-competing sectors. For example, while the United States did not experience a drastic trade liberalization "shock", Bernard et al. (2006c) examine the firm-level response in US manufacturing industries in the wake of increased competition from low-wage countries over the 1977-97 period.[21] This US line of research mirrors the research described earlier regarding the response of exporting firms to globalization. Researchers examined how firms adjusted to the new environment presented by globalization – for example, by exiting the market, reallocating inputs within industries, or changing the product mix within industries. They found that greater exposure to low-wage country imports is negatively associated with plant survival and employment growth. In terms of different firms (plants) within the same industry, they found that greater industry exposure to low-wage country imports led to a bigger difference in the relative performance between capital- and labour-intensive plants. Finally, they examined data on products that

plants are producing over time and infer a positive association between exposure to low-wage country imports and industry switching into products that are less likely to compete with imports from low-wage countries.

An example of a particular industry in the United States that has undergone adjustment following trade liberalization is the textile sector. Using plant-level data, Levinsohn and Petropolous (2001) find that more intense international competition has led to a substantial restructuring within the industry. Textiles has experienced a tremendous capitalization and a reallocation of inputs used to produce output that competes with foreign-produced goods. While they note that industry productivity has increased substantially because individual plants are becoming more productive, much of the effect appears to be driven by a reduction in reliance on labour and an increased use of capital.

(b) How do labour markets adjust to trade-liberalizing reform?

The previous section illustrated how the adjustment process associated with globalization can have different effects on firms within an industry, depending on the firm's characteristics. Similarly, there is increasingly interesting and important research that examines the effects of trade liberalization on labour markets. As was observed in the case of firm-level versus industry-level studies, one observation is that much more upheaval in the labour market appears to take place within sectors rather than across sectors in response to trade liberalization.[22]

Like the previous literature on firms, this research on labour markets is largely focused on activity in a number of developing countries that have experienced substantial episodes of trade liberalizing reform. The research attempts to identify the adjustment response of workers in sectors that, after a substantial cut in the import tariff, find themselves facing an increase in import competition. The research focuses on countries where episodes of large-scale trade liberalization have been accompanied by the collection of household survey information. This allows the researchers to assess various channels through which trade liberalization may subsequently affect the labour market. This includes examining employment changes both within and across industries as well as between

the formal and informal sectors of the economy, and looking into changes in wages facing these workers.

One country that has been examined in detail is Colombia because of its trade liberalization in the 1980s and the availability of household data from the Colombian National Household Survey, which records labour market experiences in a variety of sectors (and how this might correspond to changes in trade policy). Attanasio et al. (2004) are unable to find any evidence that industry-level employment is affected by the shock of import liberalization. They conclude that there is little labour reallocation across industries in the aftermath of the Colombian trade reforms. This is somewhat surprising given the predictions of models of international trade.[23] On the other hand, Attanasio et al. (2004) and Goldberg and Pavcnik (2005) document that there is evidence of larger reductions in the "wage premium", i.e. the industry-specific component of a worker's wages that is not explained by their individual characteristics, for sectors with larger tariff cuts.

The surprising stability in the share of industry employment before and after reforms suggests that there may be other ways that the labour market is being affected in addition to wages. One such possibility is through increases in the size of the "informal economy" – typically defined as the sector of the economy where there are no worker benefits and no enforcement of labour market regulation (for example, workers' rights, minimum wages, etc.) – and thus through changes in the quality of jobs that workers take on as employees move out of the "formal" labour market and into the "informal" market. In countries that researchers have recently studied, such as Brazil and Colombia, the informal economy possibly plays an important role as there is evidence that it has been growing (as a share of the overall economy) during the period of trade reforms. Nevertheless, as the growth of the informal economy could have been caused by other factors unrelated to trade liberalization – for example, growth of the services sector in which informal labour markets are more predominant or simultaneous labour market reforms in these economies – an answer to the question of any link can only be found through a careful econometric examination of the data.[24]

Goldberg and Pavcnik (2003) examine whether trade liberalization leads to the growth of the

informal economy by exploiting cross-sector variation in the size of tariff cuts undertaken as part of the liberalization reform. They are unable to find a robust link between trade liberalization in Brazil and Colombia and the shift of workers into the informal economy. The only potential evidence that they find is during a period in Colombia in which it had substantial labour market rigidities. Nevertheless, in the period under which Colombia's labour market reforms took place, the positive relationship between trade liberalization and the growth of the informal economy within an industry is severed. Thus they conclude that at least in these particular countries' trade liberalization episodes, any change in the underlying composition of labour market activity away from the formal economy to the informal economy is not related to the size of the tariff cuts. Labour market regulations are more likely to have a direct impact on employment activity.[25]

(c)   What happens to workers after trade reform according to survey data?

At the same time that economic research has increasingly been able to study at the "micro-level" how individual firms and plants adjust to changes in the trading environment, micro-level data has also allowed researchers to examine how individuals adjust. This topic is arguably important as the development of domestic policies aimed at easing the adjustment burden facing individuals as a result of globalization may benefit from access to this analysis. This sub-section describes the findings of this research as well as some of the limitations of this research area.

Substantial research has analyzed questions on the characteristics of workers who lose their jobs, their chances of re-employment and the adjustment process that workers face after losing their jobs.[26] Here we focus on what researchers have discovered about workers who lose their jobs for trade-related reasons.

