D. Trade openness and the broader socio-economic context

Section C showed how fundamental economic factors – demography, investment, technology, natural resources, transportation and institutions – can affect the future of trade. But trade takes place within a broader socio-economic context. This context matters for trade and trade policy. Historically, social and macroeconomic concerns have repeatedly influenced decisions in trade policy matters. Section B of this report provided examples of such situations. Both themes are currently high on the political agenda and will undoubtedly affect policy-makers' views and positions in the area of trade reform in the future. A third factor relates to environmental concerns, an issue that has rapidly been gaining prominence in the national, regional and global policy debate. It has also been repeatedly linked to trade, notably in the context of a number of high-profile WTO disputes, in the context of regional trade agreements and as an element of the on-going Doha Development Agenda.

Contents

Some key facts and findings

- Successful integration into global markets requires the constant need for individuals and societies to cope with changes in the competitive environment. These adjustments can put labour markets under strain and can shape attitudes towards trade openness. Economies with a well-trained workforce and a business-friendly environment tend to be better placed to adjust successfully.

- Societies' transition to a sustainable development path requires careful management of the multi-faceted relationship between trade and the environment in order to avoid "green protectionism" and to maximize the environmental benefits that open trade can bring.

- The expansion of trade needs to be supported by a stable financial and monetary system – delivering a sufficient volume of trade finance at an affordable cost, particularly for developing countries, and macroeconomic policies that promote exchange rate stability.

1. Social concerns: inequality and unemployment

Employment has been high on policy-makers' agendas in recent years. This is the case for countries across different income levels although the reasons for concern differ. In many industrialized countries, unemployment has soared during the recent crisis and in some a recovery of the labour market is not yet in sight.[1] Emerging economies with large populations, such as China and India, do not find it straightforward to absorb large numbers of rural workers into formal labour markets, even when the economy is booming. The important role of jobs for economic and social development in least-developed countries (LDCs) has been highlighted in the most recent *World Development Report* (World Bank, 2012b).

Incomes of those who do work are also a matter of concern, especially in light of increasing income inequality within countries. In a number of industrialized countries, income inequality, measured in terms of the share in total wealth of the 1 per cent wealthiest individuals, is close to the levels prevalent in the 1920s, and more than double the levels of the 1970s. In many middle-income countries, income inequality has also increased sharply since the early 1990s.

As a result of these developments, policy reforms need to perform well on the employment and distributional front in order to obtain public support. This sub-section provides an overview of the patterns of inequality within and across countries, and of unemployment levels across countries. It then proceeds to discuss whether, and to what extent, trade has played a role in

driving the observed patterns. Lastly, this section will discuss whether the observed labour market patterns are likely to affect attitudes towards trade openness or its effects. The sub-section concludes by venturing into a discussion of the expected labour market challenges that different countries will face in the near future and how those challenges may relate to their trade performance.

(a) Income distribution and unemployment: recent trends

The two decades preceding the recent economic crisis were characterized by significant increases in trade and capital flows. Income inequality increased in most countries and regions during the same period. Data on the long-run evolution of inequality indicate that there has been a clear change in the late 1980s and early 1990s.

Figure D.1 illustrates that in a set of countries called the "U-shaped" group by Atkinson et al. (2011), inequality – measured as the percentage share of the 1 per cent richest households in total wealth – has risen quite dramatically in recent years and has achieved post First World War levels. It shows that in the United States, the richest 1 per cent of households held 19.6 per cent of national wealth in 1928. That share fell to a low of 7.7 per cent in 1973 and then steadily increased again to reach 18.3 per cent in 2007, i.e. before the start of the Great Recession. The share of income of the wealthiest households fell during the Recession but is now again on the increase.

The evolution of inequality follows a similar pattern in the other countries illustrated in Figure D.1. In the

Figure D.1: **Share of the 1 per cent richest households in total wealth: "U-shaped" countries, 1910-2010**

Source: World Top Income Database.
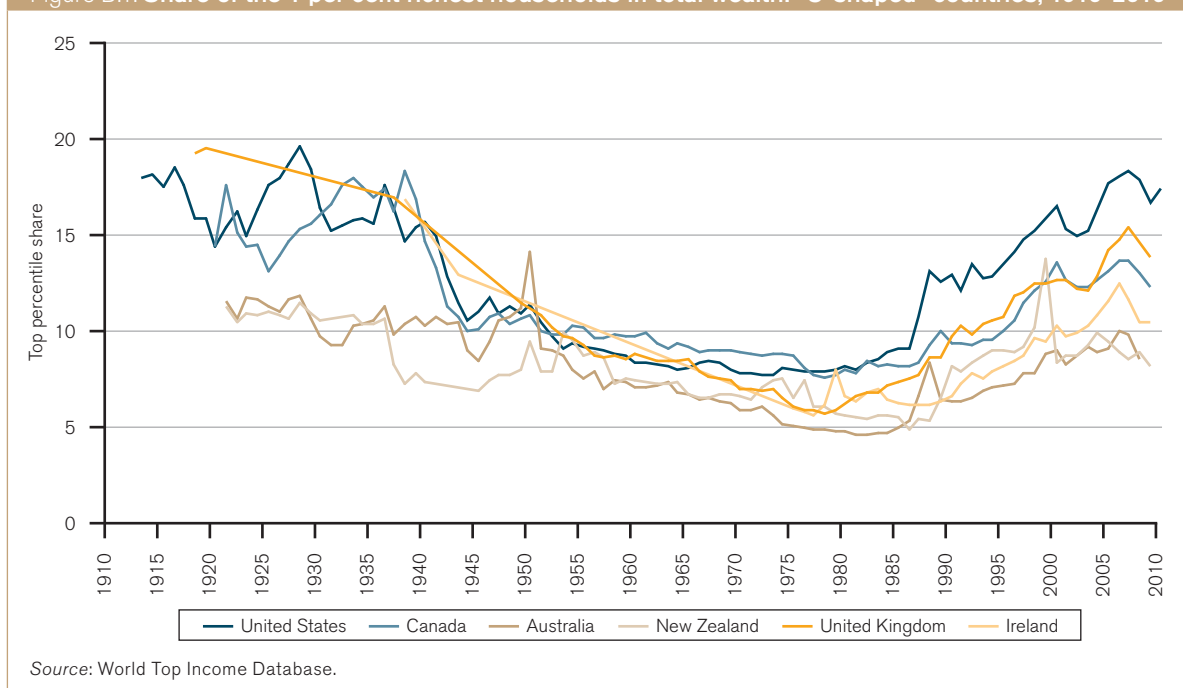
United Kingdom, inequality was higher than in the United States in the few years for which data are available in the inter-war period and just following the Second World War. Inequality then fell below 6 per cent towards the end of the 1970s and steadily increased thereafter to reach 15.4 per cent in 2007. Atkinson et al. (2011) identify another set of countries with an L-shaped evolution of inequality. These countries, including Germany, France and Japan were characterized by very high levels of inequality in the inter-war period. Inequality dropped sharply after the Second World War and remained constant thereafter until the second half of the 1990s, when the income share of the top 1 per cent of income earners started to increase, although significantly less than in countries illustrated in Figure D.1.

Figure D.2 reflects this evolution of inequality for Japan and three other Asian economies for which data are available. In all four countries, inequality started to increase in the 1990s, with the increase being sharpest in Singapore. The richest 1 per cent in China, India, Japan and Singapore, however, own a smaller share of national income than their counterparts in Canada, Ireland, the United Kingdom or the United States.[2]

Another frequently used variable to measure inequality is the Gini coefficient (explained in Section B.2). Using information on Gini coefficients during the past decade, Figure D.3 indicates that inequality is highest in much of South America and Sub-Saharan Africa. Both Brazil and South Africa have Gini coefficients above 50 per cent. China and the Russian Federation fall into the 40-49 per cent range. The United States falls into that same group. India's Gini coefficient is

lower and falls into the 30-39 per cent group. Figure D.3 also shows that many of the countries with very low inequality, i.e. Gini coefficients below 30 per cent, can be found in Europe, e.g. Germany and the Scandinavian countries.

Income distribution within countries is expected to undergo further changes in the near future. One of the most important trends affecting future income inequality is the change in the size of the middle class. While the middle class is expected to increase and become richer in emerging economies, notably in Asia, it appears to be shrinking in the United States and the European Union (see Section C.1).

A phenomenon that emerged during the economic crisis and that remains a challenge in many high-income countries is increased unemployment. The International Labour Office (ILO, 2012) highlights a general divide between the developed and developing regions, with unemployment rates remaining far above historical averages in a group of countries that they call "Developed Economies and the European Union region" (8.6 per cent in 2012 versus an average of 6.9 per cent between 1998 and 2007), while unemployment rates in 2012 were below historical averages in most developing regions.

These patterns are reflected in Table D.1, which shows unemployment rates in 2007 and 2010 for a selected number of countries. It illustrates that recent increases in unemployment have been sharpest in industrialized countries, with a number of countries in Europe and North America experiencing unemployment increases above 4 percentage points. However, this phenomenon cannot be generalized. In

II D. TRADE OPENNESS AND THE BROADER SOCIO-ECONOMIC CONTEXT

Figure D.2: **Share of income of top 1 per cent income earners in selected Asian countries, 1922-2010**

Source: World Top Income Database.
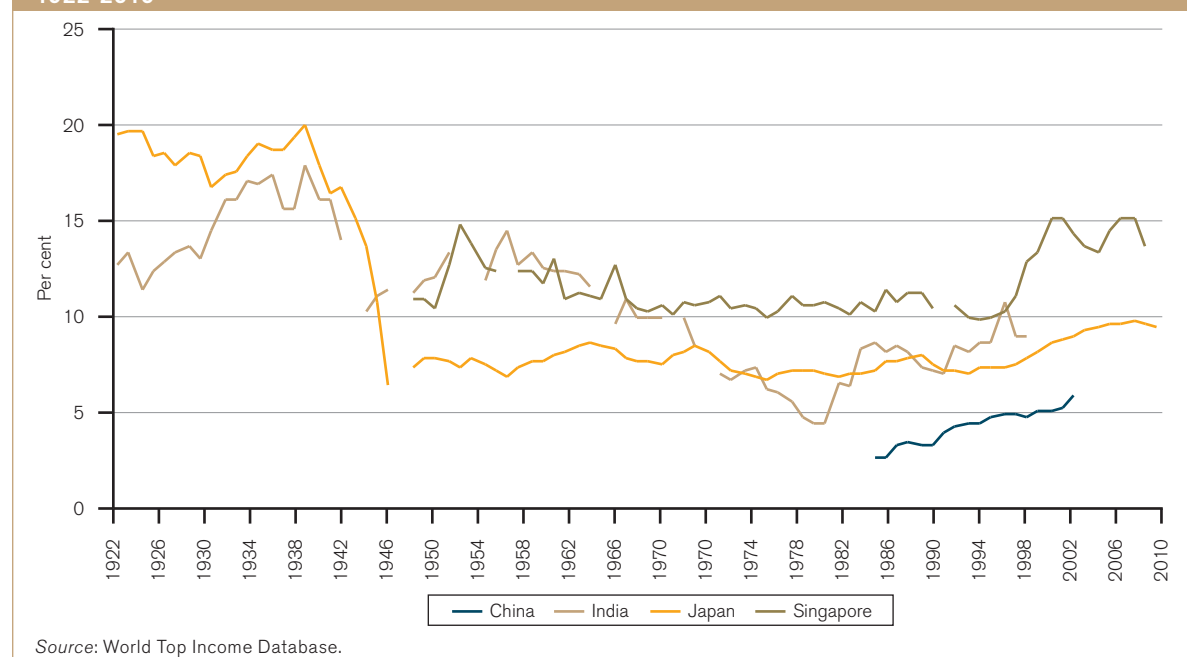
Figure D.3: **World inequality map based on Gini coefficients**

— Above 60 — 50-59 — 40-49 — 30-39 — Less than 30 — Missing

Sources: Human Development Index database 2011 and CIA *World Fact Book*, 2011.

Note: Values represent the most recent data point available in the period 2000-11. The Gini coefficient takes values between 0 and 100 in this chart, with higher values reflecting higher levels of inequality.
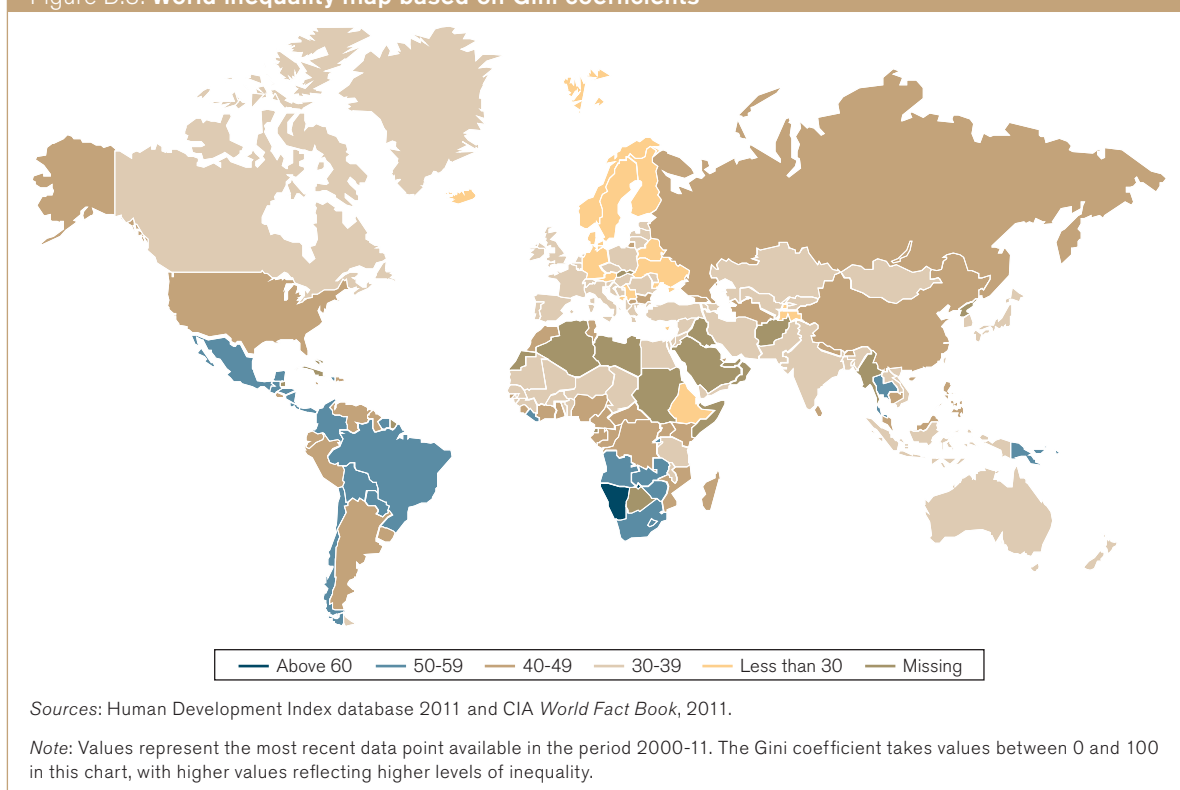
Poland, for instance, unemployment remained unchanged, while it decreased in Germany. Other developed countries, such as Japan, Mexico, the Republic of Korea and Turkey, experienced moderate increases in unemployment. Unemployment data are only available for a small number of developing countries. Table D.1 illustrates that countries such as Colombia, Indonesia or the Philippines experienced stable unemployment rates or even reductions in the 2007-10 period.

Table D.1: **Levels and changes in unemployment, 2007-2010, selected countries** (percentage)

	2007	2010	Difference
Lithuania	4.3	17.8	13.5
Spain	8.3	20.1	11.8
Ireland	4.6	13.5	8.9
United States	4.6	9.6	5.0
Greece	8.3	12.5	4.2
Mexico	3.4	5.3	1.9
Turkey	10.3	11.9	1.6
Russian Federation	6.1	7.5	1.4
Japan	3.9	5.0	1.1
Korea, Rep. of	3.2	3.7	0.5
Poland	9.6	9.6	0.0
Philippines	7.4	7.4	0.0
Colombia	12.0	11.6	-0.4
Germany	8.6	7.1	-1.5
Indonesia	9.1	7.1	-2.0

Source: World Bank.

Another element that is likely to affect trade flows and policies in the near future is the distribution of income across countries, notably because relative cross-country income levels will determine what countries consume and what they produce. Section B.2 of this report has discussed the phenomenon of "new global players". This group of countries is commonly considered to include the BRICS (Brazil, the Russian Federation, India, China and South Africa), most of which have experienced high levels of income growth in the past two decades.

Average annual real gross domestic product (GDP) per capita growth was above 10 per cent in China from 1990 to 2011 and above 6 per cent in India in the same period. GDP per capita growth was more modest but significant in Brazil (2.8 per cent) and South Africa (2.6 per cent), while it was relatively sluggish in the Russian Federation (0.7 per cent). This reflects a certain level of "catching up" in terms of GDP per capita between four of the BRICS and the wealthiest regions in the world, given that GDP per capita growth in the United States was 2.4 per cent, in the Euro area 1.7 per cent and in Japan 1.1 per cent during the same period.[3] This, together with the growth of the middle class observed in a number of emerging economies, is probably one of the main drivers behind the finding in Milanovic (2012) that global income inequality has decreased in recent decades (i.e. in the period 1988-2008). Low-income countries are, however, not necessarily reflected in this trend. In Sub-Saharan Africa, for instance, Nigeria experienced a growth rate of close to 5 per cent, while countries such as the

Democratic Republic of the Congo or Zimbabwe experienced negative GDP per capita growth between 1990 and 2011. The latter two countries and others with similar recent growth patterns therefore run the risk of "staying behind" while the rest of the world grows more closely together.
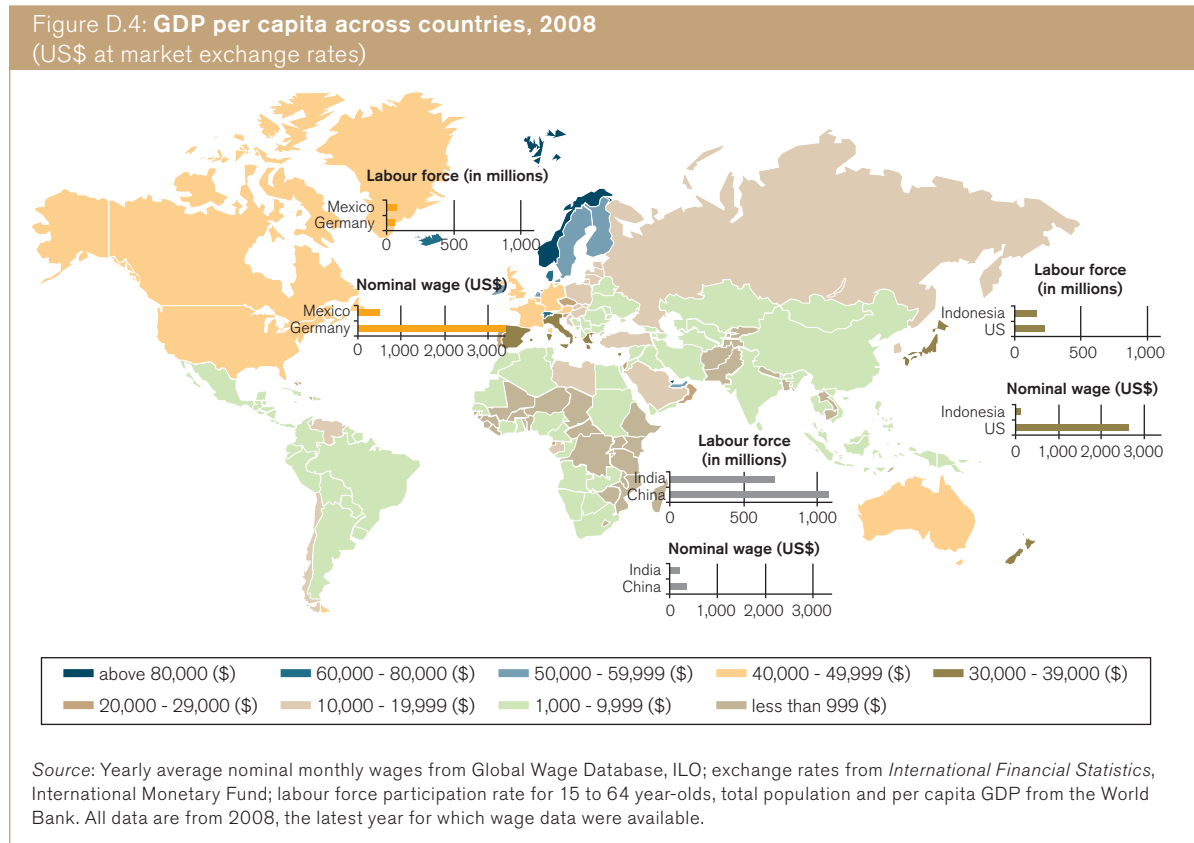
Notwithstanding the above phenomenon of "catching up", the distribution of income remains very unequal across countries, as illustrated in Figure D.4. GDP per capita in Canada, the United States, Europe, Australia and Japan continues to significantly exceed GDP per capita in South America, Africa and most of Asia. This difference will have an effect on comparative advantage and thus the labour market effects of trade.