A very sophisticated analysis for the United States involves Kletzer (2001) using data from Displaced Worker Surveys from 1979 to 1999 to examine whether individuals who experience job loss for trade-related reasons are systematically different from workers who experience job loss for "other" reasons.[27] Her research explores a number of important questions, including whether there

are important characteristic differences between these categories of workers and whether there are important differences in terms of re-employment between these categories of workers after job loss. For example, in a country such as the United States which has a separate Trade Adjustment Assistance (TAA) programme for workers who lose their jobs for trade-related reasons, the answers to these questions have the potential to be very useful to policy-makers active in this area.

Her research on the characteristics of the two types of workers – displaced for trade-related and non-trade related reasons – in US manufacturing suggests the following. On average, the two groups appear quite similar in many respects – while import-competing workers are slightly older, they have similar levels of job experience as well as educational attainment. The main difference is that trade-displaced workers in manufacturing are much more likely to be women. The primary explanation for this relates to the fact that the US industries facing the heaviest competition from imports during this period (for example, footwear, and clothing) employed a higher ratio of women. The evidence for European workers appears to be quite similar (OECD, 2005b, Table 1.2).

The next important question seeks to provide evidence on whether there are substantial differences in re-employment across the two categories of displaced workers. The evidence presented by Kletzer (2001) from the Displaced Worker Surveys in the United States suggests the following. Within the manufacturing sector, both categories were re-employed at quite similar rates, in the 63 to 68 per cent range at the time of the follow-up survey. However, there was a statistically significant difference between the general re-employment rates of men (69 per cent) and women (56 per cent) within manufacturing. As workers who lost their jobs from one plant in an industry may find it less costly to re-employ at a different facility within the same industry in the short term (i.e. in the absence of any changes in their skills), this lower re-employment rate for women probably reflects the fact that they are more likely to be employed in a manufacturing industry with stiff import competition in the first place – i.e. an industry in which there is not as much overall re-employment taking place.

On the other hand, OECD (2005b, Table 1.3) reports that re-employment rates for displaced European workers in manufacturing are much

lower (52-57 per cent) than is the case in the United States. The authors attribute this to potentially less flexible European labour markets. Nevertheless, when it comes to the question of whether there is a differential in re-employment between trade-displaced and other displaced workers in Europe, there is not a substantial difference between these groups.

Another important question regarding re-employment for these different categories of workers is the wage they receive once they are re-employed. Kletzer (2001) reports that there is not much difference between re-employment wages across the two categories of workers in the US manufacturing sector. It is useful to examine in more detail what happens to earnings among trade-displaced workers. Kletzer finds that, among trade-displaced workers in manufacturing, the average weekly earnings loss is 13 per cent, although there is also substantial variation in this loss across different types of workers. She presents evidence that 36 per cent of the trade-displaced workers either suffer no wage loss or observe a wage increase after re-employment, while 25 per cent of the trade-displaced workers observed an earnings loss of 30 per cent or more. Those that suffered the larger earnings losses were more likely to be older, have longer work experience and be lower-skilled production workers.

A final question examines the sectors in which these two categories of displaced workers become re-employed. Kletzer (2001) again finds little difference between trade-displaced and other displaced workers in this respect. Nevertheless, it is interesting to examine where import-displaced workers are re-employed as the basic trade model predicts that workers who lose their jobs in import-competing industries would move into exporting industries that are simultaneously expanding to take advantage of access to new markets. The data for the United States show that while 50 per cent of re-employed trade-displaced workers find jobs in manufacturing, only a small share of them are re-employed in export-intensive manufacturing. Only 10 per cent of displaced workers find new employment in the retail sector, although the data suggest that earnings losses are greatest for those that are re-employed in this sector. Earnings losses are smallest for those that find re-employment within the manufacturing sector. Similar results are evident for the re-employment of European workers (OECD, 2005b, Table 1.4).

Regarding the US Trade Adjustment Assistance (TAA) Programme,[28] Decker and Corson (1995) assess whether inclusion of a new worker retraining option in a 1988 revision to the programme affected re-employment opportunities for trade-displaced workers. They compare unemployed workers that received TAA before the 1988 reform with workers that received TAA after the reform. The authors are unable to provide evidence that training had a substantial positive impact on earnings of the workers being trained under the TAA programme. Although not pursued in this particular study, it would also be interesting to know more about the experiences of two sub-categories of trade-displaced workers – i.e. one that applies for and receives TAA and one that does not – in order to assess the outcome of such specially tailored policies beyond simply the effectiveness of introducing a training component.

(d) How do potential exporting firms adjust to new foreign market opportunities?

As an earlier section described in extensive detail, a number of interesting characteristics of the differences between exporting and non-exporting firms have come to light by examining firm-level data. This section briefly considers what this research literature says about how such firms adjust once the opening of foreign markets creates the possibility to export. Some of this research has important implications for policy, especially in terms of structuring Aid for Trade.