Poorer countries with a large labour force are likely to have a comparative advantage in labour-intensive goods and services. Countries such as China, India and possibly also Indonesia and Mexico are likely to base their exports on an advantage in labour costs. As illustrated in Figure D.4, Indonesia's labour force is roughly similar in size to the labour force in the United States. The same is true for Mexico's labour force when compared to that of Germany. Yet, wages in Germany are more than six times the average wages in Mexico, while US wages exceed Indonesia's by a factor of 20. Average wages in China and India currently also exceed those in Indonesia but are significantly below those in Mexico and well below wages in Germany and the United States. At the same time, China and India are characterized by a very large labour force that by far outweighs those of other countries.

Although the productivity levels and skill composition of the labour force differ significantly across countries, Figure D.4 suggests that the labour cost advantage may remain in low and middle-income countries – and, in particular, Asian ones – for a while, even if wages in countries such as China are on the increase (e.g. Li et al., 2012). Some of the future labour market challenges that countries at different income levels are likely to face in the context of increased global integration are discussed in more detail below.

(b) Trade and labour markets: a two-way relationship?

The economic literature on the labour market effects of trade reform has traditionally focused on the effects of trade on relative factor incomes. A significant number of studies in the 1980s and 1990s examined the impact of trade on the relative wage of high- to low-skilled labour, arguably driven by the observation that the relative wage of the highly skilled was increasing in a number of industrialized countries. A different strand of literature focused on the effect of trade reform on unemployment levels. In recent years, researchers have analysed the relationship between globalization and the wage share of GDP, a measure that has the advantage of combining information on wage levels and job numbers.[4] Neither of these measures is likely to capture everything that is going on in labour markets as a result of trade reform,[5] but together they can provide a general picture of the main mechanisms at work.

Figure D.4: **GDP per capita across countries, 2008**
(US$ at market exchange rates)

Source: Yearly average nominal monthly wages from Global Wage Database, ILO; exchange rates from *International Financial Statistics*, International Monetary Fund; labour force participation rate for 15 to 64 year-olds, total population and per capita GDP from the World Bank. All data are from 2008, the latest year for which wage data were available.

(i) Does trade affect inequality within countries?

Much has been written on the relationship between trade reform and income distribution within countries. The trade literature has focused on a variety of questions. What are the channels through which trade affects income distribution within countries? What is the relative importance of the effect of trade on income distribution when compared with other possible determinants of distribution? To what extent does the effect of trade on income distribution depend on country characteristics?

According to traditional trade theory based on comparative advantage, a country exports goods that are intensive in the use of its relatively "abundant" factor and imports goods that intensively use its relatively "scarce" factor. This implies that trade opening would increase demand for the abundant factor relative to the scarce factor. Hence, trade is expected to reduce income inequality in developing countries by creating new jobs and increasing wages for unskilled labour but increase income inequality in industrialized countries via a loss of jobs for unskilled labour due to imports from more cost-efficient producers overseas.

A number of empirical studies have analysed the relationship between trade and wage differences.[6] Evidence on the determinants of change in wages indicates that trade is only one of many determinants of wage inequality. Other determinants include technological change, de-unionization, an eroding real minimum wage and changing consumer tastes. In general, skill-biased technological change is found to be the main determinant of changes in wage inequality, while trade is only found to account for a minor share.

More recent literature deviates from traditional ways of analysing the trade-inequality nexus in a number of ways. First, there is an increasing interest in examining the determinants of the evolution of top incomes, i.e. the measure of inequality described in Figures D.1 and D.2. Theoretical contributions analysing this phenomenon refer to the concept of "super-star economics" (Rosen, 1981) and the notion that only very limited numbers of individuals reap a large share of the gains from increases in market size (Manasse and Turrini, 2001; Costinot and Vogel, 2010).

Atkinson et al. (2011) conjecture that recent changes in the evolution of the income share of top-income earners may be linked to the fact that "the expansion of scale associated with globalization and with increased communication opportunities has raised the rents of those with the very highest abilities". Haskel et al. (2012) propose a theoretical framework that explains how the combination of globalization and innovation can end up boosting the real and relative earnings of "superstars".

This last point hints at the second deviation from the traditional analyses of the globalization and inequality nexus. While the early empirical literature tried to separate the distributional effects of trade from the effects of technological change, the more recent literature focuses on the fact that trade and technological change may go hand in hand. One of the implications of this literature is that trade affects income distribution through its effect on technology choice and productivity. It also implies that positive growth effects of trade may be more systematically accompanied by inequality increases than thought in the past, and that development of new activities becomes increasingly important to guarantee sufficient job creation and avoid jobless growth traps (e.g. Burstein et al., 2011; Newfarmer and Sztajerowska, 2012).

Recent research has also begun to focus on different forms of inequality, notably the relationship between trade and increased wage inequality across firms for workers with otherwise similar characteristics (e.g. Amiti and Davis, 2011; Frias et al., 2012; Krishna et al., 2011). One of the findings of the research is that workers in exporting firms earn more than workers with otherwise similar characteristics in non-exporting firms.[7] This suggests that firms, which adjust successfully to globalization, pay higher wages and offer better working conditions (Newfarmer and Sztajerowska, 2012).

Finally, there is increased interest in how other components of globalization affect the distribution of income within countries. Foreign financial flows have been identified as a possible determinant of inequality that may often act in combination with trade flows.[8]

FDI inflows may, for instance, increase inequality in low-income countries because they increase the relative demand for skilled labour (Feenstra and Hanson, 1997). Increased mobility of capital that is not matched by a similar increase in global labour mobility is also likely to have an impact on the relative bargaining power of workers and capital owners and on taxation choices. Both have an effect on income distribution within countries (e.g. Boix, 2011). Recent empirical studies have found that increases in global financial flows have contributed to increased inequality (e.g. ILO, 2011; IMF, 2007; Jayadev, 2007; OECD, 2011).

Overall, therefore, evidence seems to indicate that trade in goods and services is unlikely to have had a significant impact on inequality through the traditional channels of shifting relative demand for production factors (Haskel et al., 2012). However, there is some evidence that trade, combined with technological change or with FDI, can significantly affect income distribution within countries. At the same time, all three factors are among the major drivers of economic growth.

(ii) Is trade openness a determinant of unemployment levels?

Trade opening triggers economic change. It allows well-performing firms to expand their activities and to export. It also puts under-performing firms under increased competitive pressure from abroad. As a consequence, those firms may shrink or even close down. These changes brought about by trade opening are thus an inevitable and desirable part of the process that leads to improvements in economic performance and subsequently to increases in wealth. However, during the period of change, jobs are created in some parts of the economy and lost in others. Policy-makers, therefore, often consider such periods of transition as critical.[9] They are also concerned about the employment implications of changes in the competitive environment once their economy is open. This is reflected in the fact that WTO agreements contain safeguard measures that allow governments to intervene under certain conditions if unexpected surges in imports have significant negative employment effects.[10]

Economic research provides policy-makers with information on the direction of change following trade opening. In particular, it provides information on which parts of the economy are most likely to suffer job losses. In traditional trade theory, the reshuffling of resources and economic activity was expected to take place across sectors, with jobs being created in exporting sectors and being lost in import-competing sectors. More recent trade models show that firm-level adjustment following trade opening leads to job creation and job loss in all sectors, due to the fact that high-productivity firms fare better in both net-exporting and net-importing sectors, while low-productivity firms fare worse (e.g. Bernard et al., 2007). The latter implies that part of the adjustment process following trade opening takes place within sectors (Jansen and Lee, 2007), which probably makes adjustment easier than cross-sectoral adjustment.

In general, the focus of economic research in recent decades has not been on understanding the adjustment process following trade opening but rather on assessing whether trade opening has an effect on long-run unemployment rates. In this context, it is worth noting that trade opening would have no effect on unemployment rates if markets – particularly labour markets – function smoothly. In theoretical models analysing the relationship between trade and unemployment, economists assume imperfect markets where wages do not reach the market-clearing level. This may be because minimum wages put a lower bound on wage levels (e.g. Brecher, 1974; Davis, 1998), because workers' efforts on the job depend on whether they consider wages to be fair (e.g. Egger and Kreickemeier, 2009),[11] or because labour markets are characterized by matching or search frictions (e.g. Jansen and Turrini, 2004; Helpman et al., 2010; Felbermayr et al., 2011b).[12]

The impact of trade opening on unemployment will depend on whether increased trade is expected to exacerbate the impact of already existing frictions or whether it is expected to reduce the strain on a particular friction. If, for instance, trade opening puts pressure on wages of workers that are already working at minimum wage levels, increased foreign competition can lead to higher unemployment if demand for those workers is reduced further. If, on the other hand, trade opening allows companies to take advantage of scale economies, minimum wages and search frictions will become less binding and unemployment levels will go down in the long-run. As trade reform and openness are expected to trigger a combination of different effects, it is difficult to predict the effect of trade on long-run employment on the basis of economic theory alone. The empirical literature provides more clear-cut insights into the long-run effects of trade on unemployment, as will be highlighted later in this section.

One reason why theoretical research has focused on the long-run rather than the short- to medium-run effects of changes in trade flows may be that economists expect adjustment phases to be short and not very costly. Early studies attempting to assess the economic costs of adjustment following trade reform concluded that those costs were low and around 5 per cent of the total benefits of trade (Magee, 1972; Baldwin et al., 1980).

It is therefore reasonable to assume that changes in trade flows do not necessarily have a significant impact on macroeconomic measures, such as the overall employment rates, when the value of trade is small compared with the size of the overall economy. In a country such as the United States, the ratio of imports to GDP was around 15 per cent in the years preceding the economic crisis. When measured in terms of value added, i.e. if only the foreign value added embodied in imports is taken into account, imports represented less than 14 per cent of the United States' GDP in 2008 and around 11 per cent in 2009.[13]

Figure D.5, however, suggests that an increase in competition may affect a country's economic structure, even in economies as large as the United States. It reflects structural change, measured by the so-called structural change index (SCI), which captures changes in the relative size of sectors. The index ranges from zero to 100, with higher values reflecting more important changes in the relative size of sectors, changes that typically go hand in hand with the reshuffling of resources. The individual bars in Figure D.5 illustrate the extent to which the economic structure of an economy in a given year differs from the economic structure ten years earlier. The period of ten years has been chosen because such a period would typically be expected to cover two business cycles. Structural changes in terms of the sectoral composition of value-added and in terms of employment are reflected separately.

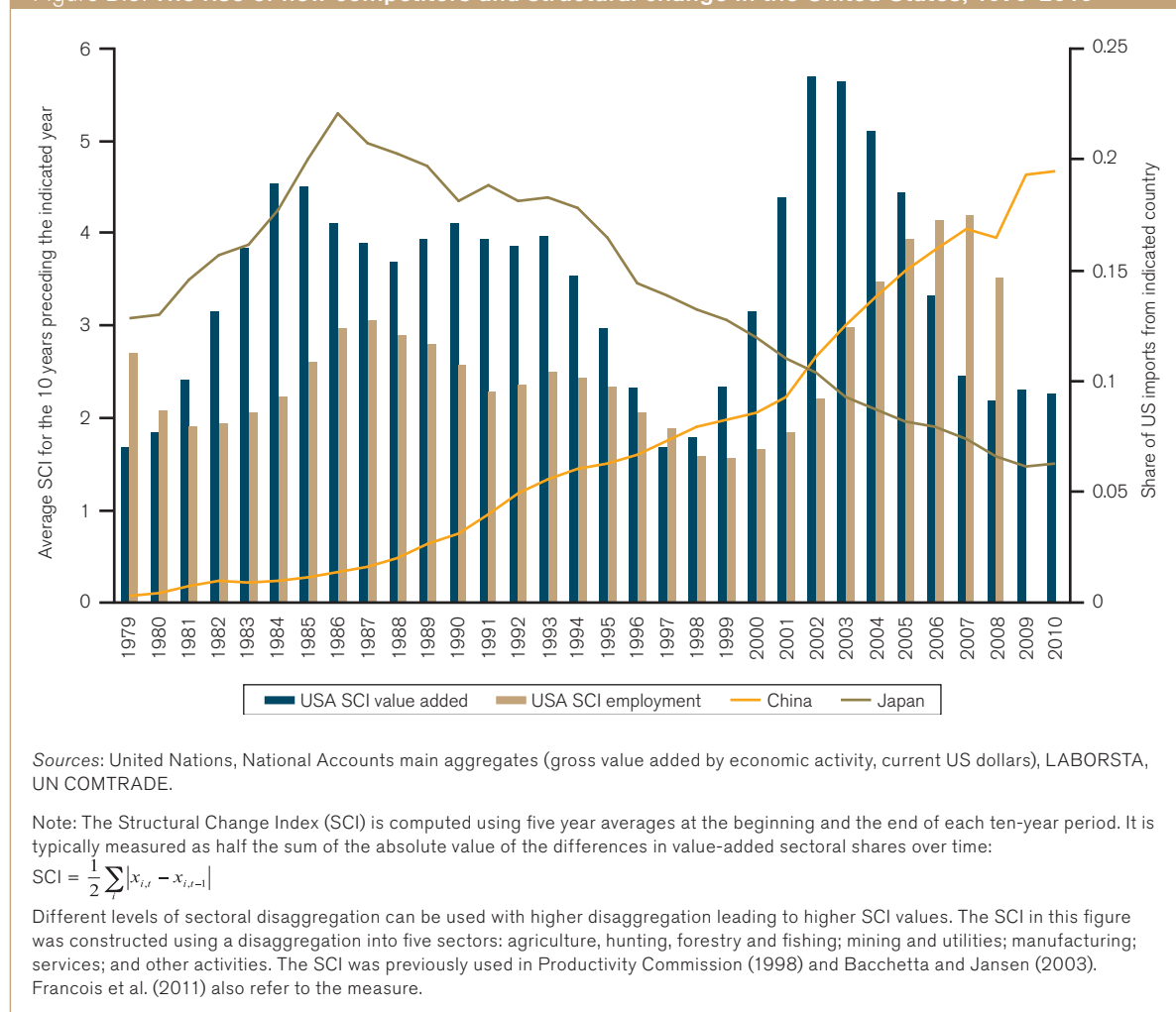Figure D.5: **The rise of new competitors and structural change in the United States, 1979-2010**

Sources: United Nations, National Accounts main aggregates (gross value added by economic activity, current US dollars), LABORSTA, UN COMTRADE.

Note: The Structural Change Index (SCI) is computed using five year averages at the beginning and the end of each ten-year period. It is typically measured as half the sum of the absolute value of the differences in value-added sectoral shares over time:

$$SCI = \frac{1}{2} \sum_i \left| x_{i,t} - x_{i,t-1} \right|$$

Different levels of sectoral disaggregation can be used with higher disaggregation leading to higher SCI values. The SCI in this figure was constructed using a disaggregation into five sectors: agriculture, hunting, forestry and fishing; mining and utilities; manufacturing; services; and other activities. The SCI was previously used in Productivity Commission (1998) and Bacchetta and Jansen (2003). Francois et al. (2011) also refer to the measure.

Figure D.5 shows that observed levels of structural change differ over time, with some periods being characterized by high levels of change and others by lower levels. It also demonstrates that the measured rate of structural change has increased over time in the United States, as both the peaks and troughs reflected in the chart increase over the years. Figure D.5 even indicates that structural change may have something to do with trade. The two lines reflect the share of world exports of Japan and China, respectively. It is striking to see how the rise of these trading powers, for example, has coincided with periods of increased structural change in the United States. The figure illustrates that adjustments in terms of employment appear to take place later than value-added adjustments, perhaps reflecting that firm-level productivity adjustments pre-date adjustments in terms of staffing. Furthermore, the difference in timing between labour and production adjustments is larger in recent decades than in the 1980s and early 1990s. The employment adjustments are also significantly larger in the more recent period. This discussion, however, cannot claim to reflect any causal link between increases in exports from major traders and structural change in their trading partners. It is also

the case that the nature of the reshuffling process following trade reform is likely to be country specific and to depend on the timing of trade reform and the nature of trade shocks (e.g. Haltiwanger, 2011).

The story reflected in Figure D.5 seems to be in line with findings in recent trade literature: the adjustment phase following trade shocks can be challenging.[14] Cosar (2011), for instance, points out that it may be particularly difficult for older workers to adjust.[15] Autor et al. (2012) highlight that the medium-run efficiency losses associated with adjustment to trade shocks can be significant. Davidson and Matusz (2004b) show in a theoretical set-up that unemployment levels following trade shocks can be lower or higher depending on the adjustment path that an economy takes.

The existing empirical literature on the determinants of unemployment finds that trade opening is likely to decrease unemployment in the long-run, while it may lead to increases in unemployment in the short-run. Using information on 92 countries for the period 1990-2000, Dutt et al. (2009) find that unemployment increases immediately after trade opening, but decreases in the first and second year after trade

opening. The decline more than outweighs the original surge in unemployment.[16] Görg (2011) echoes this finding in a literature overview where he concludes that globalization may lead to higher job turnover in the short run but that there is no indication that trade or offshoring lead to higher unemployment overall. In a paper focusing on the long run, Felbermayr et al. (2011a) find that greater trade openness is consistently associated with a lower structural rate of unemployment. The empirical literature thus appears to suggest that in the long run, trade does not increase unemployment or it contributes to reducing it. Where trade contributes to increased unemployment, this is likely to be only a short-run phenomenon.

Actual or expected economic difficulties during phases of transition may, however, create important challenges for policy-makers, particularly if they affect the public's attitude towards trade or put long-run structural adjustment processes at risk. Fear of job loss may, for instance, affect voters' attitude towards trade reform independent of whether relevant individuals actually end up losing their job. This issue will be discussed in the next sub-section. Adjustment periods following trade opening may also affect long-run trade and growth patterns (e.g. Mussa, 1978; Davidson and Matusz, 2004b; Francois et al., 2011), because they set the stage for the resulting structural composition of employment and production. The challenges that different types of countries face in this context are discussed below.

(iii) Effect of unemployment and income distribution on trade policy

This sub-section discusses how the actual or perceived impact of trade on jobs and the distribution of income is likely to affect policy-making, with a particular focus on trade policy. It also discusses how income inequality within countries can affect the benefits that these countries draw from trade opening.

Perceived impact of trade on labour markets and potential rises in protectionism

Income inequality has risen within most countries and regions over the past two decades. Since this period has also been characterized by unprecedented international trade, it is often perceived that the benefits of rising living standards associated with globalization have not been shared equally across all segments of the population. There is a risk that such concerns may translate into protectionist sentiment and ultimately affect trade policies and trade flows.

Based on traditional trade theory, it would be expected that individuals employed in import-competing industries are sceptical about trade opening. People with a skill that will be less in demand after reform are also likely to lose and, according to the most recent literature, those employed in small firms are more likely

to experience negative consequences from trade than those employed in large firms.[17]

In industrialized countries (i.e. countries well-endowed with high-skilled labour), low-skilled labour has traditionally been expected to lose (in relative terms) from trade. Econometric analysis of survey information has confirmed that attitudes towards trade opening are indeed in line with theoretical predictions. Mayda and Rodrik (2005) find that individuals working in non-trade sectors tend to be the most pro-trade, while those in import-competing sectors are the most protectionist.[18] They also find that individuals with higher levels of educational attainment oppose trade restrictions in countries well-endowed with human capital. Based on the above, standard political economy considerations would predict that policy decisions would take a protectionist tendency if sufficiently large numbers of individuals consider themselves to be losers from trade opening (Boix, 2011; Mayer, 1987; Dutt and Mitra, 2002 and 2006). If the distribution of gains from trade is sufficiently skewed, protectionist sentiments may prevail even when the overall effect on the economy's welfare is positive.

While most economic analyses of this question have focused on the actual distributional effects of trade on income, perceptions and uncertainty about individual outcomes matter. Individuals who suffer from job or income loss may be hostile to trade opening if they perceive trade to be the source of their problems independent of whether this is actually the case. Individuals may also nurture protectionist sentiments if they fear the loss of their jobs as a result of trade opening even if they end up keeping their job or finding a better one. The latter phenomenon has been examined in Fernandez and Rodrik (1991) who show that individuals prefer to maintain the status quo if they do not know in advance who is going to be affected by possible negative consequences of reform.

An analysis of survey data, collected in the year 2000, suggests that individuals may evaluate differently individual employment perspectives and the employment perspectives for their country as a whole. In the survey, Asian and European interviewees in 18 countries were asked about their views regarding their personal work situation, unemployment in their country and the need to limit imports of foreign products. Interviewees were asked:

- whether they believe that globalization has a bad effect on job security (globalization 1)

- whether they believe that globalization has a bad effect on standards of living (globalization 2)

- whether they agreed that their country should limit imports of foreign products (trade)

- whether they were worried about their personal work situation (job 1)

- whether they were worried about unemployment in their country (job 2).

Figures D.6 and D.7 reflect how concerns about jobs are related to views on trade or globalization by representing relevant correlations across individual replies for the 18 countries. Only statistically significant correlations are presented. Figure D.6 illustrates that individuals who are concerned about their personal work situation also believe that globalization is bad for job security and standards of living. This pattern holds across countries, with correlations being somewhat higher in European than in Asian countries. Individuals who are concerned about their personal work situation also tend to have stronger protectionist views when it comes to trade. This again holds for all countries in both regions, with the exception of the United Kingdom.

This pattern of correlations is reversed when individuals are asked about employment outcomes at the national level. Figure D.7 reveals that in all countries, individual responses regarding concerns about globalization are systematically negatively correlated with individual concerns about unemployment in their country.[19] Combining the information shown in Figures D.6 and D.7 suggests that interviewees who tend to believe that globalization has negative effects on job security and the standard of living fear their own employment perspectives while acknowledging that the country's overall employment perspectives may be positive.

The above distinction between overall and individual effects is also reflected in other survey evidence from European countries. This indicates that a majority of respondents believe that globalization provides opportunities for economic growth but increases social inequalities.[20] Figure D.8 looks more closely at survey information regarding inequality and compares country responses regarding two questions:

- Do you consider that differences in incomes are too large?

- Do you consider that globalization represents a threat to national employment and companies?

The first question was asked in the Eurobarometer survey of 2009, while the second question was contained in the Eurobarometer survey of 2012. Figure D.8 reflects the percentage of respondents who replied positively to the two questions in individual countries. It reflects a positive correlation between concerns about inequality and concerns about globalization. This correlation may reflect a Europe-specific phenomenon as similar exercises for a dataset covering global attitudes did not find positive correlations of a comparable significance.[21]

Figure D.6: **Attitude towards job insecurity (personal work situation)** (correlation with attitudes towards trade and globalization)
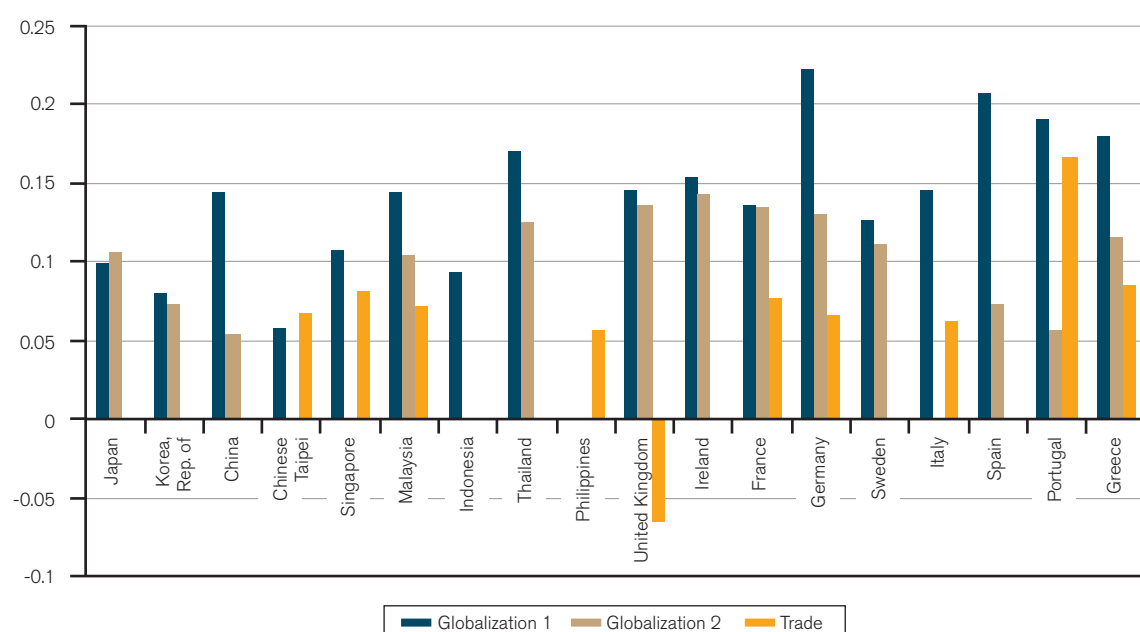
Source: Authors' calculations based on Inoguchi (2001).

Note: Globalization 1 – Does globalization have a bad effect on job security? Globalization 2 – Does globalization have a bad effect on standards of living? Trade – Should your country limit imports of foreign products?
Only statistically significant correlations are represented in the figure.

Figure D.7: **Attitudes towards job insecurity (unemployment in the country)**
(correlation with attitudes towards trade and globalization)

Legend: Globalization 1 | Globalization 2 | Trade

Source: Authors' calculations based on Inoguchi (2001).

Note: Globalization 1 – Does globalization have a bad effect on job security? Globalization 2 – Does globalization have a bad effect on standards of living? Trade – Should your country limit imports of foreign products?
Only statistically significant correlations are represented in the figure.
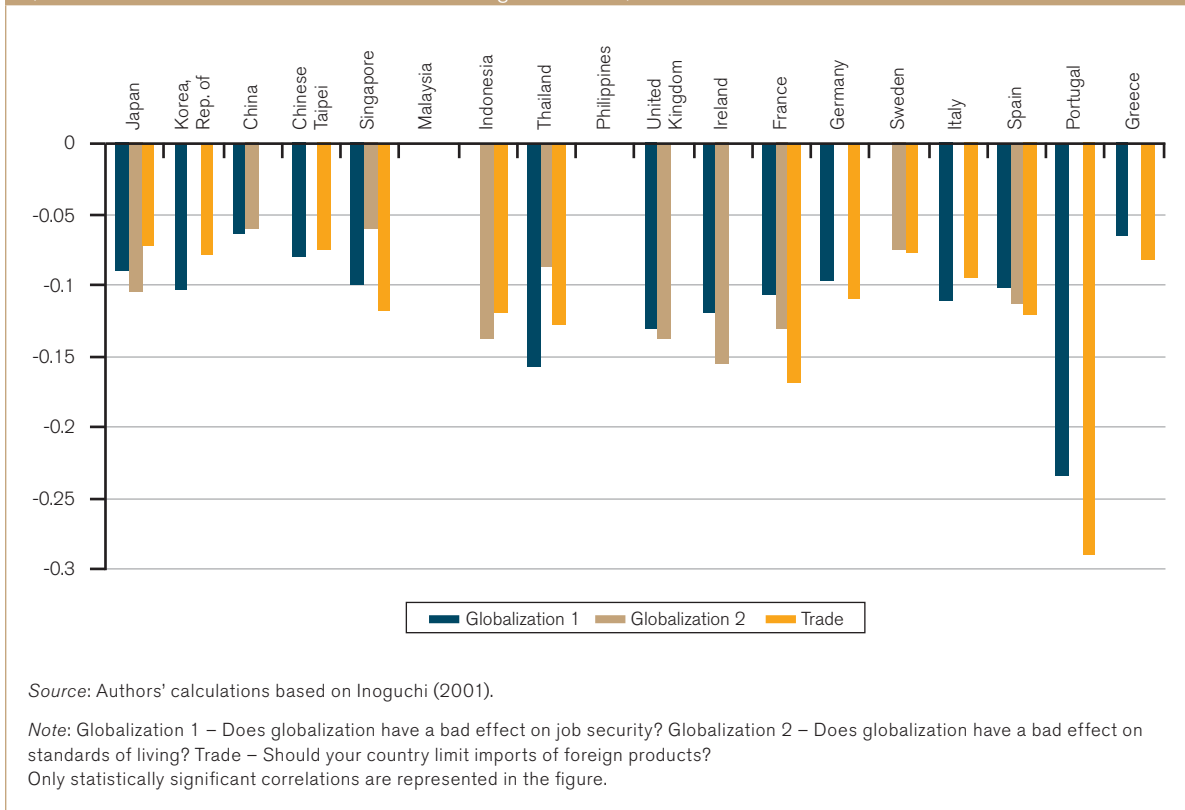
Figure D.8: **Attitudes towards globalization (2012) and inequality (2009) in Europe**
(percentage of respondents that agree or agree strongly with the statements shown on the axes)

Source: Authors' calculations based on Eurobarometer 2009 and 2012.
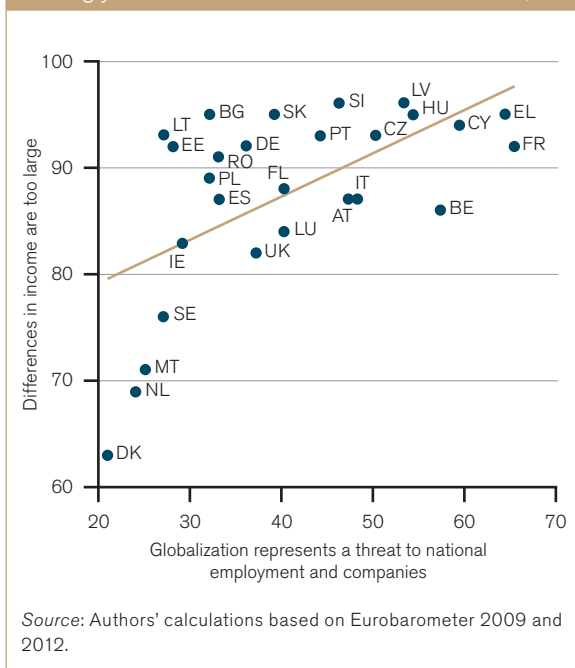
Overall, the survey evidence discussed above seems to suggest that individuals perceive globalization as entailing risks for their personal job situation. As predicted in Fernandez and Rodrik (1991), individuals may take these risks very seriously even when they acknowledge the likely positive effects of globalization for the overall job market. One of the possible consequences is that individuals may increasingly "vote" against globalization.

Inequality and the benefits of trade reform

Actual or perceived inequality may not only affect trade through its possible impact on trade policy decisions; inequality is also likely to affect trade directly through its effect on consumption and production patterns. Wealthy individuals consume different products from poor individuals and high-income countries produce different goods from low-income countries.[22]

As consumers become wealthier, they will spend lower shares of their income on so-called necessity goods such as food and increasing shares of income on goods such as household furniture and services such as education. As their income increases further, other luxury goods such as jewellery and cars start to play a more important role in their consumption basket. Economists refer to this phenomenon as the "income elasticity of demand": as consumers become richer, they spend more money on goods that have a high-income elasticity of demand. Businesses use this concept to predict future sales of their products depending on expected changes in income levels or income distribution in the markets they serve.

In line with the above, Grigg (1994) shows that spending on food ranged from 64 per cent of household income in Tanzania to less than 15 per cent in Australia and North America in the early 1980s.[23] Box D.1 illustrates why such differences in consumption patterns may affect countries' positions in trade negotiations. Consumption patterns do not only differ across countries, they also differ within countries and depend on income distribution within countries. Dalgin et al. (2008) find that imports of luxury goods increase with countries' level of inequality.

Income inequality is also likely to affect production. Linder (1961) argues that proximity to a large consumer market for high-quality goods gives firms in wealthy countries a comparative advantage in producing those goods. When exporting, these firms find larger markets for high-quality goods in other high-income countries. Accordingly, Linder predicted that trade volumes are larger among countries with similar income levels. More recent research has confirmed that the richer and the more similar countries are, the more they trade among each other, and the larger the share of intra-industry trade – that is, the larger the share of differentiated goods (e.g. Bergstrand, 1990).

As low- and middle-income countries grow richer, they are likely to consume, produce and export increasingly sophisticated goods. If inequality continues to increase in line with recently observed trends, this will be particularly beneficial for trade in "luxury goods", i.e. goods with high-income elasticities of demand. Fieler (2011), for instance, predicts that continued growth due to productivity increases in China will go hand in hand with a significant increase in the consumption of luxury goods.

In Fieler's model, China's production of luxury goods also increases but by much less, because the country's comparative advantage remains in the production of less sophisticated goods.[24] Indeed, Chinese production of less sophisticated goods is expected to take significant advantage of the productivity increases mentioned before. Fieler (2011) predicts that world prices of "basic" goods will decrease in relative terms as a consequence of Chinese increases in supply. Relative prices of luxury goods are predicted to increase because of the demand surge in China. According to Fieler, rich countries that are net exporters of luxury goods would take advantage of this change. Poor countries that are large consumers of "basic" products would take advantage of the decrease in their prices. Middle-income countries that are net importers of luxury goods could be negatively affected by such changes in relative prices.

Fieler (2011) does not provide a separate analysis for consumers of different income groups within countries. In line with the discussion in previous paragraphs, it is not unreasonable to expect that the relative price changes may end up benefiting lower-income households who consume more basic goods and the highest-income households if they are owners of production factors involved in producing luxury goods. Fieler's paper and most of the literature discussed so far assumes that global and national markets function relatively smoothly. If this is not the case, inequality within countries can have a significantly stronger effect on the distribution of gains from trade within and across countries.[25]

The work by Foellmi and Oechslin (2010; 2012) illustrates that if financial markets are characterized by

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Box D.1: Food security versus food safety

Cross-country differences in consumption patterns may affect trade policy-makers' negotiation positions. In recent debates related to agricultural trade, for instance, representatives of low-income countries have tended to emphasize the need for secure access to food while representatives of industrialized countries are paying increasing attention to the need to guarantee the quality of food.

The last decade has been characterized by high levels of price volatility in agricultural commodities. Given that poor households tend to spend a large share of their income on food, they are particularly vulnerable to price hikes in agricultural commodities. The World Bank (2011) has estimated that rises in food prices between June and December 2010 pushed an additional 44 million people below the US$ 1.25 poverty line. As a consequence, concerns about food security have been high on the agenda of policy-makers, particularly in developing countries. In order to ensure adequate food supply at acceptable prices, policy-makers have turned to interventions such as subsidizing the consumption of food or restrictions on the exports of locally produced food.

Although volatility in commodity prices has also affected industrialized country consumers, concerns about food safety rather than food security have been prominent in the public debate in those countries (Cheong et al., 2013). Indeed, as consumers become rich enough not to worry about basic access to food, the quality of food starts gaining in importance for them. The bovine spongiform encephalopathy (BSE) crisis in the late 1990s, the 2011 E-coli outbreak and bird flu transmission through poultry trade in recent decades have contributed to concerns about the safety of imported food. In this context, demands for stricter food safety regulation have increased and have resulted in new forms of non-tariff measures (NTMs) or in private labelling schemes.

market imperfections, inequality may exclude some parts of the economy from trade. In particular, they show that trade opening may widen income differences among firm owners in LDCs since shrinking profit margins make it difficult, if not impossible, for these entrepreneurs to access credit (Foellmi and Oechslin, 2010). If investments in new technologies are necessary to be competitive at the global level, imperfect financial markets are likely to impede small and medium-sized enterprises (SMEs) in LDCs from making the necessary investments (Foellmi and Oechslin, 2012). This suggests that policies targeted towards facilitating access to credit would allow a larger part of an LDC's economy to participate in trade and would thus increase the gains from trade.[26]

In the set-up proposed by Foellmi and Oechslin (2012), targeting companies that are relatively less credit constrained, i.e. the larger companies among the credit-constrained ones, is likely to bring the largest benefits in terms of increases in trade. As such, the findings of Foellmi and Oechslin (2012) may provide useful insights for the debate on strengthening developing countries' supply response to trade reform in the context of Aid for Trade.

(c) Trade and labour markets: different challenges at different stages of development

Whether and how inequality will affect future trade flows and the resulting economic benefits, and whether concerns about jobs or inequality will affect trade negotiators' future decisions, is to a large extent dependent on country-specific situations. As described above, GDP per capita still differs significantly across countries and these cross-country differences will contribute to differences in national consumption patterns. They will also determine comparative advantage and thus the global distribution of production.

What the future brings will very much depend on whether fast growing developing countries will continue to catch up, and whether those who did not manage to catch up in the past are more successful in the future. Another factor will be how current high-income countries cope with the emergence of new competitors. Much has been written about how policy-makers can influence the development path of individual economies.[27] The simulations in Section B.3 provided some illustration of how policy decisions can influence future trade and growth paths. This section adds to this discussion by examining how labour market challenges may interact with growth challenges encountered by different types of countries.

In particular, this sub-section discusses three stages of integration in global markets that may determine the future challenges to be faced by individual countries in their labour markets. First, numerous low-income countries, in particular LDCs, have not managed to successfully integrate into global markets and need to find ways to overcome existing obstacles. Secondly, with increasing GDP per capita and wages, a number of low and middle-income countries that have successfully integrated into global markets as providers of low-wage exports may wish to move into the production of higher value-added segments. Thirdly, in the past two decades, advanced economies have had to cope with the rise of new competitors, which has often put labour markets under strain. If the new competitors manage to move into new product niches in the near future, further labour market adjustments may be necessary in the industrialized world.

(i) Not staying behind

Developing economies, especially in Africa, are abundant in raw materials and have become important sources of global supply to meet the strong demand arising from the rapid urbanization and industrialization in other developing countries, such as China and India. Will an increase in the terms of trade resulting from these demand increases spur income growth for commodity exporters, notably in Sub-Saharan Africa? Or will the dependence on commodity exports lead such countries to fall further behind other regions, in particular Asia?