One of the earliest and most robust results found across the various countries studied in this literature is that exporting firms are more productive than non-exporting firms. This is by and large a "selection" effect, with the more productive firms choosing to become exporters, while less productive firms choose not to.[29]

Nevertheless, a recent study by Lileeva and Trefler (2007) presents some of the first evidence that some exporters do become more productive after the decision to export has taken place.[30] Studying Canada's trade liberalization experience under the Canada-US Free Trade Agreement (CAFTA), they find that the lower-productivity Canadian plants that were prompted by tariff cuts to start exporting managed to increase their labour productivity after exporting began. Furthermore, the authors identify

potential mechanisms through which this "learning by exporting" result may occur: plants engaged in more product innovation after exporting and had high adoption rates of advanced manufacturing technologies.

In addition to exporters adjusting by making changes that may affect their productivity, the extremely detailed data in some of these studies will allow future research to identify the extent to which firms may make adjustments both to respond to opportunities and to overcome challenges presented by exporting. For example, data on product-level transactions undertaken by individual firms will help to shed light on the relative importance of various fixed costs to exporting. In particular, are they specific to products or to market destination?[31] Future research using new techniques and newly available data could help to improve understanding of how firms competing in global markets are adjusting.[32]

Missing from this literature is information on firms outside the manufacturing sector. In particular, because of data limitation, empirical economic research has contributed little so far to understanding whether firms in service industries have important similarities or differences to manufacturing firms. Similarly, most of the extremely detailed information on exporting firms relates to developed economies. While a number of the basic findings about productivity and firm sizes have largely been confirmed when examining exporting and non-exporting firms in other countries as well, there are new potential avenues of research, especially in the case of developing countries, that would be worth pursuing. For example, Tybout (2000) provides some extremely interesting information about variations in the size of manufacturing firms in developing countries, which may result from a tradition of protectionism and heavy domestic regulation. He finds that oligopolies of extremely large plants with large market shares co-exist with a set of very small plants that are unwilling and/or unable to grow in order to take advantage of economies of scale. So how can such firms possibly overcome the challenges of becoming an exporter?

3. TRADE AND POVERTY

One of the biggest challenges facing the world community today is how to eradicate poverty in the world. Under the Millennium Development Goals, the international community has committed to reduce poverty by half by 2015 with several key targets relating to trade. Trade reform has long been part of national economic policy packages aiming at promoting economic efficiency and growth. Trade liberalization creates many new opportunities. Both theory and empirical research have well documented the long-term benefits from improved resource allocation and efficiency that follow from trade liberalization. Trade openness is believed to have been central to the remarkable growth of developed countries since the mid-20th century and an important factor behind the poverty alleviation experienced in most of the developing world since the early 1990s (see Table 16).

While it is widely acknowledged that trade liberalization has the potential to help the poor increase their income and expenditure, it is also known that trade liberalization tends to create some losers. Is it possible that the poor are among the losers or that low-income groups are pushed into poverty? If yes, how does this happen and can it

Table 16
Percentage of population below US$ 1 (PPP) per day

	1990	1999	2004
Developing regions	31.6	23.4	19.2
Northern Africa	2.6	2.0	1.4
Sub-Saharan Africa	46.8	45.9	41.1
Latin America and the Caribbean	10.3	9.6	8.7
Eastern Asia	33.0	17.8	9.9
Southern Asia	41.1	33.4	29.5
South-Eastern Asia	20.8	8.9	6.8
Western Asia	1.6	2.5	3.8
Commonwealth of Independent States	0.5	5.5	0.6
Transition countries of South-Eastern Europe	<0.1	1.3	0.7

Source: MDG Report 2007, United Nations.

be avoided? This sub-section tries to answer these questions by examining a number of ways that trade can affect the most vulnerable groups in society. It discusses whether trade liberalization, in the short term, can harm poorer individuals and whether, even in the longer term, successful open trade regimes may leave some people trapped in poverty.

Although the relationship between trade liberalization and poverty has received considerable attention in recent years, establishing the precise link between changes in trade policy and the overall effects on poverty has proven to be a difficult task. One of the difficulties lies in the fact that trade affects individuals in various ways. It may affect their income – through effects on employment, distribution of resources and/or growth – and it may affect their expenditure through its effect on the prices of consumer goods (Winters, 2006). Trade reform may also affect the poor through its impact on government revenue and spending. The combined impact of these different effects tends to be difficult to assess. This may explain why most of the evidence on trade and poverty is indirect evidence that focuses on one or two of the ways that trade may affect poverty (Harrison and McMillan, 2007). There are surprisingly few studies on the direct linkage between trade and poverty.[33]

The structure of this sub-section reflects the economic literature on the ways that trade reform affects poverty. It starts with a review of recent studies examining the linkage between trade, growth and poverty. It then focuses on how poverty is affected by entrepreneurial activity or labour market (through profits, wages and employment), by household consumption and production (the transmission of changes in prices to households) and by government (where trade reform affects government revenues and thus possibly the scope for more spending on the poor or where it leads to taxation that may put a disproportionate burden on the poor – see Section C.4.

i) Trade, growth and poverty

One of the main channels through which trade reform affects growth is by reducing the anti-export bias of trade policy and leading to a more efficient allocation of resources. However, this is a one-off gain in efficient allocation and need not affect the economy's long-term growth rate. In the long term, trade liberalization can affect the economy's rate of growth by creating incentives for investment. In addition, trade reform usually encourages innovation and FDI, which can result in the acquisition of advanced technologies and new business practices that increase overall productivity and growth in domestic firms (see Section C.4).