One of the consequences of the recent increase in commodity prices has been an increased level of specialization in commodity exports by many African countries, including the LDCs among them (see Section B.2). It is likely that this increased economic importance of commodity exports has gone hand in hand with increases in GDP in the short run. However, evidence shows that over time countries that become richer also tend to diversify their exports (Cadot et al., 2011). It suggests that a focus of policy-makers on increasing economic diversification in low-income countries appears to be justified.

The debate about ways to promote diversification can provide useful insights for the multilateral trading system and in particular for the capacity-building activities within this system. Brenton et al. (2009) emphasize two points that may be relevant for policy-makers concerned about diversification. First, low-income countries experience a much higher "death rate" of new exports than middle or high-income countries. This indicates that firms in these countries find it hard to sustain and increase exports of potentially viable products. Policy-makers may therefore want to pay attention to market failures, institutional obstacles and policy shortcomings that are strangling product lines in their infancy. Secondly, low-income countries tend to serve only a small portion of potential overseas markets for the products that they already export. A proactive role of governments to help introduce prospective

exporters to foreign markets or link them up to global supply chains can therefore have a high pay-off. Lederman et al. (2009) describe the role that export promotion agencies can play in this context and emphasize the importance of the institutional set-up of such agencies for their success.

Any effort to increase diversification will have to take into account one important labour market characteristic of LDCs. On average, agricultural employment represents 72 per cent of total employment in LDCs, compared to only 4 per cent in high-income and highly diversified economies. Any moves towards more diversification and better integration in world markets is therefore likely to go hand in hand with migration from rural to urban areas (World Bank, 2012). Measures to facilitate integration in urban areas could include providing information on accommodation or job opportunities (Cheong et al., 2013). Because of the size of the agricultural sector, it could also make sense to direct at least some effort towards the strengthening of certain branches of that sector in order, for instance, to follow a number of LDCs that managed to enter high value-added niche markets with their agricultural exports. The success stories of Kenyan cut flower exports and Rwandan coffee exports are among the best-known examples. Aid for Trade has the potential to play an important role in this context, as illustrated in Box D.2.

(ii) Catching up with the front-runners

Global supply chains have increased trade between developed and developing economies and have also rekindled interest in the role of comparative advantage in international production. Countries export different types of parts and components at different stages of development, with developing countries completing low-skill labour-intensive tasks. It is the advanced economies, where skill and capital-intensive tasks, that capture most of the value-added trade are completed. Intra-firm trade, facilitated by investment in the establishment of subsidiaries overseas, is becoming increasingly important in this context.

The transfer of technology and knowledge facilitated through such trade and FDI has made it possible for developing countries to move up the product ladder in terms of capital intensity and quality more rapidly than in the past. A number of emerging economies have been rather successful in taking advantage of these opportunities (see Sections C.2 and C.3). For China, there is already some evidence of deepening productive capacity and of a move up the product ladders (Rodrik, 2006; Hausmann et al., 2007). India's export basket is sophisticated relative to its GDP per capita, albeit to a lesser extent than China's (Hausmann et al., 2007; Tian and Yu, 2012).

Table D.2 indicates that the labour market challenges that emerging economies will face in this context differ significantly across countries. While the sectoral distribution of employment in the Russian Federation and South Africa already resembles that in industrialized countries, China and India still employ the majority of their labour force in the agricultural sector. Both countries will therefore be able to rely on a sizeable quantity of cheap and relatively low-skilled labour. Yet, if they manage to shift production to a higher-technology and higher-quality mix, it is the relative demand for skilled labour that will rise. Both countries will therefore face the dual challenge of absorbing large numbers of relatively low-skilled rural workers into the labour markets and of educating large numbers of workers to prepare them for the next generation of jobs in the manufacturing and services sectors. Given the divergent demographic patterns in the two countries, this challenge may be more formidable for India than for China.

(iii) Adjusting to new competitors

With the rise of new major global players (for example, Brazil, China and India; see Section B.2), other traders had to adjust to a new situation in global markets. OECD imports from China have increased significantly over the past two decades, replacing local production and imports from other countries. At the same time,

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Box D.2: Entering niche markets with agricultural exports: Rwandan coffee

"Rwanda has a 'National Coffee Strategy'. Rwandan specialty coffee is winning international competitions, commands some of the world's highest prices and is sought out by Starbucks, Green Mountain Coffee, Intelligentsia, and Counter Culture Coffee. There is preliminary evidence that the coffee industry is creating jobs, boosting small farmer expenditure and consumption and possibly even fostering social reconciliation by reducing "ethnic distance" among the Hutus and Tutsis who work together growing and washing coffee.

How did this happen? First, the Rwandan government lowered trade barriers and lifted restrictions on coffee farmers. Second, Rwanda developed a strategy of targeting production of high-quality coffee, a specialty product whose prices remain stable even when industrial-quality coffee prices fall. Third, international donors provided funding, technical assistance and training, creating programs such as the USAID-funded Sustaining Partnerships to Enhance Rural Enterprise and Agribusiness Development (SPREAD). SPREAD's predecessor started the first Rwandan coffee cooperative as an experiment in 2001, and the project continues its work improving each link in newly-identified high-value coffee supply chains."

Source: Easterly and Freschi, AidWatch, May 2010.

Table D.2: **Evolution of the share of employment per sector, BRICS** (percentage)	Share of world exports	Share of employment		
		Agriculture	Industry	Services
Brazil 1995	0.9	26.1	19.6	54.3
Brazil 2009	1.2	17.0	22.1	60.7
China 1995	2.9	52.2	23.0	24.8
China 2008	8.9	34.6	27.2	33.2
India 1994	0.6	61.9	15.7	22.4
India 2010	1.5	51.1	22.4	26.5
Russian Federation 1995	1.6	15.7	34.0	50.0
Russian Federation 2008	2.9	8.6	28.9	62.4
South Africa 2000	0.5	15.6	24.2	59.4
South Africa 2009	0.5	5.7	25.7	68.6

Source: ILO KILM (Key indicators of the labour market) database and WTO.

Table D.3: **Evolution of the share of employment per sector, major OECD exporters** (percentage)	Share of world exports	Share of employment		
		Agriculture	Industry	Services
Germany 1995	10.1	3.2	36.0	60.8
Germany 2010	8.2	1.6	28.4	70.0
Japan 1995	8.6	5.7	33.6	60.4
Japan 2010	5.0	3.7	25.3	69.7
United States 1995	11.3	2.9	24.3	72.8
United States 2010	8.4	1.6	16.7	81.2

Source: ILO KILM (Key indicators of the labour market) database and WTO.

access to the Chinese market has also provided opportunities for OECD exporters. The result has been a repositioning of numerous producers and exporters with regard to global markets.

Most OECD countries have lost in terms of global market share in the past two decades. Table D.3 provides details for Germany, Japan and the United States, the three main export powers before the rise of China. Employment patterns have also changed over this period, with industrial employment declining markedly everywhere. In 2010, while industrial employment represented more than a quarter of total employment in Germany and Japan, it had shrunk to around 17 per cent in the United States. In all three OECD countries, services employment now represents by far the largest share in employment. Some observers consider that the extent and speed at which this change has taken place is a matter for concern (e.g. Spence, 2011), notably because of the role of manufacturing as a driver of innovation. Pisano and Shih (2012), for instance, argue that production and research and development (R&D) activities in manufacturing need to take place in the same or in neighbouring locations in order for R&D to be effective. According to their argument, countries losing their production base in manufacturing would also run the risk of losing their innovative capacity (see Section C.3).

Employment in advanced economies is being increasingly concentrated in the services sector. It consists of a number of sub-sectors that are associated with high qualifications and high pay (e.g. finance, legal affairs) and others where employment tends to be associated with low qualifications and low pay (e.g. retail, hospitality, construction, day care). The latter group of sub-sectors is also often characterized by high levels of informal employment.

In order to understand whether restructuring of employment leads to better or worse employment outcomes, it would be necessary to understand what types of services jobs are created. Until recently, studies analysing labour market changes following trade reform only took into account the manufacturing sector and failed to account for the services industry or the informal economy. The availability of new datasets makes it possible to analyse potential labour flows out of manufacturing. Ebenstein et al. (2009) find that workers who leave manufacturing, as a result of trade reform or offshoring, to take jobs in the services sector suffer from a wage decline of between 6 and 22 per cent.[28] The growth of the services sector in terms of employment may therefore be one of the drivers of the observed patterns of inequality increase in industrialized economies that was discussed above.

The current employment structure in industrialized countries has arisen following the emergence of new players in global markets. As mentioned above, emerging economies may seek to climb up the value chain in order to sustain growth. If China and possibly

other large emerging economies such as Brazil and India do so, it is possible that industrialized economies will have to withstand another wave of major labour market adjustments. It cannot be excluded that this adjustment would contribute to a further polarization within labour markets, whereby there is growth in employment in the highest- and lowest-skilled occupations, with declining employment in the middle range of the skill distribution.[29] With greater competitiveness across all skill levels, matching firm level strategies with education and training policies is likely to become increasingly important (see Box D.3).

(d) Conclusions

Employment has been high on policy-makers' agendas in the past years and may remain there for a while. The reasons for this differ across countries. Some countries need to find ways to absorb a growing population into the labour market or to absorb a large rural population into formal and urban activities. Other countries have been plagued by high unemployment rates since the recent economic crisis. In addition, there appears to be a growing discomfort across the globe with increasing levels of income inequality. The share of income of the 1 per cent wealthiest individuals has increased significantly in many countries since the 1990s. While there is no conclusive evidence that trade contributes significantly to changes in long-run unemployment or in inequality, public perceptions imply that policy reforms have to be seen to do well on

these two fronts in order to receive public support in the coming years.

In the public debate, "globalization" has often been associated with increases in inequality observed in recent decades. Research has tried to disentangle the effect of different components of globalization on income distribution and has also tried to understand whether different components of globalization act jointly. Available evidence suggests that trade is unlikely to have had a significant impact on inequality through the traditional channels of shifting relative demand for production factors. However, there is some evidence that trade goes hand in hand with technological change and that the combination of the two contributes to increased inequality. Recent evidence also suggests that global financial flows may play a role in explaining observed increases in inequality. Given that FDI, technological change and trade are among the main drivers of growth, this therefore hints at a possible challenge for policy-makers to ensure that growth is maintained but also balanced in terms of income distribution.

The relationship between trade and employment has received a significant amount of attention from policy-makers in recent years. Evidence suggests that trade opening can contribute to job creation. At the same time, as it tends to go hand in hand with the adoption of new technologies and productivity increases, successful integration in terms of export growth may

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Box D.3: Relevance of education and training policies for integration in global markets

In today's rapidly changing and highly integrated world, skills at all levels of the firm become extremely critical for performance and global competitiveness. Access to a skilled labour force will make it easier for firms to enter new markets abroad, to integrate into global supply chains, to survive and thrive in the domestic market and to adjust to changing conditions in global markets (e.g. Gregg et al., 2012; Froy et al., 2012).

Education and skills policies also have the potential to contribute to two objectives discussed in this section: job creation (in particular for the young) and reducing inequality (because the highly skilled tend to cope better in modern economies than the low skilled).

One way to prepare the young for the challenges of their future working environment is to ensure that they have a good basic knowledge and the ability to employ this knowledge in different settings (Almeida et al., 2012; Woessmann, 2011). However, ensuring that young people have a skill set that makes them "adaptable" is unlikely to be enough for them to find a job, in particular when they first enter the job market.

In hiring processes, employers are typically looking for candidates that have a set of skills specific to the job, or to the sector or sub-sector in which the company is active. Given that education and training decisions are taken well – often years – ahead of the moment of labour market entry, time-inconsistency problems may arise, i.e. situations where education and training decisions today do not match the skills demand of tomorrow (e.g. Almeida et al., 2012).

To minimize this problem and to reduce the occurrence of skills mismatches, it will be increasingly important for governments to strengthen skill anticipation mechanisms in their economy. This implies strengthening the collection of information about current and possible future skill demand by employers and to ensure that this information is passed on to students. It also implies that the transmitted information should influence education and training supply. Employers are well placed to know about current and possible future skill demand and their involvement is therefore likely to be important for skills anticipation policies to be successful.

not lead to large-scale job creation unless the supply response is significant in exporting firms and the domestic supply chain supporting them.

More generally, globalization facilitates the spread of ideas and innovations, which is likely to contribute to an increased speed of technological change. The latter implies that firms and workers need to constantly adjust to new technologies. Those competing in global markets also need to constantly adjust to changes in the competitive environment, as has been evident during the past two decades that have been characterized by the rise of new major players in global markets.

In order to fare well in an increasingly integrated world, economies need to have a strong capacity to adjust. This is true for many aspects of the economy but in particular for their labour markets. The nature and the extent of labour market challenges will differ across countries. For many low-income countries not yet well integrated into global markets, successful integration will imply significant economic restructuring, most likely from agricultural to industrial and services employment.

A number of emerging economies may face the dual challenge of having to employ large numbers of rural workers while simultaneously moving into higher value-added activities. In order to successfully do this, these countries will need to maintain exports in a number of low-skilled activities while at the same time expanding employment rapidly in new, higher value-added activities. If growth in emerging economies is sustained and the relative weight of individual exporters continues to change, labour markets in industrialized countries may continue to be under pressure to adjust.

Survey evidence reveals that individuals in industrialized and emerging economies alike are concerned about their individual employment perspectives, even when they have optimistic views about the economic perspectives for their country as a whole in a globalized world. Taking into account the extent of such fears and the fact that they often coincide with concerns about the distributional effects of globalization, negative views of globalization may persist or even increase. It would be very risky to reach a point where deteriorating perceptions of job security and income distribution within countries become a pressure point for countries to resort to protectionism.

In the short run, policy-makers can address these fears by providing social protection to individuals during periods of unemployment.[30] In the medium to long run, education and training policies are likely to play an important role for all countries. Access to a skilled labour force will make it easier for firms to access new markets and for firms and workers alike to adjust to changing market conditions. Education and training policies can also play a role in addressing possible distributional concerns, as high-skilled workers will find it easier to take advantage of new opportunities than low-skilled workers.

In addition, active labour market policies that help displaced workers to find new jobs can contribute to reducing fears about job loss. Policies that strengthen the enabling environment for enterprises can positively contribute to job creation. Initiatives to strengthen domestic financial markets can have particularly high pay-offs, to the extent that they succeed in facilitating investments necessary to raise firms' competitiveness. More generally, initiatives, such as Aid for Trade, that aim to strengthen supply response in developing countries can contribute in this regard.

2. Environmental concerns

Open trade and environmental protection are key elements of sustainable development.[31] This was recognized at the Rio Earth Summit 20 years ago, when the international community emphasized the importance of cooperation "to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation".[32] When the WTO was established a few years later, WTO members affirmed their commitment to sustainable development and identified environmental protection and the sustainable use of the world's resources as essential goals of the multilateral trading system.[33]

Both open trade and sound environmental policies should work to utilize existing resources better (UNEP, 2013). Openness to trade allows countries to specialize in the productive activities in which they have a comparative advantage. It also extends the market for domestic producers, enabling them to exploit economies of scale. Environmental policy seeks to increase the efficiency of the economic system by ensuring that the full costs of production and consumption, including environmental costs, are reflected in economic decisions.

Beyond this broad level of commonality, trade and the environment interact in complex ways, with multiple links and feedback effects between them. Thus, managing the interface between trade and the environment poses multiple challenges, including for the WTO. Based on this recognition, the section explores selected aspects of the relationship between trade and the environment, and identifies possible future challenges. Specifically, it examines the impact of trade openness on the environment, and the related question of how trade may be influenced by public perceptions of its environmental impacts. This section then explores the multiple interactions between environmental policy and trade, as illustrated by two sets of climate change policies (border carbon

adjustments and incentive schemes for renewable energy). The analysis reveals that, if not managed carefully, the interaction between trade and the environment may give rise to trade and other tensions, which may undermine the future contribution of trade openness to economic growth and sustainable development.

(a) Patterns of environmental degradation

The environment and the economy are two interdependent systems. In recent decades, the scale of growth has led to significant environmental transformations and problems (Dittrich et al., 2012) (see Figure D.9). For instance, more than 50 per cent of the planet's land surface has been modified by human activities (Hooke and Martín-Duque, 2012). Increased pressure on biodiversity has led to significant loss of wild species and increased risk of extinction (Secretariat of the Convention on Biological Diversity, 2012).

Environmental degradation is complex and can take multiple (non-mutually exclusive) forms, such as air pollution (e.g. outdoor and indoor air pollution, stratospheric ozone depletion, climate change), water pollution (e.g. groundwater depletion, freshwater pollution, marine pollution, coral loss), changes in land use (e.g. soil erosion, desertification, drought, wetlands loss), biodiversity loss (e.g. species extinction, natural habitat loss, invasive species, overfishing), or chemicals and waste pollution (heavy metals, persistent organic pollutants, radioactive waste) (United Nations Environment Programme, 2012).

Environmental degradation poses direct risks to long-term economic development (Dell et al., 2012), national security (Matthew, 2000) and political stability (O'Loughlin et al., 2012). In addition, environmental pollution has various harmful and adverse health effects. It has been suggested that almost one-quarter of all deaths and the total disease burden (up to one-third of the disease burden of children) can be attributed to environmental risk factors (World Health Organization, 1997; Prüss-Üstün and Corvalán, 2006).

Economic theory suggests that environmental degradation is the result of market failures, such as the difficulty to define, allocate and enforce property rights of environmental resources. Environmental degradation is a typical negative externality, which arises when producers or consumers who use environmental resources and generate pollution do not take into account the harmful effects of their activities on the rest of society, which leads to social costs in excess of private costs.

Depending on their scope and range, environmental problems may be local, regional or global (Ramanathan and Feng, 2009). If the polluting activity and its associated environmental impact occur in the same geographical location, pollution is considered local. Examples include water pollution, emissions of particulate matter, and land degradation. Regional pollution (e.g. emissions of sulphur dioxide (SO_2) or contamination of large rivers) involves a polluting activity whose effects straddle an entire region and possibly multiple jurisdictions. Global pollution (e.g. emissions of carbon dioxide (CO_2) or ozone-depleting

Figure D.9: **Trends in output, trade and pollution, 1970-2008**

Legend: Living Planet Index; SO_2 Emissions Index; GDP (constant 2000 US$) Index; CO_2 Emissions Index; NO_x Emissions Index; Merchandise Trade (% GDP) Index
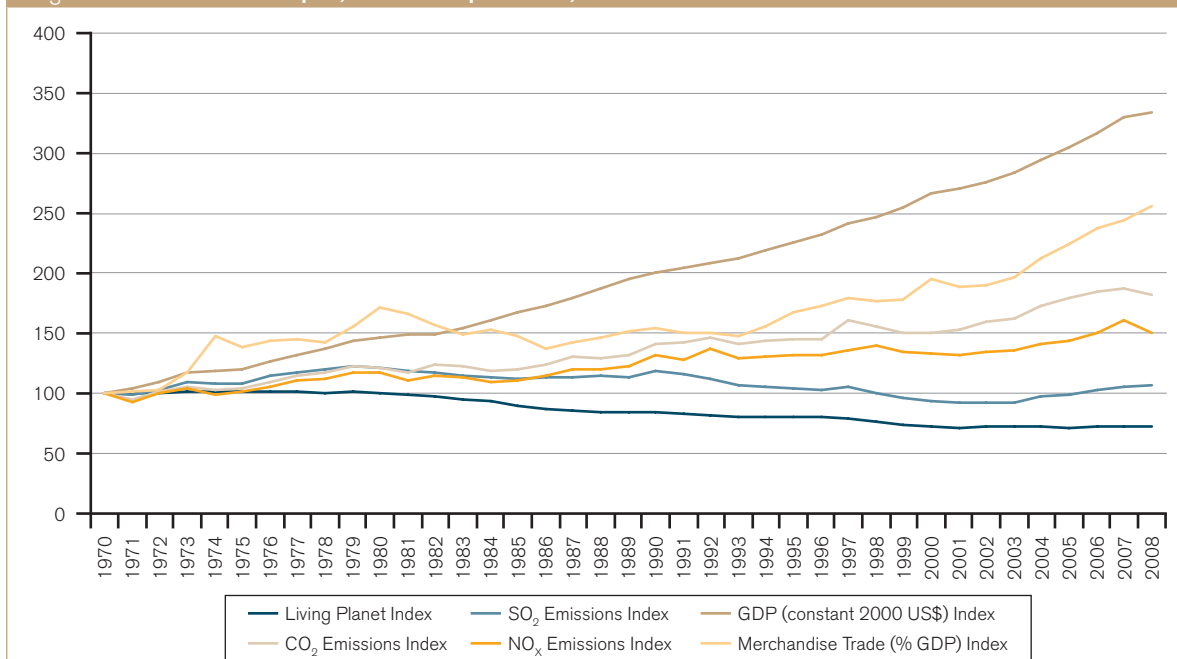
Sources: WTO Secretariat, based on European Commission Joint Research Center (2011), WWF (2012) and World Bank (2012c).

Note: Data have been transformed into indices (1970 base year).

substances) refers to a polluting activity with worldwide impacts. Global pollution does not necessarily entail homogenous consequences; for example, one of the features of climate change is that all countries will be affected, but not in the same way.

Due to the multi-faceted nature of countries' impact on the environment, it is difficult to define a single set of environmental indicators comparable across time and countries. Several sets of indicators have been developed; some integrate economic and social variables to reflect sustainability. Besides data on emissions of CO_2, SO_2 and nitrogen oxide (NO_x),[34] and biodiversity measures,[35] there are several sets of broad environmental indicators, including Adjusted Net Saving, Environmental Performance Index, Ecological Footprint, and Environmental Impact.[36]

A descriptive analysis of these data indicates that countries' impact on the environment at the worldwide level is characterized by strong heterogeneity and asymmetry (see Figure D.10). Developed and developing countries perform differently in terms of environmental impact, yet both can perform better or poorly. For example, in terms of emissions, eight developed and 11 developing countries[37] generate more than three-quarters of global CO_2 emissions. Similarly, 17 countries (13 developing countries among them)[38] generate more than three-quarters of global SO_2 emissions while seven countries[39] represent more than half of global emissions of NO_x. The strong variation in the rankings could partly reflect differences in the methodologies and environmental coverage of the indices and measures as well as different

Figure D.10: **Comparison of environmental performance indices**
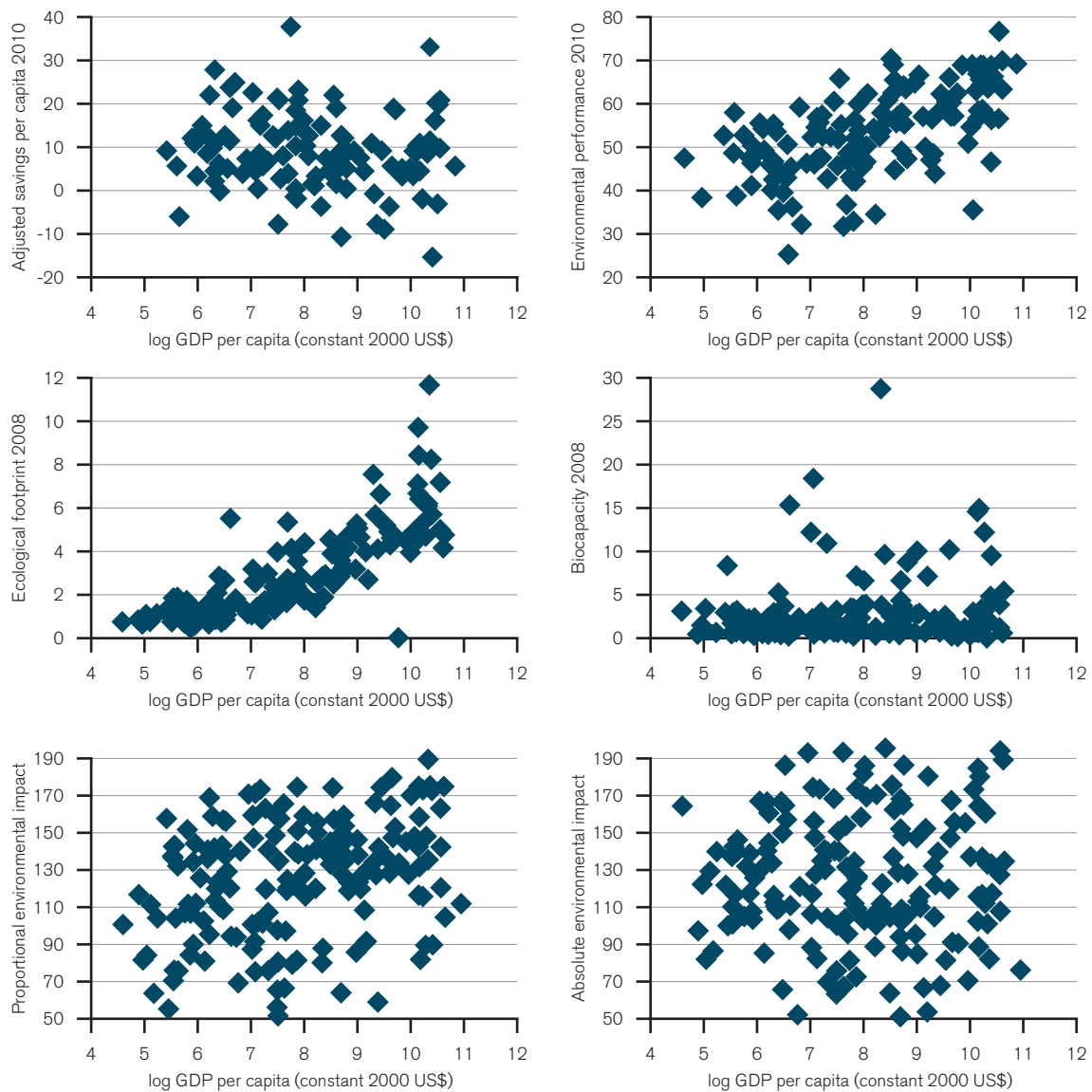
Sources: WTO Secretariat, based on World Bank (2012c), Yale Center for Environmental Law and Policy and Center for International Earth Science Information Network (2012), Borucke et al. (2013) and Bradshaw et al. (2010).

Note: The logarithm of GDP per capita (constant 2000 US$) was used to mitigate skewedness.

environmental challenges faced by countries. Several countries, developed and developing, are outliers (i.e. significantly above or below the average) in terms of positive or negative impact on the environment, reflecting the specific relationship between economic development and environmental performance.

The so-called environmental Kuznets curve hypothesizes an inverted-U shape relationship between environmental degradation and economic growth: environmental degradation increases with economic growth for low levels of income per capita but eventually improves beyond a given threshold (Grossman and Krueger, 1993). This pattern of pollution and income may be related to consumers' income-elastic demand for environmental protection, which entails an improvement in pollution abatement policies and environmental quality as income increases. The empirical evidence in support of the environmental Kuznets curve remains controversial, in part due to the lack of appropriate data and several econometric issues. While some studies find evidence of an inverted U-shape curve for specific pollutants (e.g. SO_2 emissions), others produce inconsistent results (e.g. CO_2 emissions).

Recent empirical estimates that rely on more representative datasets, higher-quality data and more appropriate econometric techniques suggest that countries' environmental performance depends not only on the level of economic development but also on several factors that are related to income, including political institutions, good governance and the diffusion of technological innovation. Regarding trade, the key question is to what extent production, transport and consumption related to trade contributes to additional pressure on the environment. This is discussed in the next section.

(b) Trade, the environment and public perceptions

As noted, international trade flows have increased dramatically during the past three decades, a period that has coincided with significant environmental degradation. This has raised concerns about the possible contribution of trade to environmental degradation, and has sparked a large literature on the subject of whether trade is good or bad for the environment. The answer to this question has important implications for the future of international trade, reflecting in part the two-way relationship between trade and the environment, and the multiple feedback effects between these two interconnected systems. The following discussion illustrates possible policy challenges that arise from this dual relationship by examining the effect of trade on the environment and the influence on trade of public perceptions about its environmental consequences.

(i) How are trade and the environment linked?

One way in which economists have examined how trade affects the environment is by breaking down the impact of a marginal change in trade into three "effects": scale, composition and technique (Grossman and Krueger, 1993). The magnitude and sometimes the direction of the individual effects depend on the particular circumstances of each country, and must therefore be determined empirically. The net result of the three effects provides the overall impact of trade opening on the environment in a given economy. In what follows, this framework is used to help uncover the main "drivers" underlying the relationship between trade and environmental conditions, a necessary first step in examining the future evolution of this relationship.

Scale effect

The scale effect refers to the increase in the level of economic activity due to trade opening, and its impact on the environment. Unless production becomes cleaner and less resource intensive, and consumers change their behaviour, for example by becoming more willing to recycle waste, the increase in the level of production, transport and consumption associated with trade opening leads to environmental degradation.

The contribution of transport to the scale effect of trade has received considerable attention. Reflecting the heavy reliance of transport on petroleum as a source of energy, much of the attention has focused on the impact of transport on climate change. Although the bulk of international trade is transported by sea, which is the most efficient mode of transport in terms of carbon emissions and represents a relatively minor share of worldwide carbon emissions, trade-related transport activity is projected to increase sharply during the next few decades, as are emissions from transport.

It has been estimated that emissions from international shipping represent approximately 3 per cent of world CO_2 emissions from fossil fuel combustion (International Transport Forum, 2010).[40] Regarding the more CO_2-intensive modes of transport, their contribution has been estimated at 1.4 per cent of global carbon emissions from fuel combustion for air and 17 per cent for road. These numbers overestimate the contribution of trade, given that they include emissions generated by the transport of people besides freight. In addition, the figure for road transport comprises both domestic and international transport.

Relative to emissions generated by trade (i.e. emissions from the production and transport of goods traded internationally), transport is estimated to represent approximately one-third of worldwide carbon emissions

(Cristea et al., 2011). This average masks large differences in the contribution of different economic sectors and countries to trade-related transport emissions. For example, the share of transport-related emissions in total emissions from exports ranges from 14 per cent for South Asia to 55 per cent for North America (see Figure D.11). This largely reflects the heavy reliance of North American exports on air and road transport.[41] Regarding economic sectors, the share of transport-related emissions in total emissions from exports of agricultural, mining and other bulk products that rely on maritime shipping are often less than 5 per cent, compared with 75 per cent for transport equipment, electronic equipment, machinery and some manufactured goods.

Between 2010 and 2050, carbon emissions from international freight transport are projected to increase by a factor of four outside the OECD, and by a factor of 1.5 in the OECD area, assuming that the modal composition remains constant (International Transport Forum, 2012). These projections highlight the importance of multilateral efforts that seek to internalize environmental costs in the prices of international air and maritime transport, including through taxes and other market-based measures.

The future evolution of the trends identified in Section B.2 may affect the projected patterns of CO_2 emissions from transport. For example, the growing importance of cross-regional instead of intra-regional preferential trade agreements should make trade more globalized, implying a shift towards more distant trading partners. This could result in higher levels of greenhouse gas emissions from trade-related transport, especially if accompanied by heavier

reliance on air instead of sea transport. The spread of regional instead of global supply chains, as is occurring in Asia (see Section B.2(e)), would work in the opposite direction.

Composition effect

The composition effect refers to the changes in relative prices and levels of pollution brought about by trade opening. Trade opening causes some sectors to expand and others to contract, in line with a country's comparative advantage. Holding constant the scale of economic activity and methods of production, trade opening reduces domestic pollution if the expanding (export) sector is less pollution-intensive than the contracting (import-competing) sector. The composition effect works against the scale effect in countries with a comparative advantage in clean sectors, while the two effects reinforce each other in countries with a comparative advantage in dirty sectors.

What determines whether a country specializes in clean or dirty production? The so-called "factor endowments hypothesis", which is based on the Heckscher-Ohlin model, predicts that trade opening will cause capital-abundant (developed) countries to specialize in the production of capital-intensive (dirty) goods, while developing countries specialize in labour-intensive (clean) production.[42]

An alternative hypothesis, known as the "pollution haven hypothesis", is based on the idea that environmental policy is the main source of comparative advantage. The hypothesis posits that trade opening will lead to the relocation of pollution-intensive production from countries with stringent environmental

Figure D.11: **Transport-related emissions from exports, 2004**
(percentage)
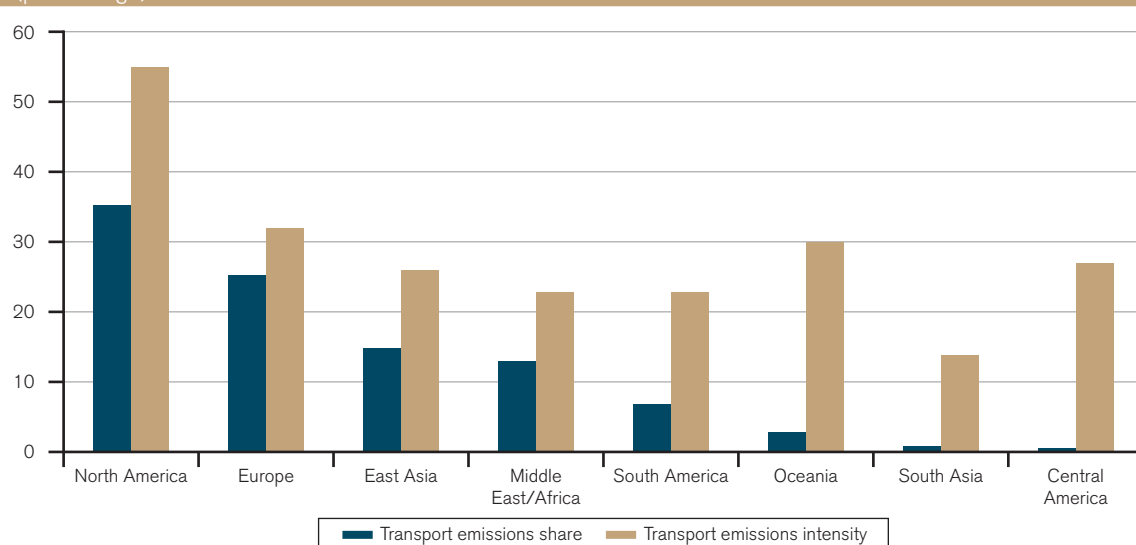
Source: WTO Secretariat, based on Cristea et al. (2011).

Note: "Transport emissions intensity" refers to the share of transport-related emissions in total emissions from exports. For perspective, the figure also displays transport emissions for each region as a share of total transport emissions ("transport emissions share").

policy to countries with relatively lax environmental policy (Taylor, 2005).[43] This implies the specialization of developing countries (which are assumed to have lower than average levels of environmental policy stringency) in dirty production, while developed countries specialize in clean production.[44] Whether the factor endowments hypothesis prevails over the pollution haven hypothesis or vice versa in a particular economy is an empirical question (see Section D.2(c)).

Technique effect

The technique effect refers to the improvements in environmental conditions that result from trade-induced changes in the methods by which goods and services are produced.[45] It implies a reduction in the pollution intensity of individual firms as a result of trade opening (see Box D.4). Although the impact of the technique effect on the environment is always positive, nothing in the literature suggests that the technique effect will happen by compelling necessity, or that its magnitude will be sufficiently large to offset the negative environmental impact of the scale (and possibly, composition) effects. One reason that has been advanced is that without proper incentives, private agents are unlikely to adopt the technologies needed to improve production methods (Copeland, 2012). Given the key role of environmental policy in providing incentives for the adoption of new technologies, it would appear that the magnitude of the technique effect will depend in large measure on the existence and adequate implementation of sound environmental policy.

The economics literature has identified at least two ways in which trade may improve production methods. First, the increase in per capita income associated with open trade can give rise to greater demand by the public for a cleaner environment. Provided that the political process is not "captured" by polluting industries or otherwise compromised, the demand for improved environmental quality should result in a more stringent environmental policy that entices producers to reduce the pollution intensity of output (Nordström and Vaughan, 1995).

Secondly, eliminating tariffs and other trade barriers tends to increase the availability and lower the cost of environmentally friendly technologies embodied in imported capital goods or in the form of knowledge-based processes diffused by the movement of personnel. For example, a study cited in Dutz and Sharma (2012) finds that if the top 18 developing countries ranked by greenhouse gas emissions would eliminate tariffs and non-tariff barriers on renewable energy goods, their imports would increase by 63 per cent for energy efficient lighting, 23 per cent for wind power generation, 14 per cent for solar power generation and close to 5 per cent for clean coal technology.

The potential environmental benefits of trade highlight the critical importance of the first ever WTO negotiations on trade and environment. The mandate of these negotiations stipulates "the reduction, or as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services" (WTO, 2001). These negotiations could result in fewer and lower barriers to trade in environmental goods and services, thereby improving market access conditions worldwide to more efficient, diverse and less expensive green technologies embodied in such goods and services (see Section E.2).

A closely related issue is the possibility that foreign direct investment (FDI) will result in "environmental spillovers". It has been argued that multinational enterprises may impose particular environmental requirements on their supply chain subsidiaries and external suppliers (for example, due to concerns about their reputation or economies of scale), inducing them to adopt environmentally friendly technologies (Albornoz et al., 2009). The movement of trained workers from foreign to domestic firms has been

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Box D.4: The technique effect in a world where trade is concentrated in a few global companies

As discussed in Section B.2(f), empirical evidence suggests that trade is mainly driven by a few big firms across countries. A recent study by Kreickemeier and Richter (2012) explores the implications of this finding for the environmental impact of trade through the technique effect.

The authors develop a trade model with monopolistic competition and heterogeneous firms that shows how openness to trade reallocates production from the least productive (and more pollution-intensive) firms, which are forced to exit the market due to increased competition from abroad, to the more productive (and least pollution-intensive) firms. The increase in aggregate productivity caused by trade opening leads to a reduction in overall domestic pollution if firm-specific pollution intensity decreases strongly with increasing firm productivity.

The link made in Kreickemeier and Richter's model between the productivity of firms and their environmental efficiency finds some support in the empirical literature. For example, Cole et al. (2008) use data on 15 industries in China during the period 1997-2003 and find evidence of a negative link between total factor productivity and emissions of three air pollutants. Mazzanti and Zoboli (2009) find a positive relationship between labour productivity and emissions efficiency for several types of air emissions in Italy.

identified as an additional channel through which FDI may encourage the dissemination of environmentally friendly knowledge and technologies.

In sum, the scale-composition-technique framework has revealed at least three drivers of the relationship between trade and the environment that seem to be particularly important. The first is the role of technology in minimizing or possibly offsetting any negative environmental effects that occur through the scale and possibly the composition effects. Adequately designed and enforced environmental policy and an open trade regime have been identified as key conditions to facilitate the adoption of new technologies necessary to improve production methods.

The second driver is trade-related transport, and its contribution to greenhouse gas emissions. Whether this becomes a pressure point for the multilateral trading system depends in large measure on the results of cooperative efforts to internalize environmental costs in international transport prices, and on the future evolution of the geographical scope of preferential trade agreements and supply chains, among other factors. An additional driver pertains to the significance of environmental policy (relative to "traditional" factors, such as endowments of capital and labour) in determining countries' comparative advantage in dirty or clean production. Deriving appropriate policy conclusions from this aspect is hampered by the divergence of views on the difficulty of analysing the relationship between environmental policy and trade (see Section D.2(c)).

(ii) What is the net effect of trade on the environment?