Much has been written on the link between trade and growth from both a theoretical and an empirical perspective and this linkage has been the subject of some controversy. The finding that trade openness, broadly defined, promotes growth, as reported by Dollar (1992), Sachs and Warner (1995) and Dollar and Kraay (2002), has been questioned by Rodriguez and Rodrik (1999) on the grounds that their measures of trade liberalization and their econometrics are inconsistent.

In their controversial study, Dollar and Kraay (2002) find a positive relationship between trade, growth and poverty reduction. The authors select a group of countries that they call "globalizers"; countries with large tariff reductions and a high trade to GDP increase since the 1980s. For this group of countries, they establish a positive link between the change in trade volume and growth rates. Furthermore, looking at the distribution of the gains from increased growth they find that the income of the poorest fifth of society increases proportionally and conclude that trade is good for the poor.[34] The reliability of findings such as the one in Dollar and Kraay (2002) on the basis of cross-country studies has been questioned, but the result has been replicated in time-series analysis for individual countries. Tsai and Huang (2007), for instance, find a one-to-one relationship between the growth of the average income of the bottom 20 per cent of the population and growth of the mean income of Taiwan's population over the period 1964-2003. Their findings also suggest that trade has contributed to increasing the mean income of the poor, not only through its impact on growth, but through a positive impact on distribution, i.e. on the share of income accruing to the poorest fifth of society.

Other studies have used more sophisticated methods to examine the relationship between growth and poverty. Ravallion (2001) estimates the link between growth and poverty by using data from household surveys of several developing countries. The estimated "elasticity" of poverty – measured as US$ 1 per day – is positive. Hence, growth reduces poverty on average. However, an examination

of the variance of the result suggests that the poverty-reducing effect is more pronounced for some countries than for others. Datt and Ravallion (2002) perform a similar analysis using a sample of 15 states in India. They find a positive relationship between non-farm output and poverty alleviation, with large variations across states. In particular, they find that the poverty-reducing effect of growth was lower in states with low levels of initial rural development and education.

In pursuing an even more ambitious approach, Cline (2004), merges estimated links between growth and trade, and country-specific links between poverty and growth with General Equilibrium (GE) analysis of global trade liberalization.[35] This permits him to create an estimate of the aggregate long-term poverty reduction that might arise from such reforms. His estimates are large, totalling nearly 650 million people – the majority in Asia – where the absolute number of poor (based on a US$ 2 per day 1999 purchasing power parity (PPP) poverty line) is large and trade growth is relatively high following multilateral trade liberalization. However, Cline's growth-based estimates of poverty reductions stemming from trade liberalization are considerably larger than those obtained by the World Bank Development Prospects Group (World Bank, 2004).

ii) Labour markets: the factor price, income and employment link

The previous paragraphs emphasized the potential role for trade in stimulating growth and thus indirectly increasing the income of the poor. But trade also affects labour markets and may influence relative incomes through this channel. Lopez (2004), for instance, differentiates between the short- and the long-term impact of different policies and finds that trade openness raises inequality and stimulates growth at the same time. He, therefore, refers to trade liberalization as a win-lose policy.

As discussed before in Section C.1.b, the effect of trade liberalization on labour markets has traditionally been discussed in the framework of the Stolper-Samuelson theorem (Samuelson and Stolper, 1941) which suggests that the "abundant factor" should see an increase in its real income as a consequence of a country opening up.[36] This reasoning has been used by some authors, such as Krueger and Berg (2003) and Bhagwati and

Srinivasan (2002), to support the idea that trade liberalization benefits unskilled labour, and thus the poor, in developing countries. Yet, the discussion in Section E.1 above has shown that there is evidence for both increased and decreased inequality in developing countries following trade reform.

The effect of trade reform on labour markets in developing countries may also be more complex than suggested in traditional trade theory because of the particularities of those labour markets. Developing countries tend to have a large pool of informal labour, and the poor often form part of that informal labour force. If trade increases the demand for labour in the formal economy, this can lead to a reduction of poverty in two ways. First, if the wage in the formal economy is higher than in the informal economy, an increase in formal employment reduces the number of people in poverty. The second scenario assumes that the wage in the formal economy is equal to the subsistence wage or the wage in the informal economy. Subsequently, a shift in labour demand reduces poverty only if the implicit wage in the subsistence or informal economy increases following trade liberalization either due to a reduction of labour supply in the subsistence sector or a reduction of overcrowding.[37]

Another issue, not discussed so far, is the potential effect of rigidities in labour markets. Traditional trade models expect workers to move easily from (import-competing) sectors where employment declines to (exporting) sectors where employment increases. But numerous studies have observed a lack of movement of labour following trade reform. This is the case in Revenga (1997), Harrison and Hanson (1999) and Feliciano (2001) for Mexico and Currie and Harrison (1997) for Morocco. Labour market rigidity may lead to temporary unemployment, with potentially severe consequences for the poor. In this context, Winters (2000) calls for an increased focus on transitional unemployment as a possible consequence of both trade reform and labour market rigidity.