Starting with Grossman and Krueger (1993), several econometric studies have examined the environmental impact of trade mostly by seeking to assess empirically the net result of the scale, composition and technique effects (Antweiler et al., 2001; Cole and Elliott, 2003). The ambiguity in the results of this literature may partly reflect differences in underlying conceptual frameworks, data sources and proxies, and econometric methodologies. Broadly, the studies suggest that total pollution may increase or decrease depending on whether the technique effect overrides the scale effect. The type of pollutant is among the factors that influence the net result. For a global pollutant such as CO_2, it appears that the scale effect tends to dominate the technique and composition effects. For some local pollutants, the technique effect is likely to exceed the scale effect. Moreover, some studies find differences in the impact of trade on the environment depending on countries' income levels (Managi, 2012).

Given that trade separates production and consumption across space, a set of studies have

developed concepts describing how trade distributes environmental degradation between countries. These studies remain largely descriptive and do not imply any causality between international trade and evidence of specialization in "dirty" production. Because of large data requirements in terms of comparable input-output tables and environmental impact measures, they usually consider a single country (Weber and Matthews, 2007; Jungbluth et al., 2011) or a small group of countries (Nakano et al., 2009). While several of these studies assess the environmental impacts embodied in trade for air pollutants such as CO_2 and SO_2 (Antweiler, 1996), others do this for water (Hoekstra and Hung, 2005), land use (Hubacek and Giljum, 2003), material extraction (biomass, fossil fuels, metals, and industrial minerals and construction minerals) (Bruckner et al., 2012), and pressure on biodiversity (Lenzen et al., 2012). None of these studies takes into account the energy and emissions associated with international freight transport.

Although empirical evidence suggests that most developed countries have increased their consumption-based environmental impacts faster than their domestic environmental impacts, making developing and emerging countries net exporters of embodied environmental impacts, there is no single pattern with respect to embodied environmental impacts (Ghertner and Fripp, 2007; Peters and Hertwich, 2008; Bruckner et al., 2012; Douglas and Nishioka, 2012; Lenzen et al., 2012; Peters et al., 2012). In fact, several developed and developing countries appear to be net exporters and importers, respectively. As noted, environmental impacts embodied in trade depend on many factors, including factor endowments, production technologies, trade balance, energy intensity and trade specialization (Jakob and Marschinski, 2012). Institutional factors may play an important role too.

Pressures on the environment caused by the rapidly growing weight of emerging economies in international trade has attracted much attention, and will probably continue to do so in the future. Looking ahead, a critical issue seems to be the extent to which the scale effects associated with the rapid rate of trade growth in emerging economies will be accompanied by changes in production methods that lower the pollution and energy intensity of their production and trade. One additional issue is the extent to which FDI into emerging economies results in positive environmental spillovers. Some empirical studies have sought to examine these factors with respect to particular countries. For example, Dean and Lovely (2008) find that China's increasing participation in global supply chains generated composition and technique effects that may have played a role in reducing the pollution content of its trade.

### (iii) How do environmental concerns affect trade?

In the absence of robust empirical evidence on the environmental effects of trade, there is a risk that public perceptions of the environmental consequences of trade will be shaped predominantly by narrow examples of harmful effects, which tend to carry strong emotional appeal and attract considerable media attention. This raises concerns that the perceived negative impact of trade on the environment could exacerbate existing protectionist sentiment caused by economic uncertainty and the perceived contribution of trade openness to growing unemployment and income disparities within and across countries (see Section D.1(b)). The following discussion reviews the available evidence on public perceptions of the environmental consequences of trade, and their possible influence on trade policy.

Data on how individuals perceive the environmental effects of trade are scarce. A 2007 survey of attitudes about globalization in 18 economies (comprising around 56 per cent of the world's population) reveals significant differences in attitudes across countries, with individuals in open economies displaying a more positive perception about the environmental impacts of trade than those in less open ones (see Figure D.12). Differences across countries are also evident in a survey of the 27 EU member states (European Commission, 2010). The share of respondents in the EU who consider environmental harm to be one of the major negative consequences of international trade ranged from 4 per cent in Bulgaria to 42 per cent in Austria. For the EU as a whole, environmental harm ranks well below unemployment among the perceived harmful consequences of international trade.

Relatively few studies have dealt with the interaction between environmental concerns and public attitudes towards trade. Among them, Bechtel et al. (2011) find that individuals in Switzerland who express a higher level of concern for the environment tend to perceive globalization negatively, favour the use of trade-restrictive measures to protect jobs endangered by import competition, and consider factors that go beyond price and quality in their purchasing decisions. Additional empirical research is needed to determine whether these results apply more widely.

In a related set of studies, political economists have drawn a link between the growing tendency to include environmental provisions in regional trade agreements and individuals' environmental concerns. Specifically, this literature argues that some countries may be relying on environmental provisions in regional trade agreements to appease voters who fear the negative effects of trade on the environment (Bechtel et al., 2011). This argument would seem to be particularly relevant for one type of environmental

Figure D.12: Public perceptions about the environmental impact of trade (percentage of respondents that agree with the statement shown on the vertical axis)
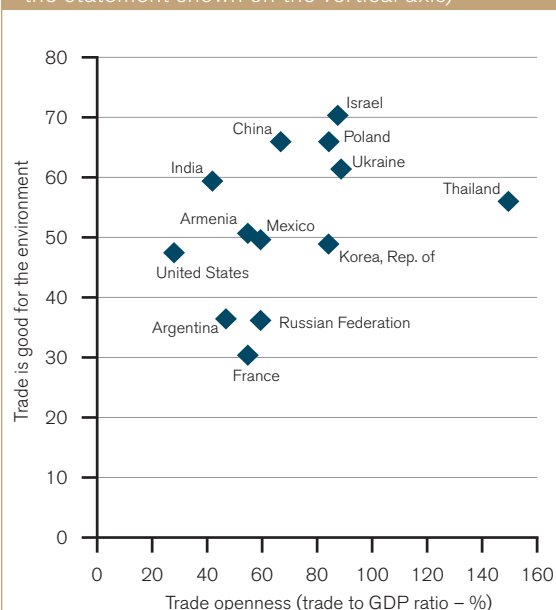
Source: Authors' calculations based on the Chicago Council on Global Affairs and WorldPublicOpinion.org (2007).

Note: The vertical axis shows the share of survey respondents that answered "good" to the following question: "Overall, do you think that trade is good or bad for the environment?", weighted by the share of population that answered either "good" or bad".

provision found in a growing number of regional trade agreements, namely the commitment by the parties to not lower environmental standards as a means to gain a trade advantage or attract investment (see Box D.5).

The overall conclusions in this strand of the literature may be applicable to other features of trade policy besides environmental provisions in regional trade agreements. For example, the proliferation of private standards could be seen as an indication of the influence on trade policy of concerns about the environmental effects of trade.

Private standards are developed by non-governmental entities, including businesses, trade associations, consumer groups and standardizing bodies, in response to rising consumer demand for information about the environmental and other characteristics of goods and services. They seek to strengthen markets for goods and services whose environmentally friendly attributes are "invisible" to consumers. While some of these standards focus solely on environmental criteria (related to a good or the way it is produced), others may incorporate food safety and social criteria.
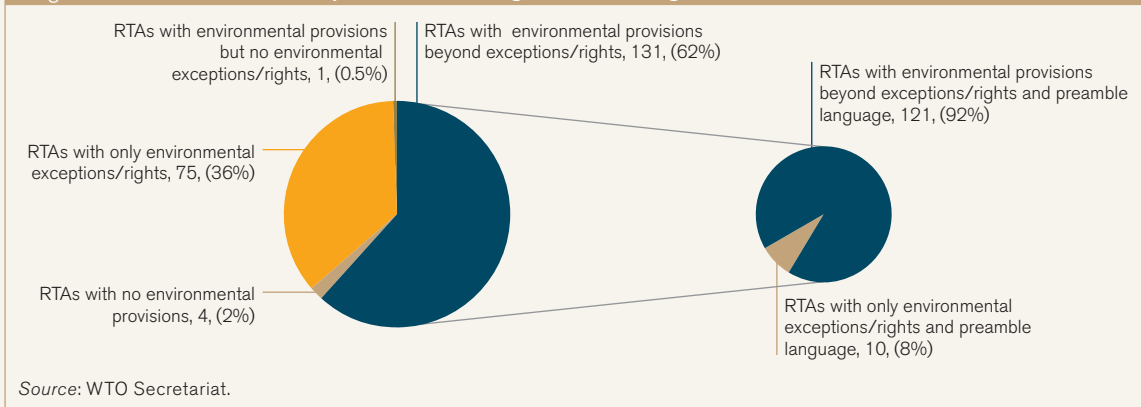
Private standards have been developed with respect to several environmental indicators, including carbon

Box D.5: **Environmental provisions of regional trade agreements**

Prior to the entry into force of the North American Free Trade Agreement (NAFTA) in 1994, environmental provisions in regional trade agreements (RTAs) were relatively limited in scope. References to the environment appeared mostly in the preamble to RTAs and the rules on general exceptions, largely mirroring the approach followed at the multilateral level.

Since NAFTA, the scope of environmental provisions in RTAs has expanded. Of the 194 RTAs that have been notified to the WTO (up to end-2010), close to 60 per cent contain environmental provisions other than those in the preamble or the general exceptions. Of the RTAs with more extensive environmental provisions, 55 per cent involved RTAs between developed and developing countries, 38 per cent RTAs between developing countries, and 7 per cent RTAs between developed countries.

Figure D.13: **Environmental provisions of regional trade agreements**

RTAs with environmental provisions but no environmental exceptions/rights, 1, (0.5%)

RTAs with environmental provisions beyond exceptions/rights, 131, (62%)

RTAs with environmental provisions beyond exceptions/rights and preamble language, 121, (92%)

RTAs with only environmental exceptions/rights, 75, (36%)

RTAs with no environmental provisions, 4, (2%)

RTAs with only environmental exceptions/rights and preamble language, 10, (8%)

Source: WTO Secretariat.

The expansion of the "environment dimension" of RTAs notably comprises the decision to include commitments on the level and stringency of domestic environmental laws and standards. Of all RTAs notified to the WTO, 46 contain such provisions. These provisions take the form of commitments to not lower environmental standards as a means to attract investment, to enforce domestic environmental laws and standards effectively, to raise environmental standards or even to harmonize them among the parties to the RTA. Although provisions on environmental laws and standards are most commonly found in RTAs between developed and developing countries, several agreements between developing countries contain such provisions too.

Cooperation on environmental matters is an additional subject often covered in RTAs. Some 70 notified RTAs cover environmental cooperation. There is significant variation in approaches to this issue. While some RTAs outline general principles, others identify specific issues or sectors for cooperation. Provisions on environmental cooperation found in RTAs between developed and developing countries tend to focus on building capacity and strengthening the design and implementation of environmental laws, while RTAs involving only developing countries stress the need to tackle common environmental problems.

Parties to RTAs sometimes establish institutional arrangements specifically targeted at facilitating the implementation of environmental provisions contained in the agreement. These arrangements may include review and monitoring bodies, dialogue and consultation mechanisms, or formal dispute settlement procedures. Increasingly, RTAs provide opportunities for public participation (e.g. access to information and documents, representation in committees, and submissions on enforcement matters) as part of the implementation arrangements related to environmental provisions.

footprints, food miles and embodied water use. They span a widening range of products, including food, household appliances, forestry products and services such as tourism. Although these standards are cast as "voluntary" in nature (because they are imposed by private entities), they may nevertheless have significant

impacts on trade, an issue that has been of particular concern to developing countries (WTO, 2012b).

In sum, there is insufficient evidence to draw a definitive conclusion about the future interaction between public perceptions of the environmental consequences of

trade on the one hand and trade policy on the other. More research is needed on the question of how widespread negative perceptions are about the environmental effects of trade, and whether such perceptions could result in a protectionist backlash.

Pending more robust empirical results, the available evidence would seem to suggest that people's concerns about trade and the environment do exert an influence on trade policy, albeit in other ways than outright protectionism. For example, concerns about the environmental impact of trade are reflected in the growing tendency to include environmental provisions in regional trade agreements; such concerns could also be seen as partly fuelling the proliferation of private standards that seek to respond to rising consumer demand for information on the environmental and other characteristics of goods and services.

(c)   Environmental policy and trade

A key aspect of the relationship between trade and the environment is the impact of the environment on trade through the channel of environmental policies. When referring to "stringent" environmental policies, the following discussion assumes that the stringency level in law is matched by correspondingly stringent enforcement. In practice, this may not always be the case, as adequate implementation may be impaired by weak institutional capacity in many countries (Poelhekke and Ploeg, 2012).

The interaction between environmental policy and trade is probably two-way. In other words, efforts to tackle impact on the environment through environmental policies may influence the direction and composition of trade flows, while openness to trade may affect the willingness and ability of governments to adopt environmental policies. The complex and multidirectional interaction between environmental policies and trade poses challenges for the multilateral trading system. A key question from the perspective of this report is whether these challenges will intensify in the future. The following discussion considers this question by examining two sets of policies related to climate change. Given that concerns about competitiveness strongly permeate policy and academic discussions on the effects of environmental policies and trade, we begin with an overview of this issue.

(i)   The competitiveness consequences of environmental policy

When evaluating the impact of environmental policy on trade, a useful starting point is to recognize that the magnitude of the impact can vary quite drastically depending on whether the measure in question is targeted at pollution from consumption or production (Copeland, 2012). An environmental policy measure that is targeted at 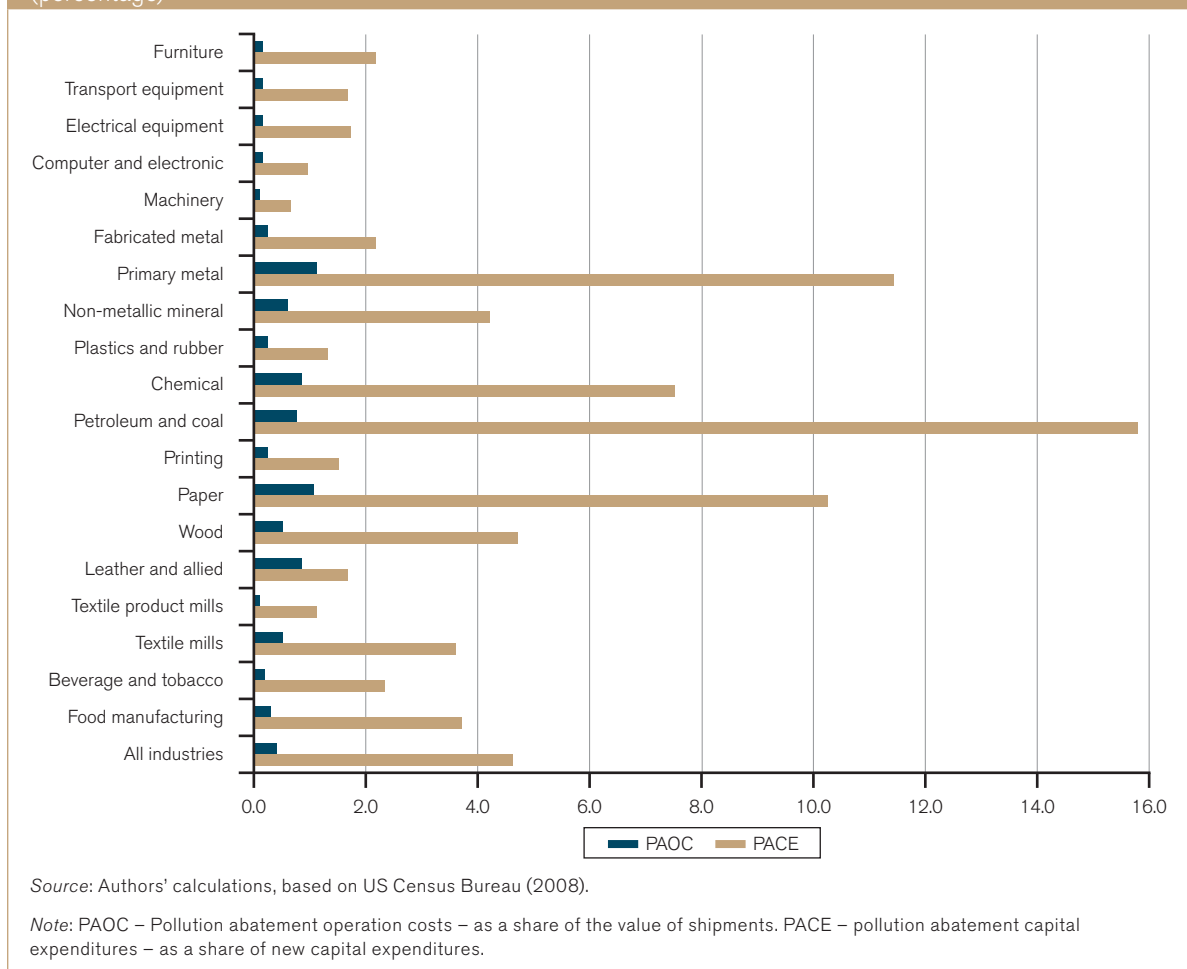pollution from consumption will normally increase costs for both domestic and foreign producers. One example would be a requirement setting a minimum level for the energy efficiency of household appliances. If the cost of complying with such a requirement is higher for domestic producers than foreign producers, imports of household appliances would increase and domestic production decrease.

By contrast, environmental policy measures that are targeted at pollution from production instead of consumption (e.g. a limit on waste-water discharges to surface waters by domestic producers of chemicals) could negatively affect the competitiveness of domestic producers by driving up their costs relative to foreign producers. This could result in a decrease in output of domestic chemicals, or put domestic producers of chemicals at a disadvantage relative to foreign producers.

Much of the economics literature assumes that environmental policies entail costs for particular firms and sectors (Pasurka, 2008). However, some observers have argued that these costs need not always result in competitiveness losses for affected firms and industries.[46] Porter and Linde (1995) postulate that properly designed environmental policy can lead to "innovation offsets" that will not only improve environmental performance but also partially or fully offset the additional cost of those policies. This is known as the Porter hypothesis, which has sparked an abundant empirical literature. Following Ambec et al. (2011), it appears that the "weak" version of the hypothesis (i.e. stricter policy leads to more innovation) is fairly well supported by the data, while the empirical evidence on the "strong" version (i.e. stricter policy enhances business performance) is mixed.

Assessing the competitiveness consequences of environmental policy is fraught with difficulties, partly because of the lack of data on the costs of compliance with such policies. The United States has published some relevant data, which suggests that the direct cost of pollution control is relatively minor. In 2005 (latest year available), US industry spent close to US$ 21 billion on operational costs to reduce pollution. For most industries, pollution abatement operation costs represent 0.5 per cent or less of revenue (see Figure D.14). This share can reach up to 1.1 per cent for pollution-intensive industries, such as primary metal and paper. Regarding capital expenditures to reduce pollution, the share of these expenditures in total new capital expenditures is usually below 5 per cent except for a handful of pollution-intensive industries, such as paper, petroleum and coal, chemicals and primary metals. The amount spent by US industry on pollution abatement capital expenditures in 2005 totalled around US$ 6 billion, slightly less than one-third of the total spent on pollution abatement operating costs that same year.

Figure D.14: **Pollution abatement costs in the United States, 2005** (percentage)

Source: Authors' calculations, based on US Census Bureau (2008).

Note: PAOC – Pollution abatement operation costs – as a share of the value of shipments. PACE – pollution abatement capital expenditures – as a share of new capital expenditures.

Economists have sought to assess the competitiveness consequences of environmental policy by testing whether the "pollution haven" hypothesis holds in practice. As noted, the pollution haven hypothesis predicts that trade (and capital) openness results in the relocation of pollution-intensive production from countries with stringent environmental policy to countries with lax environmental policy. Although the hypothesis is relatively simple, empirical studies designed to test it have yielded conflicting evidence, partly reflecting the use of different conceptual frameworks, data sources and proxies, and econometric methodologies. Following Copeland and Taylor (2004), recent studies in this area have found that differences in the degree of stringency of environmental policies tend to influence the distribution of "dirty" production across countries, suggesting that more stringent environmental policy has a "deterrent effect" on the production of "dirty" goods. Nonetheless, there is no robust evidence that this deterrent effect is "strong enough to be the primary determinant of the direction of trade or investment flows".