Hertel and Reimer (2005) emphasize in their overview that labour market rigidities may be one of the explanations for the increase in "horizontal" rather than "vertical" inequality that has been observed in the study by Ravallion and Lokshin (2004). In this study of prospective trade reforms in Morocco, they distinguish vertical inequality (impacts on households at different income levels) from horizontal inequality (impacts on households

at the same initial income level), and find that the latter tends to dominate in their results. This finding reflects the fact that households with identical consumption patterns and identical income levels may be affected differently by trade reform if they draw their income from different sources.

iii) Prices, household consumption and production

The trade and poverty literature has paid particular attention to the effect of trade on agricultural prices and their effect on poor households. This is the case because food represents a particularly large share of expenditure for poor households. In addition, in most developing countries a large share of poor households lives in rural areas and are agricultural producers either for subsistence or at a commercial level. Changes in agricultural prices may, therefore, affect poor households differently, depending on whether they are net consumers or net producers of agricultural products.

If trade leads to an increase in agricultural prices, this is likely to be good news for net producers of agricultural products, who are likely to increase production. Such price increases may also prompt some rural households to start selling crops on the market rather than using their entire production for subsistence. In other words, net consumers of agricultural goods may turn into net producers. Those who remain net consumers, however, are likely to be affected negatively by an increase in agricultural prices.

Several studies have, indeed, found that poor urban households are affected differently by changes in agricultural prices than poor rural households. Analyzing the effects of the financial crisis in Indonesia, Smith et al. (2000) find that full family income in urban areas fell by twice as much as in the rural areas (43 per cent versus 21 per cent) during the first year of the crisis. Friedman and Levinsohn (2001) come to a similar finding. They find that almost all Indonesian households suffered strongly from the crisis, but the impact on the urban poor was more severe. Their explanation is that poor rural households were able to offset some of the effect by subsistence farming. Ackah and Appleton (2007) analyse the effect of higher food prices in Ghana following trade and agricultural reform beginning in 1983. They report that the rural poor do not suffer more than the rural non-poor. On the other hand, the urban poor are worse off by a change

in prices. Minot and Goletti (2000) simulate the effect of the elimination of an export quota on rice in Vietnam and find that urban and rural non-farm households would be hurt by the resulting increase in rice prices, while farmers would gain.

The impact of agricultural trade liberalization will also depend on the extent to which the prices of inputs are affected, with reductions in input prices being more likely than reductions in output prices to affect poor households in rural and urban areas equally. Klytchnikova and Diop (2006) analyze the impact of the liberalization of trade for irrigation equipment and fertilizers in Bangladesh during the early 1990s. They find that liberalization resulted in significant increases in rice productivity, which was associated with significant declines in rice prices for both producers and consumers. In their study, this price decline benefited both urban and rural poor households as they turn out to be net consumers. Large net sellers, on the other hand, are among the better-off households in rural areas in their samples and those households lost from liberalization. Gisselquist and Grether (2000) also analyze the case of liberalization of trade in agricultural machinery in Bangladesh. In addition, they examine the effects of the deregulation of seed production and trade in Turkey during the 1980s. The two case studies lead them to conclude that the deregulation of the trade of inputs can lead to significant increases in the range and quality of inputs available to farmers, which in turn raises productivity and income.

Reaction to price changes triggered by trade is not always immediate. It is sometimes also lower than expected because price changes occurring at the border are not necessarily fully transmitted to producers and consumers in the country. With respect to the first point, the study by Ravallion (1990) addresses both the short- and long-term impact of an increase in the price of rice on rural wages and poverty in Bangladesh. Based on his short- and long-term estimates of wage elasticity, he concludes that the average landless poor household loses from an increase in the rice price in the short term (when wage increases are relatively small), but gains in the long term (after five years or more), as wages, with respect to the price of rice, rise over time. Porto (2005) looks at the responses of households – net producers or net consumers – to trade reforms in rural Mexico. In a static scenario, net producers should benefit from an increase of prices, whereas net consumers are worse-off because they have to reduce consumption. In a

dynamic environment, consumers can switch their consumption to less expensive goods (substitution effect). Furthermore, former net consumers might increase or start production of the product that has increased in price. As a result, they turn into net producers and gain from the price increase. Porto (2005) finds that the dynamic gains of an increase in price outweigh the losses and thus make rural households better-off.

The transmission of border price changes to producers and consumers may differ between industrialized and developing countries due to differences in transport costs and other costs of distribution. In their survey of the empirical evidence on trade liberalization, Winters et al. (2004) highlight the important role of transactions costs between the border and the consumer or producer. They argue that price transmission is likely to be particularly ineffective for poor people living in remote rural areas and that producers or consumers in these areas may, in extreme cases, be completely insulated from changes taking place at the border.

A study by Arndt et al. (2000) in Mozambique underscores the empirical significance of marketing margins in low-income countries. The authors report producer-consumer margins as high as 300 per cent and argue that this tends to discourage rural households from participating in markets, hence limiting the potential impact of trade reforms on their livelihood. Along similar lines, Nadal (2000) explains that the lack of a fall in corn production in Mexico following price decreases due to the North American Free Trade Agreement (NAFTA) liberalization was due to the fact that Mexican corn was produced largely for subsistence purposes. De Janvry et al. (1991) also show that missing markets for labour and staple foods substantially dampen the supply response of Mexican peasant households to price changes for cash crops like corn. To this end, de Janvry et al. (1991) conclude that most small Mexican corn producers are hardly affected by price declines under the early 1990s NAFTA.

Nicita (2004) simulates the effect of Mexican tariff changes, allowing for a differential pass-through by region based on a measure of distance to the United States, the primary source of Mexican imports for many products. In line with most of the relevant literature, he finds incomplete pass-through of tariff change to consumers, with the extent of pass-through being smaller for agriculture than for manufactured goods. Ultimately, agricultural

tariff cuts have little or no impact on the more remote regions of Mexico. Nicita (2004) argues that his findings are due to high transportation costs, making local production more profitable in regions further from the border.

iv) Tax revenue and social expenditure

Winters et al. (2004) identify the effect of trade liberalization on government revenue as one of the key concerns for many developing countries. Indeed, the share of trade taxes in total revenue is negatively associated with the level of economic development, with many low-income countries earning half or more of their revenue from trade taxes. Trade liberalization thus has the potential to significantly reduce government revenue, with possible repercussions for the poor.

One response to declining tariff revenues is to seek alternative sources of revenue. Depending on the choice of tax replacement, the poor may be adversely affected (Hertel and Reimer, 2005). This is highlighted by Emini et al. (2005) for the case of Cameroon, where the authors simulate the impact of different tax-replacement tools on poverty. They view a rise in value-added tax (VAT) as the most likely tax-replacement tool and find that this tool is favourable to the poor because they consume disproportionately goods that are favoured by the exemptions in Cameroon's VAT scheme. When a uniform consumption tax is used instead, the impact of trade reform on poverty is quite adverse.

Baunsgaard and Keen (2005) analyze data on tax revenues in a search for evidence on whether countries have actually recovered from other sources the revenues lost from past episodes of trade liberalization. They find that high-income countries clearly have done so and that for middle-income countries, recovery has been in the order of 45-60 per cent. Troublingly, however, revenue recovery has been weak in low-income countries, recovering at best 30 cents of each lost dollar in trade tax revenue.

If losses in tariff revenue are not fully recovered, public expenditure may have to be cut. The question arises as to whether the poor are likely to be adversely affected by this. Winters et al. (2004) conclude from the literature on structural adjustment and public expenditure that social expenditure has tended to be relatively protected, when compared

with capital expenditure in countries reducing public expenditure. Looking at the evidence on public expenditure in sub-Saharan Africa, for instance, Sahn (1992) does not find any evidence of systematic increases or decreases in real levels of total and social sector expenditures, or in social sector spending as a share of total expenditure.

Reductions in government expenditure may also be offset partially by increases in private investment. This is illustrated by Dorosh and Sahn (2000), who use a CGE approach to examine the consequences of macroeconomic policy reform on real incomes of poor households in Cameroon, the Gambia, Madagascar and Niger.[38] They simulate a cut in real government expenditure by 10 per cent and find that urban households are affected more than rural households because government employment is concentrated in urban areas. But they also find that increases in private investment partly offset the decline in government expenditure, with increases in private investment reaching 4.5 per cent in Cameroon and even 20.3 per cent in Niger.

v) Trade and poverty: lessons from economic research

This short overview of the literature on trade and poverty highlights that the linkages between trade and poverty are multiple and complex. It is, therefore, hard to predict the effects of trade reform on poverty, and past experiences have shown that those effects are not necessarily uniform across the developing world. Although empirical evidence suggests that trade liberalization tends to reduce poverty rates, there is ample opportunity for policy-makers to exploit further the positive linkages. The discussion in this sub-section has also shown that some of the poor may actually become worse-off even when poverty rates decline, and this should be a matter of concern to policy-makers. Among the numerous tools that can be used to stimulate the positive effects of trade reform, those affecting transaction costs and supply constraints are those most related to trade policy. Not surprisingly, therefore, both researchers and policy-makers dealing with trade issues have examined these policy tools in the context of trade reform in developing countries, as discussed in more detail in Section F.

4. CONCLUSIONS

Policy reforms usually do not affect all individuals equally. Trade reform is no exception to this rule. Although trade reform tends to create gains for the overall economy, those gains are unlikely to be distributed evenly. Traditional trade theory made rather straightforward predictions as to the distribution of the gains from trade: comparative advantage would determine the competitiveness of individual sectors, leading some to export and others to import; short-term effects on workers would reflect the sectoral impact of trade reform, while long-term effects on revenues would differ across production factors and would depend on the countries' relative endowments of these factors. For developing countries, the prediction was that sectors intensively using low-skilled labour would export and that this would lead to gains for low-skilled workers. Inequality was, therefore, expected to decrease in developing countries, while the opposite was likely to happen in the industrialized world.

Recent research presents a much more complex picture of the changes that trade liberalization is likely to trigger and of the resulting consequences. In particular, recent research emphasizes that firms within a given sector are not identical and that it is necessary to analyze individual firms to understand export behaviour. This literature predicts that exporting firms are likely to be found within all sectors and that all sectors also contain firms that suffer from trade liberalization and reduce production. As a result, the effects of trade reform on production can no longer be explained along sectoral lines. There are indications that the increasing importance of offshoring in the services sector reinforces this phenomenon.