This general result implies that there may be negative competitiveness effects associated with more stringent environmental policy for particular firms and sectors, depending on their pollution intensity and degree of geographical mobility, among other factors. This raises the possibility that affected firms and sectors (and possibly others) may appeal to (real or perceived) competitiveness concerns when lobbying against environmental policies. Governments may in turn respond by incorporating trade-restrictive elements into environmental policies ("green protectionism") as a way both to compensate affected sectors and overcome resistance to environmental policy reform.

It has been suggested that the growing fragmentation of the production process along global supply chains (see Section B.2(e)) could ease competitiveness concerns associated with stringent environmental policy. With global supply chains, it is possible for only certain parts of the production process to be relocated in response to stringent environmental policy at home. Using a large sample of Japanese manufacturing firms, Cole et al. (2011) find evidence that firms outsource the dirty part of their production process. They suggest that "increases in environmental regulations can increase the health of local citizens without the massive job losses associated with wholesale relocation or closure predicted by industry lobby groups".

Nonetheless, the prospect of governments using green protectionism in exchange for political support for more stringent environmental policies remains a possibility, which could, if realized, complicate future efforts to open trade. As illustrated in the following discussion of the trade implications of specific environmental policies, much will depend on whether competitiveness concerns associated with environmental policy prompt governments to seek cooperative solutions to common environmental problems instead of resorting to green protectionism.

(ii) Interaction between environmental policies and trade

Coping with carbon leakage

Some of the more complicated and contentious environmental issues are global in nature – that is, they involve countries whose economic activities pollute or reduce a common resource, damaging all other countries. The absence of cooperative solutions to correct these cross-border effects poses challenges for tackling global environmental problems and managing the interface between environmental policies and trade. Challenges are particularly evident in the area of climate change, where the emergence of a patchwork of regional, national and sub-national climate change regimes may lead to concerns about the loss of competitiveness of certain firms and sectors, and the possibility of "carbon leakage". This refers to a situation in which reductions of greenhouse gas emissions by one set of countries ("constrained" countries) are offset by increased emissions in countries which do not take mitigation actions ("unconstrained" countries). Openness to trade and investment are two of the channels through which carbon leakage can occur.[47]

Until now, there has been no robust evidence of carbon leakage, in part because many carbon pricing policies are relatively recent, and carbon prices relatively low. The available literature, most of which relies on computable general equilibrium models, suggests that carbon leakage is modest overall.[48] Nonetheless, with high carbon prices, leakage would become relatively large for sectors that are energy and emissions intensive and exposed to international trade.

Most governments that have put in place carbon emissions trading schemes have sought to allay competitiveness fears and reduce the perceived risk of carbon leakage by allocating emissions allowances freely to participants.[49] Examples include Australia, the European Union, the Republic of Korea and New Zealand. A key issue with implications for the future of trade and the multilateral trading system is how countries will manage the perceived threats of competitiveness losses and carbon leakage during future implementation stages of their emissions trading schemes. Among the possible instruments to manage these twin threats are border carbon adjustments, which involve the extension of carbon pricing to imports and have therefore received significant attention in trade policy circles.

No country with an emissions trading scheme has yet put in place border adjustments but some proposals have been considered. Most of them focus on imports and would take the form of a tax on imported goods, or a requirement for importers to purchase emission permits or allowances for their imports. On the export side, border adjustments could take the form of an export rebate, where exporters shipping items to unconstrained countries are compensated for the cost of complying with emission requirements.

Although border adjustments may be justified as a second-best measure to complement carbon pricing schemes if no agreement on global carbon pricing can be reached, their practical implementation may be a source of trade friction. There are several practical difficulties involved in the implementation of a border tax adjustment in relation to a carbon pricing scheme, and further difficulties in designing a mechanism to adjust the cost of emission allowances and calculate the proper level of border adjustment (WTO and UNEP, 2009). The main challenges relate to the difficulty in assessing product-specific emissions and the fluctuations of the carbon price (or allowance price) in the context of an emissions trading scheme. An additional difficulty may arise in cases where imported products are subject, in the country of origin, to other climate change regulations, such as technical regulations, rather than price mechanisms such as taxes. Compliance with certain regulations, such as a fuel efficiency standard, may involve a cost (e.g. investment in more energy-efficient technologies) that may be complex to evaluate and transform into an adjustable price or a "comparable action".

Furthermore, although there is widespread interest in reducing carbon leakage and countries can have environmental reasons for using trade measures to prevent such leakage, there is a risk that these measures may be used to manipulate the terms of trade and protect domestic producers. The possible "dual use" of anti-leakage policies may blur the distinction between policies that seek to pursue a legitimate policy objective (e.g. tackling climate change) and those that are used as a means of supporting competitively challenged domestic firms and industries. This underlines the practical challenge of distinguishing between "legitimate" and protectionist motivations for anti-leakage measures and of identifying instances where they create trade barriers.

Promoting green technologies

A growing number of governments have put in place or are considering incentives for green technologies, in particular renewable energy. Some of these policies

(often referred to as "market-pull policies") seek to create demand for these technologies while others aim to increase supply or foster innovation (so-called "technology-push policies"). Common market-pull instruments include quota systems, feed-in tariffs and premiums, and a wide range of tax incentives.[50] Technology-push policies usually take the form of support for research and development at early stages of innovation, and for product development and manufacturing at later stages, mostly through financial and tax incentives.

Incentives to promote innovation and adoption of renewable energy technologies have been justified on the basis of particular hurdles facing renewable energy, including those related to the energy market structure, infrastructure, learning curves and future climate policy uncertainty (Popp, 2012; Serres et al., 2010). Nonetheless, the empirical evidence on the effectiveness of incentives for renewable energy remains relatively limited, in part due to issues of data availability affecting some recently enacted incentives (Fischer and Preonas, 2010). A study assessing the role of incentives in promoting the deployment of renewable energy technologies in 35 countries during the period 2000-05 found that only a small subset of countries had implemented policies that succeeded in accelerating deployment during that period (International Energy Agency, 2008). Several other studies on the effectiveness of incentives for renewable energy focus on selected instruments, limiting the extent to which policy alternatives can be compared (e.g. Klaassen et al., 2005). Moreover, some of the studies that examine the experience with incentives tend to avoid the question of whether the benefits of these policies exceed their costs (e.g. Buen, 2006).

The motivations for renewable energy incentives reach well beyond purely environmental concerns. Governments increasingly cast renewable energy incentives within the broader framework of "green competitiveness" – that is, as tools not only to achieve environmental (e.g. climate change mitigation) goals but also to stimulate economic growth, spur job creation and promote exports and diversification. For example, in 2007, the European Union put in place policies to increase the share of renewable energy in total energy consumption as a way to diversify EU energy supply and create new industries, jobs, economic growth and export opportunities (European Commission, 2012).

The Republic of Korea has identified several energy technologies as "new growth engines" in its National Strategy for Green Growth. The decision whether to include a particular technology in the list was based on its potential contribution to economic growth and environmental sustainability, and its "strategic importance" (OECD, 2010b). The 27 technologies selected are the focus of increased public spending on research and development. Under its strategic roadmap for 2011-15 (known as the 12th Five-Year Plan), China has identified for support several strategic export industries, including clean energy technology and clean cars.

The rapid proliferation of renewable energy incentives in both developed and developing countries and the growing tendency to link these measures to green competitiveness pose significant challenges for the management of the interface between trade and the environment. Although the trade effects of incentive measures will vary according to the magnitude of support provided and the measure's design features, including the question of how close the supported research or goods are to commercial application, some types of incentive policies may assist domestic firms in taking market share and profits away from more efficient foreign competitors or may otherwise distort trade so the risk of regulatory "capture" cannot be easily dismissed (WTO, 2012b).

The intertwining of environmental and green competitiveness objectives could increase the vulnerability of renewable energy incentives to powerful lobbies and rent-seeking behaviour. It could also result in flawed policy design due to the insufficient information to achieve multiple (and often vaguely defined) policy objectives (World Bank, 2012b). Some evidence lends support to concerns about the possible influence of political economy considerations in the design of renewable energy incentives. For example, Fischer et al. (2012) conduct simulations of the electricity sector and find that the magnitude of observed renewable energy technology incentives exceeds, probably by a wide margin, what would be justified by the positive effects generated by research and development or learning by doing. This result holds even assuming high spillover rates into other areas from learning by doing. Other work finds that certain renewable energy policies are driven by, among other factors, the presence of well-organized interest groups instead of environmental considerations (Lyon and Yin, 2010).

A related concern about renewable energy incentives stems from the decision by some countries to incorporate into such incentive schemes trade-restrictive policies, such as local content requirements. For example, under some national or sub-national programmes, participation in a feed-in tariff scheme (or the availability of additional benefits under such a scheme) is contingent on the use of domestically manufactured components of renewable energy technologies. These local content requirements may channel the additional demand for inputs created by the renewable energy incentive to domestic producers, possibly at the expense of more efficient foreign producers, causing distortions to international trade.

(d) Conclusions

Trade openness and environmental protection are key elements of sustainable development, and policies in both fields should work to utilize existing resources better. There is no inherent conflict between trade openness and environmental sustainability and there are many instances where measures that promote one objective promote the other too. This was recognized at the time of the WTO's creation in 1995, when WTO members stressed that trade and the environment can and should be mutually supportive, and that trade policies should be conducted in accordance with sustainable development objectives and should seek to protect and preserve the environment.

Trade and the environment interact in complex ways, with multiple feedback effects between them. If not managed carefully, the multifaceted relationship between these two interconnected systems may give rise to tensions, which can weaken the positive contribution of trade to economic growth and sustainable development.

The dramatic increase in world trade during the past three decades, which has coincided with a period of significant environmental transformations and problems, has drawn attention to the growing scale effects of trade. Most of this attention has been directed at large emerging economies, given their rapidly growing weight in international trade. Conclusive empirical evidence on the global, average or net effect of trade opening on the environment, however, remains elusive.

Looking ahead, there remain many unexploited opportunities to bolster the environmental gains from trade. Trade has the potential to prompt changes in production methods, which offset the scale effects of trade. However, the so-called technique effect may be contingent on many conditions, including an open trade regime, sound environmental policies and sound institutions. This highlights the importance and urgency of the first-ever multilateral negotiations on trade and the environment, where WTO members are seeking to reduce or eliminate the barriers affecting trade in green goods and services.

Transport, which is an additional driver of the scale effects of trade, has come under increased scrutiny too, largely because of its contribution to carbon emissions. Although the bulk of trade relies on maritime transport, which is the most efficient mode of transportation in terms of carbon emissions, trade-related transport is projected to increase sharply during the next few decades, as are transport-related emissions costs. These projections may be affected by the future importance of cross-regional relative to intra-regional preferential trade agreements and the evolution of international supply chains. An additional factor to be considered is the outcome of multilateral efforts to align the private and social costs of international transport, including through market-based measures that incorporate environmental costs in international air and maritime transport prices.

In principle, the scale effects of trade could play an important role in shaping public perceptions and attitudes towards trade, thereby heightening protectionist sentiment. Nonetheless, drawing a definitive conclusion on how public perceptions related to the environment are affecting trade must await additional research. The available evidence would seem to suggest that individuals' concerns about the environment do exert an influence on trade policy in ways other than protectionism. For example, concerns about the environmental impact of trade have been implicated in the growing tendency to include environmental provisions in regional trade agreements or in the proliferation of private standards.

Besides the scale effects of trade, the competitiveness effects of environmental policy are sometimes perceived as holding back environmental policy reform. There is no robust empirical evidence on the so-called pollution haven hypothesis. Still, environmental policies inevitably affect production and consumption patterns, and may therefore have adverse effects on the competitiveness of particular firms or sectors, which may then appeal to (real or perceived) competitiveness concerns when lobbying against environmental policies. Governments, in turn, may respond by incorporating trade-restrictive elements into environmental policies.

In an effort to boost "green competitiveness", a growing number of governments have put in place incentive packages for green technologies, with a focus on renewable energy. From the perspective of future trade and the multilateral trading system, the risk is that the intertwining of environmental and green competitiveness objectives may increase the vulnerability of renewable energy incentives to powerful lobbies. It may also result in flawed policy design due to the lack of sufficient information to achieve multiple (and often vaguely defined) policy objectives. This could exacerbate the possible adverse trade effects of some types of incentive measures, and undermine their environmental effectiveness.

Global environmental problems are likely to pose additional challenges for trade and the multilateral trading system. This is particularly evident in the area of climate change, where the emergence of a patchwork of regional, national and sub-national climate change regimes may lead to concerns about the loss of competitiveness of energy-intensive and trade-exposed firms and sectors, and the related possibility of "carbon leakage". Although border adjustments may be seen as a second-best measure to prevent these effects, if no agreement on global carbon pricing can be reached, their practical implementation may be a source of trade friction. In

addition, there is a risk that these measures may be used for manipulating the terms of trade and protecting domestic producers. The possible "dual use" of these measures underlines the practical challenge of distinguishing between "legitimate" and protectionist motivations for anti-leakage measures and of identifying instances where they create trade barriers.

The individual and collective decisions by open economies in managing the relationship between trade and the environment carry significant implications for the future of international trade and the WTO. The future evolution of this relationship will depend in large measure on how governments respond to competitiveness and other concerns related to environmental pressures and policies. Collective efforts that result in agreed policy approaches towards global environmental problems may limit the scope for negative competitiveness consequences, thereby reducing the risk that individual countries will favour protectionist policies. This underlines the importance of improved multilateral cooperation at the WTO as much as within the global environmental governance regime.

3. Macroeconomic and financial concerns

As destabilizing as they may be in the short run, macroeconomic and financial shocks only affect long-term trends when the underlying factors of growth are negatively and durably altered, for example in the form of severe changes in the supply of labour and capital. The 2008-09 financial crisis, and its relative similarity to the 1929 crisis (a financial crisis having global effects on production and trade), is a reminder that macroeconomic and financial shocks can have strong, recurrent and global, if not durable, effects on trade and growth.

Two channels of particular interest to the WTO through which macroeconomic and financial shocks influence international trade are credit crunches, which reduce the amount of finance available to traders, and exchange rate shifts, which divert trade flows and strain trade relations. While exchange rates eventually adjust and credit crunches are generally associated with the "purge" of over-leveraged financial sectors, they may nonetheless derail both the trend and the rate of expansion of world trade. This section reviews the problems that excess exchange rate variability and shortages of trade finance pose to trade expansion and discusses how they may contribute to shaping the macro-financial environment impacting trade in the future.

(a)   Trade finance

Finance is the "oil" of commerce. Most trade transactions are supported by short-term trade credit – according to

IMF-BAFT (2009), 80 per cent of all trade finance is in the form of either structured finance (letters of credit or similar commitments, using the merchandise as collateral) or open account liquidity supplied against receivables.[51] In principle, while the commercial risks involved in an international trade transaction seem to be larger than in a domestic trade transaction (risk of non-payment, risk of loss or alteration of the merchandise during shipment, exchange rate risk), trade finance is generally considered to be a particularly safe form of finance, as it is underwritten by strong collateral and documented credit operations.

According to the International Chamber of Commerce's (ICC's) "trade finance loss register", the average default rate on short-term international trade credit is no larger than 0.2 per cent, of which 60 per cent is recovered (ICC, 2011). Despite trade finance being a routine task, it is vital for trade. Until the financial crises of the 1990s and of 2008-09, trade finance had been taken for granted. The crisis periods created distortions in the trade finance market which made policy interventions necessary. Below is a discussion of the link between trade and trade finance and of key drivers of trends in trade finance.

(i)   Clarifying the link between trade finance and trade

During the Asian financial crisis, policy institutions, such as the IMF and the WTO, had revealed elements of market failure in explaining the trade credit crunch. These included herd behaviour, increased gap between the level of risk and its perception, market concentration and confusion between country and counterparty risk (IMF, 2003; WTO, 2004b). Academic research on the role of trade finance has grown in the context of the 2008-09 financial crisis and the subsequent economic downturn, when global trade outpaced the decline in real GDP by a factor of 12 – a figure much larger than anticipated under standard models. As summarized by Eichengreen and O'Rourke (2012), "the roots of this trade collapse remain to be fully understood, although recent research has begun to shed light on some of the causes (see Baldwin, 2009; Chor and Manova, 2012)". While most authors agree that the fall in demand has been largely responsible for the decline in trade flows, the debate has focused on the extent to which other potential factors, such as trade restrictions, a lack of trade finance, vertical specialization and the composition of trade, may have played a role.

Empirical work on trade finance has been limited by the lack of a comprehensive dataset, despite the availability of qualitative information provided by surveys on market trends and structure (ICC 2009; IMF-BAFT 2009). However, progress has been made in highlighting some links between financial conditions, trade credits and trade at the firm level.

Amiti and Weinstein (2011) establish causality between firms' exports, their ability to obtain credit and the health of their banks. Using firm-level data from 1990 to 2010, they suggest that the trade finance channel accounted for approximately 20 per cent of the decline in Japan's exports during the financial crisis of 2008-09. The authors show that exporters are more reliant on trade credit and guarantees than domestic producers, and that firms working with troubled banks saw their foreign sales drop by more than that of their competitors. Multinational enterprises seem less affected, notably because a large part of multinational trade is intra-firm, which exhibits less risk. Multinationals are also able to optimize the production-to-trade cycle, thereby minimizing working capital needs: the shorter the lag between production and payment, the less finance is a problem.

In the same vein, Bricongne et al. (2012) find that sectors highly dependent on external finance have been most severely hit by the financial crisis and experienced the largest decline in their export activity. Using monthly data for individual French exporters at the product and destination level, the authors also found that both small and large firms had been similarly affected by the crisis. Using data on US imports, Chor and Manova (2012) find that credit conditions were one channel through which the crisis led to the collapse in trade. Countries with tighter credit markets, measured by their interbank interest rates, exported less to the United States during the financial crisis. This effect was especially strong for financially vulnerable industries. These industries, categorized by Chor and Manova (2012) as those that require extensive external financing, had limited access to

trade credit. Access was especially limited during the peak of the financial crisis. Some studies, however, have not found any significant role played by trade finance in the "Great Trade Collapse" (for example, Paravisini et al., 2011 and Levchenko et al., 2010).

At the macro level, Korinek et al. (2010) find a strong statistical relationship between insured short-term trade credit, as a proxy for total trade finance, and trade flows. When extending the same dataset over a full business cycle, 2005-12, this strong correlation is confirmed (see Figure D.15).

(ii) Key drivers of recent developments in trade finance markets

Risk aversion and market failures during recent financial crises

As indicated above, trade finance is one of the safest financial activities, with low credit default rates. However, as a short-term lending activity, it is heavily reliant on re-financing on the inter-bank market for wholesale, short-term funds. In the 2009 financial crisis and in the Asian financial crisis of 1997-99, the overall tightening of liquidity on inter-bank markets appears to have had an impact on trade credit supply through a contagion effect: not only was liquidity insufficient to finance all requests for lending but trade lending was additionally affected by the general re-assessment of risk linked to the worsening of global economic activities.