According to recent research, the effects on workers' revenue and employment are likely to be more complex than initially thought. For a long time, trade economists used to think of workers as being divided into clear categories and typically only made a distinction between "low-" and "high-" skilled workers. Trade was expected to affect all workers within a given category in the same way. Empirical evidence has shown that this is not the case and that workers with apparently similar qualifications or with similar occupations can earn very different wages depending on where they work. Yet, what is relevant is not in which sector they work, but rather whether they work for a company that exports or not,

as exporting companies systematically pay higher wages. While traditional trade theory predicted that the effects of trade on wages would be different for industrialized and developing countries, some strands of recent literature emphasize mechanisms that trigger similar effects across countries. These mechanisms could explain why increases in inequality have been observed after trade reform in certain developing countries. Recent empirical work also reflects the need for more nuanced definitions of skill difference in order for research to generate useful policy guidance.

With respect to the effects of trade on developing countries and, in particular, the poor in developing countries, there seems to be agreement that those effects are likely to be country and situation-specific. In general, however, empirical evidence continues to support the idea that trade is good for the poor, although trade is likely to affect individual households differently. The strength of the poverty-reducing effect of trade appears to be country-specific and will to a large extent depend on the policies accompanying trade reform. This is one of the subjects which will be discussed in more detail in the next section.

Endnotes

[1] This section does not deal with the distribution of wealth between nations, that has been raised, for instance in the debate trigger by Samuelson's (2004) argument that certain types of technological change in developing countries may have negative effects on industrialized countries' wealth in a free trade regime.

[2] To be more precise: it depends on countries' relative factor endowments.

[3] According to the Stolper Samuelson theorem, some wages may even go down in absolute terms.

[4] See Section C.3 of this Report.

[5] See the discussion in Section C.1.d on offshoring.

[6] See (Baldwin and Robert-Nicoud, 2007) for a more exhaustive discussion of how the different channels interact in a set-up with two sectors and two production factors.

[7] Wacziarg and Wallack (2004) focus on the pattern of reallocation of labour following trade liberalization. They examine the impact of trade liberalization episodes on movements of labour across sectors for 25 countries, mainly developing and transition economies, and find weakly negative effects of liberalization on the extent of intersectoral labour shifts at the economy-wide 1-digit level of disaggregation. They find increased sectoral change after liberalization at the more disaggregated 3-digit level within manufacturing, although the estimated effects are statistically weak and small in magnitude. They also find that the effects of liberalization on labour shifts differ across individual countries, in a way related to the scope and depth of reforms.

[8] See Section C.3.

[9] Scheve and Slaughter (2007) distinguish seven educational categories for US workers – high school dropout, high school graduate, some college, college graduate, non-professional master's, Ph.D., and M.B.A./J.D./M.D. They argue that only those in the last two categories, with doctorates or professional graduate degrees, experienced any growth in mean real money earnings between 2000 and 2005. Workers in these two categories comprised only 3.4 per cent of the labour force in 2005, meaning that more than 96 per cent of US workers are in educational groups for which average money earnings have fallen. In contrast with earlier decades, since 2000 even college graduates and those with non-professional master's degrees – 29 per cent of workers in 2005 – suffered declines in mean real money earnings. They do not analyze the causes of those reported changes in inequality.

[10] In a paper that analyzes how the increased use of information technologies has affected the demand for different skills, Spitz-Oener (2006) classifies tasks along related lines. She finds that in Germany information technologies have acted as a substitute for routine activities – be they cognitive or manual – and have complemented interactive and analytical activities.

[11] In addition, Blinder (2007) distinguishes two intermediate categories.

[12] Data for labour shares do not allow the authors to differentiate between skilled worker and unskilled workers directly.

[13] See also the discussion on increases in the income of the top decile in the previous section.

[14] Their measure for trade-policy preferences comes from the National Election Studies (NES,1993) survey, an extensive survey of political opinions based on an individual-level stratified random sample of US population.

[15] Studies that have found support for the specific-factors model include Magee (1978), Irwin (1994) and Irwin (1996).

[16] Do and Levchenko (2006) use this set-up in a political economy model explaining the relationship between openness and the quality of institutions. In particular, they assume that the quality of institutions determines market entry costs, with market entry costs being lower in countries with better institutions. The larger a company the easier to cope with market entry costs. Large companies may therefore favour bad institutions, as high market entry costs keep their smaller competitors out of the market and increase their market power. In this model openness may either increase or decrease the quality of institutions. According to the authors the detrimental effect of trade on institutions is most likely to occur when a small country captures a sufficiently large share of world exports in sectors characterized by economic profits.

[17] This section draws on influential surveys such as Tybout (2003) and Erdem and Tybout (2003). Examples of country-level studies include Chile (de Melo and Urata, 1986; Pavcnik, 2002); Mexico (Tybout and Westbrook, 1995), Canada (Trefler, 2004), Brazil (Muendler, 2004), India (Krishna and Mitra, 1998), Turkey (Levinsohn, 1993), and Cote d'Ivoire (Harrison, 1994).

[18] By "clean", what economists mean is that the policy change was unanticipated by firms, to reduce concerns over endogeneity between the policy change and the economic measures being examined. Nevertheless, in

many of these country studies other important policy changes were occurring within the economy in addition to trade liberalization, which therefore weakens the ability to draw inference that changes in firm-level activity were caused by trade liberalization alone, or whether they also may be related to other simultaneous changes to domestic policies occurring as well.

[19] The other two-thirds of the increase in Chilean industry productivity was associated with the change in relative firm size within the industry – i.e., the growth of firms that began with high-productivity and the shrinkage of low productivity firms – in the face of new competition introduced by liberalization.

[20] Tybout (2003) rationalizes the apparent contradiction in the findings that, in the presence of trade liberalization, both initially large firms tend to shrink and high-productivity firms tend to grow by suggesting that firm size is not a good proxy for firm productivity.

[21] This particular work can be interpreted as motivated by the unknown implications of "de-industrialization," or the decline in the share of manufacturing employment in total employment, more developed economies. Studies such as Rowthorn and Ramaswamy (1999) and Boulhol and Fontané (2006) point to a small but positive role of trade in speeding the pace of de-industrialization, arguing that the more important domestic factors are changes in productivity and shifts in structural demand away from manufacturing toward services.

[22] This point is broadly captured by the work of Wacziarg and Wallack (2004) using a cross-country sample of data. First they find that trade liberalization episodes are followed by a reduction in the extent of intersectoral labour shifts at the economy-wide 1-digit level of industry disaggregation. Then, even at the 3-digit level of disaggregation, they find that liberalization has only a weak and positive effect on labour adjustment, and this result is sensitive to minor changes in the definition of liberalization, the measures of sectoral shifts, and controls for the underlying domestic (labour market regulation) policy environment.

[23] Nevertheless, Goldberg and Pavcnik (2005) report that this result has been documented in a number of other studies as well in countries as diverse as Brazil, India, Mexico and Morocco.

[24] Furthermore, a decrease in formality on its own is not necessarily a sign of inferior quality, even from the worker's perspective, provided that it is voluntary behaviour. For example, a worker may prefer the flexibility (number or timing of hours worked) that informal sector employment provides but that formal sector employment does not.

[25] In a related study, Currie and Harrison (1997) provide evidence that there is a positive link between the number of temporary workers hired by firms and the conclusion of a trade reform episode in Morocco.

[26] An interesting survey of labour adjustment costs across OECD markets and attempts to relate some of these dislocation measures to trade can be found in OECD (2005b).

[27] In reality there is no way to know for certain whether or not the underlying cause behind any individual displaced worker was increased competition from imports or some other factor (for example, labour-saving technological innovation), or more likely the degree to which any increase in competition from imports contributes to the dislocation of a worker. In recognition of this, Kletzer (2001) provides an empirically-based approach that sorts manufacturing workers in the survey based on the severity of import competition in the worker's industry. The proxy used to sort workers is based on a measure of the worker's industry's import penetration ratio (and/or changes thereto) which is defined as the share of industry imports in the total domestic industry's available supply (domestic shipments + imports − exports).

[28] For a recent survey of the US TAA program, see Baicker and Rehavi (2004).

[29] See again the survey of Bernard et al. (2007a).

[30] An example of another study that finds some evidence that there is learning by exporting, at least in the case of a sample of developing countries in sub-Saharan Africa, can be found in Van Biesebroeck (2005). See also the discussion in Sections C.3.d and C.4.b.

[31] As one approach in this direction of research, Eaton et al. (2005) use disaggregated data from a sample of French firms to estimate destination-specific fixed costs of exporting.

[32] For example, in their study of US firms, Bernard et al. (2007a) find that exporting firms tend to export multiple products and that nevertheless trade is extremely concentrated across firms. Earlier research by subsets of these authors also examines the question of "product-switching" and how firms change their mix of product offerings in response to the pressures of globalization. Furthermore, there is also evidence from US import data on within-product differentiation (Schott, 2004) that is consistent with a theory of within-product specialization in ways that may reflect differences in product quality, i.e. that rich countries export varieties with high unit values and lower income countries export varieties with lower unit values.

[33] The few studies which do examine the links between globalization and poverty typically use computable general equilibrium (CGE) models. Those studies thus generate predictions about the expected impact of trade on poverty and do not represent ex post evidence on the impact trade reform has actually had on poverty. See Hertel and Reimer (2005) for an overview of the relevant CGE literature.

[34] However, in a comment by Rodrik (2000a) the above-mentioned study is criticized in major points. For example, the selection criteria for the "globalizers", tariff averages (policy measure) and the import share of GDP (outcome), are "conceptually inappropriate, as policy makers do not directly control the level of trade". Rodrik applies the selection criteria in a more stringent way and finds that the countries under consideration did not do significantly better. This finding thus questions the relationship between trade and growth and as a consequence the potential of trade to reduce poverty through growth.

[35] A general equilibrium analysis is able to account for all the linkages between sectors of an economy, including the linkages between household expenditures and incomes.

[36] According to the standard version of Stolper-Samuelson model (the baseline two-factor, two-good and two country model), the usual benchmark for trade economists, openness in developing countries is pro-poor. In this framework, trade liberalization will lead countries to specialize in the production of goods that use intensively production factors that the country is relatively well endowed with. Returns for these factors will tend to rise while the returns for the relatively scarce production factors will tend to fall. Developing countries are typically well endowed with low-skilled labour relative to developed countries, thus they will specialize in the low-skill-intensive-sectors. Consequently, wage of low-skilled labour (the poor) are expected to increase.

[37] In Winters (2000) overcrowding occurs if the workers have a negative social product which is lowered if there are less workers in subsistence. On the other hand he calls a shortening of labour supply in the subsistence sector successful development.

[38] A CGE model is a general equilibrium model which uses the power of today's computers to calculate numerically the effects of a particular change that is introduced to the model.