In the last quarter of 2008, notably at a time when central banks injected large amounts of liquidity, the

Figure D.15: **Relation between imports and insured trade credits, 2005-2012**
(US$ million, averaged over all countries)
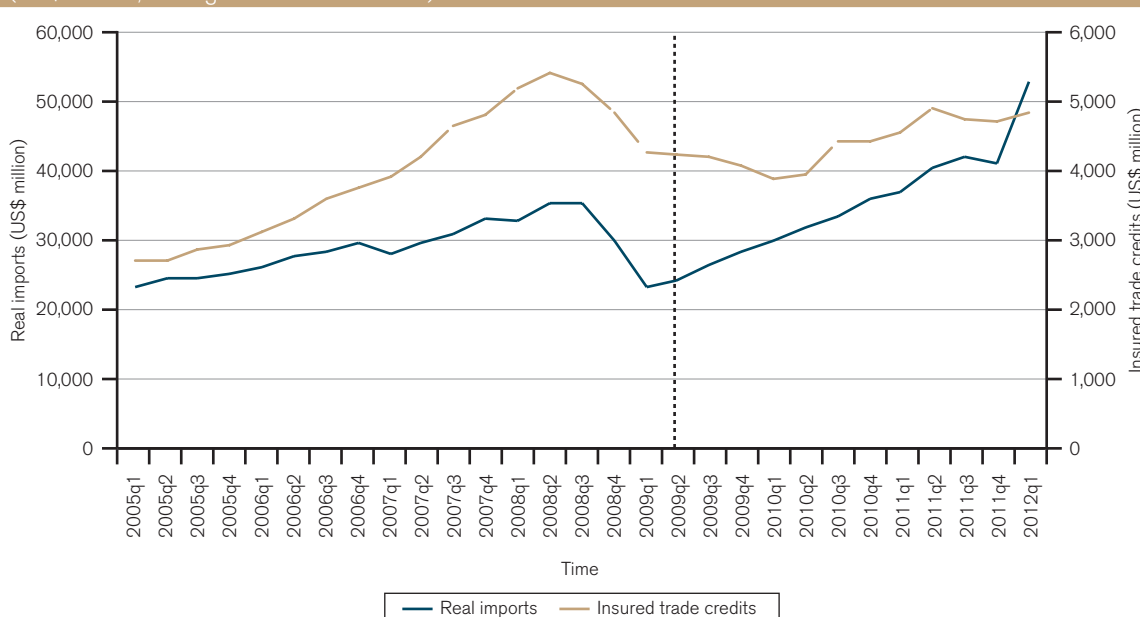
Source: Auboin and Engemann (2012).

G20 discussed whether a specific, tailor-made trade finance "package" was required to address the lack of trade finance. The problem was two-fold. A large share of the additional liquidity provided by central banks at the time was not intermediated into new loans. Hence, it did not finance "new" trade transactions. Secondly, the liquidity injection by the central banks did not resolve the growing problem of risk aversion, as the crisis spread.

The perception of risk of non-payment increased disproportionately relative to the actual level of risk. This manifested itself in a sharp increase in the demand by traders for short-term trade credit insurance or guarantees. The G20 responded to this by committing to supply greater "capacity" through export credit agencies. The question arose whether the G20 package carried an element of "moral hazard", i.e. whether such insurance might lead to imprudent lending decisions.

The 2008-09 financial crisis revealed many market failures, starting with the failure by credit rating agencies and all other market surveillance mechanisms to detect early signs of deterioration of the general soundness of banks, in particular the multiplication of off-balance sheet operations and the subsequent deterioration of their risk profiles. Another failure was the absence of a proper "learning curve" to allow for a better differentiation between "ill" market segments and "healthy" ones.

By the time of the London G20 Summit in April 2009, surveys by the International Chamber of Commerce (ICC) Banking Commission and the Bankers' Association for Finance and Trade (BAFT) on current trade finance market trends (ICC, 2009; IMF-BAFT, 2009) had provided confirmation of the sharp deterioration (lower volumes, higher prices) of markets and evidence of shortages in some regions.[52] This prompted the G20 to provide US$ 250 billion of trade finance for two years (Auboin, 2009; Chauffour and Malouche, 2011).

The G20 package provided temporary trade finance support in a way that would not result in the long-run displacement of private market activity. This package comprised a mix of instruments that allowed for greater co-lending and risk co-sharing between banks and public-backed international and national institutions. The working group that was established by the G20 to monitor the implementation of the package found that after one year, some US$ 150 billion of the funding had been used.

Specific problems of low-income countries

The problems faced by traders in low-income countries in accessing affordable trade finance are to a large extent structural and have worsened since the crisis. For example, a recent survey by the Netherlands' Centre for the Promotion of Imports from Developing Countries (CBI) revealed that a majority of small and medium-sized enterprise (SME) exporters in Africa consider that trade finance costs have increased in the last three years, and that access to trade finance has become more difficult (CBI, 2013).

SMEs in developing countries are generally faced with a mix of "structural" constraints. These range from a lack of know-how in local banks to a lack of trust, reflected in traders being required to set aside very large collateral against a trade loan and to pay high fees for these loans. This is despite the fact that the rate of default on trade payments in low-income countries is not much higher than in other parts of the world.

Multilateral development banks have developed a network of trade finance facilitation programmes aimed at supporting trade transactions at the "lower end" of such trade finance markets – transactions ranging from a few thousand dollars to a maximum of a few million. These programmes provide risk mitigation capacity (guarantees) to both issuing and confirming banks to allow, in particular, for rapid endorsement of letters of credit – a major instrument used to finance trade transactions between developing country players and between developed and developing countries. In the midst of the financial crisis, during the autumn of 2008, and with support from the WTO and the G20, the guarantee limits of these programmes were increased to support trade transactions in these markets and to reduce the "structural confidence gap" between the existing level of risk and its perception. The demand for these programmes continues to be strong.

Challenging regulatory requirements

The expansion of world trade depends on the stable and predictable functioning of the financial system. As a result, the strengthening of prudential rules is beneficial for both the financial system and for world trade. In a joint letter sent to G20 leaders in Seoul in November 2010, the heads of the World Bank and the WTO raised the issue of the potential unintended consequences of new global prudential rules (so-called Basel II and III frameworks) on the availability of trade finance in low-income countries.

While trade finance received preferential regulatory treatment under the Basel I framework in recognition of its safe, mostly short-term character, the implementation of some provisions of Basel II proved difficult for trade. Basel III added a leverage tax on letters of credit to these requirements. The letter pointed out that given the systemic importance of trade finance for trade and development, the application of excessively stringent regulatory requirements could reduce incentives in the financial sector to engage in trade finance (relative to other asset categories).

As a result, these issues were discussed by the Basel Committee on Banking Supervision Policy

Development Group and the institutions concerned with trade finance, notably the WTO, the World Bank and the ICC. Based on proposals made by the WTO and the World Bank, the Basel Committee decided in October 2011 to waive the obligation to capitalize short-term letters of credit for one full year as the average maturity is between 90 and 115 days. This measure has the potential to unblock hundreds of millions of US dollars to finance more trade transactions. In January 2013, the Basel Committee also decided to alter the liquidity requirements for short-term lending, particularly those used by developing country traders.

(iii) Challenges for trade finance in a context of financial deleveraging

A key question is whether a downsizing of the financial sector as a whole could potentially lead to a reduction in the supply of trade finance as well – and hence hamper the future expansion of trade.

The 2012 *Annual Report of the Bank for International Settlements* (BIS) indicates that the European and US banking sectors are currently undergoing a period of "de-leveraging" of bank balance sheets that might result in a "welcome downsizing of the banking sector over the long run" (BIS, 2012). This may lead to more sustainable and sound financial conditions in the global economy. Considering that the expansion of the global financial industry in the 2000s (measured by its share in GDP or the share of total credit to incomes) had been encouraged by excessive "leveraging" of banks and risk-taking, a period of credit moderation and more realistic returns on capital would yield substantial economic benefits. These include more prudent lending policies, declining debt to income ratios and a return to a more usual allocation of capital resources, with less diverted from other sectors because of artificially high returns in the financial sector.

However, financial crises, when triggered by the bursting of asset bubbles (real estate or financial assets), may lead to significant and lengthy corrections in the financial sector, with long-lasting effects on the economy. Downsizing can be a long and bumpy process, which may also lead to adverse macro- and micro-economic consequences. Figure D.16 shows that after the credit crunch in 2008-09, year-on-year growth in claims on non-financial sectors remained mainly negative from 2010 to the beginning of 2012 for the Euro area as well as for advanced economies more generally, i.e. that banks were lending less to the real economy. Only emerging country banks increased their lending activities over this period.

At the macro level, financial crises can have negative spillovers in several ways. Banks may reduce the supply of new credit to economic agents in an effort to contain, or even reduce, the size of their assets in order to meet prudential ratios.[53] Existing, over-valued assets may have to be written off or sold at a loss, with the effect of reducing bank profitability.[54] Secondly, the combination of reduced profitability on bank assets and reduced new lending may be a source of contraction for the economy's overall investment rate – both for the financial sector and for the economy as a whole (through reduced lending). If capital accumulation were to be impaired for an extended period of time, potential output would be reduced.

According to Irving Fisher's debt-deflation mechanism, financial crises usually lead to a collapse in credit and

Figure D.16: **Year-on-year growth of claims on non-financial sectors, 2006-2012** (percentage)

Source: Authors' calculations based on BIS Locational Banking Statistics.
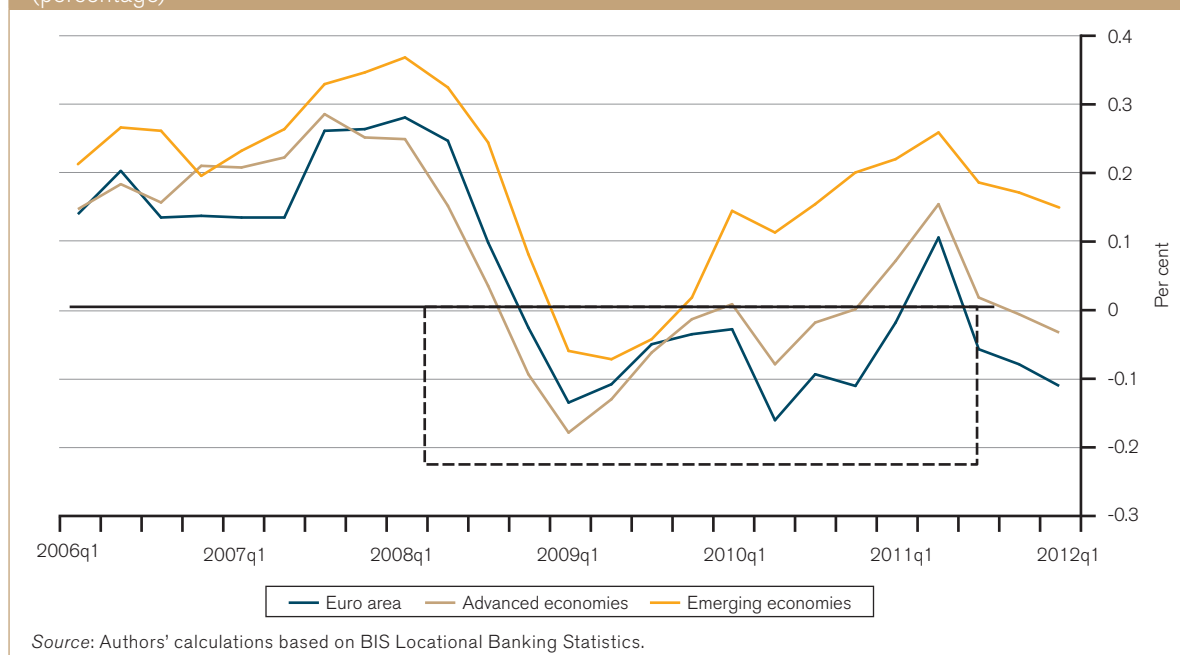
a decline in price levels, hence deflation (Fisher, 1933). Both high debt ratios and deflation generally cause depressions because debt burdens become even higher in real terms. As Fisher (1933) put it, "each dollar of debt still unpaid becomes a bigger dollar, and if the over-indebtedness with which we started was great enough, the liquidation of debts cannot keep up with the fall of prices which it causes."

During the recent financial crisis, high debt and high leverage ratios have been the main topics of discussion, with deflation being discussed less. Figure D.17 shows that annual growth in consumer prices decreased during this period, but it was only negative in 2009 for the United States and China, while for Europe it remained positive. In 2010 and 2011, consumer prices for the United States, China and Europe rose again. Central banks provided the necessary liquidity to allow banks to deleverage. However, the problem of long deleveraging periods is not necessarily deflation but a misallocation of resources. New loans are displaced by old loans, which may induce a long period of credit crunch leading to stagnation.

At the micro level, a long period of financial retrenchment may also lead to substantial negative effects, in particular for trade finance and hence trade. Explicitly, the allocation of capital resources may not improve if there is less credit.

Long periods of credit crunch can affect certain categories of economic agents or credit, such as trade credit, disproportionately – despite their good credit or safety record. Amiti and Weinstein (2011) argue that the decade-long downward adjustment of the Japanese financial industry has not had a neutral effect on the financing of Japanese exporters. Firms working with troubled banks saw their export performance decline in absolute terms. SMEs, in particular exporting ones, were the most affected because they were the most dependent on trade credit.

The question arises as to whether the access of SMEs to credit in general, and to trade credit in particular, will be negatively affected in a context of increased competition within the credit committees of banks who arbitrate on the different categories of loans. One potential pitfall of a process of greater "selectivity of risk" is the possible allocation by banks of scarce capital resources to the most profitable credit segments, thereby reducing their involvement in lower-profitability products such as short-term trade finance. Another pitfall is that banks may focus on their most profitable customers – the larger ones. Hence, a downsizing of the financial sector and greater selectivity in risk-tasking may not act automatically in favour of an improved allocation of resources in the financial industry.
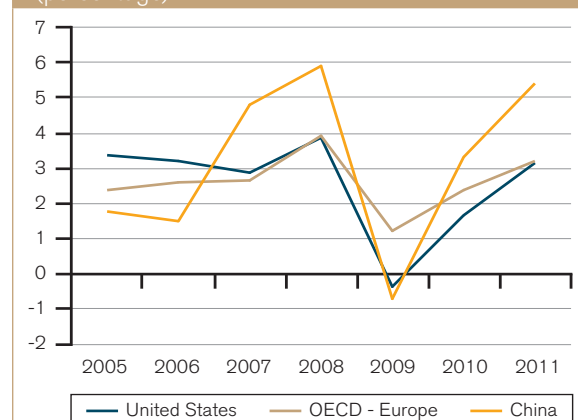
Trade finance may be used as a prime instrument for reducing the size of a bank's balance sheet, hence achieving rapid deleveraging. Because of its short-term, roll-over nature, most trade credit lines expire after 90 days, the average duration of transactions. By not renewing (rolling-over) or by reducing these credit lines, banking intermediaries can achieve a quick reduction of their lending (deleveraging) when needed. At the end of 2011, a few European banks announced a reduction of trade credit lines in an effort to restructure their balance sheets. This approach proved to be short-lived.

Trade finance may also be negatively affected if the re-scaling of the financial sector is accompanied by "re-nationalisation" of lending activities at the expense of cross-border lending. Many international banks have already scaled back international activities. As indicated by the BIS, "in addition to write downs of cross-border assets during the crisis, the more expensive debt and equity funding also led to reductions in the flow of cross-border credit. As a result, credit to foreign borrowers has fallen as a share of internationally active banks' total assets (see Figure D.18). For European banks, the share has declined by almost 30 percentage points since early 2008. Not all banks have reduced foreign activities, with notable exceptions being Asian-based banks and banks in other emerging countries. However a re-composition of the banking landscape, with shifts in market share, may be at play.
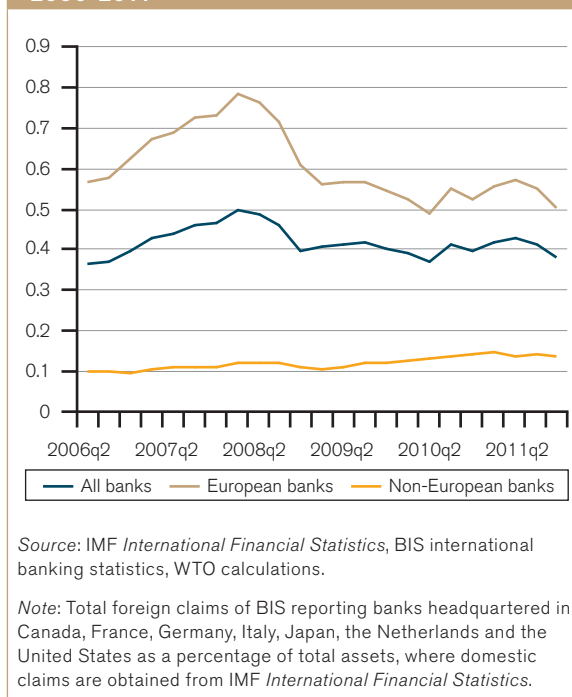
(iv) Looking ahead

The future direction of the international banking industry is difficult to predict, although some reduction of its share in GDP, at least in advanced economies, may be expected. Much depends on the incentives provided by a new, reformed financial system. Normally, bank lending should be re-oriented towards more sustainable forms of finance. If balance sheet shrinkage works at the expense of "leverage

Figure D.17: **Annual inflation – year-on-year change in consumer prices of all items, 2005-2011** (percentage)

Source: OECD.

Figure D.18: **Ratio of foreign to total assets, 2006-2011**

Source: IMF *International Financial Statistics*, BIS international banking statistics, WTO calculations.

Note: Total foreign claims of BIS reporting banks headquartered in Canada, France, Germany, Italy, Japan, the Netherlands and the United States as a percentage of total assets, where domestic claims are obtained from IMF *International Financial Statistics*.

finance and off-balance sheet toxic investment", traditional forms of finance might benefit. In that case, lending would be re-oriented towards real economy financing, including trade finance, which is an important factor of trade, not only in periods of crisis (Auboin and Engemann, 2012). At the same time, if rationalization of the sector works in favour of higher-yielding forms of lending, as opposed to cross-border lending, the question as to whether to stay engaged in trade finance will be posed by many financial intermediaries.

The question of entering or exiting trade finance is not an easy one to answer. Trade finance bears "fixed costs" of doing business, particularly costs of origination of trade finance transactions (investing in back offices, customers and sales relations, opening foreign branches, being acquainted with international trade finance procedures). Of course, the decision to stay engaged in trade finance depends largely on the demand for real trade transactions – and hence the continuation of production sharing and trade relations. Multilateral agencies will need to remain engaged in trade finance, at least to help fill the gap at the "lower end" of the market, notably in low-income countries. Dialogue with regulatory agencies will need to be pursued to ensure that trade finance is recognized as a development-friendly and low-risk form of finance.

(b)   Currency movements

Exchange rates can influence international trade in many ways. Real exchange rates (the relative prices of tradable to non-tradable products) can affect the incentive to allocate resources between sectors producing such tradable and non-tradable goods. The trade impact of exchange rates can be analysed through two effects: the fluctuations of exchange rates, which can be a source of frustration for individual producers and traders, as they may impose high uncertainty costs; and prolonged deviations of currencies from their equilibrium levels – so-called misalignments – which are regarded as important distortions in international price competition. In the short run, they may negatively impact the allocation of resources between countries. In the longer run, the situation is less clear.

Economic theory suggests that when markets are free of distortions, an exchange rate misalignment has no long-run effect on trade flows as it does not change relative prices. However, long-run effects are predicted in models that assume market distortions, such as information problems or product market failures. In the short run, when some prices in the economy are less likely to adjust, movements in nominal exchange rates can alter relative prices and affect international trade flows, although this depends on several factors, including the pricing strategy of trading firms and the importance of global production networks. Thus, these short-run trade effects are not straightforward.

Even if longer-run economic effects of currency misalignments cannot be fully established for all countries and in all circumstances, persistent misalignments in exchange rates are a systemic irritant in international trade because they fuel perceptions of unfair monetary competition. This, in turn, creates pressure on the use of trade policy measures, such as tariffs and trade "defence" instruments, to redress perceived monetary imbalances. For this reason in particular, the world trading system needs an international monetary system promoting exchange rate stability and adjustments. Progress in monetary cooperation is uneven, however. The exchange rate issue can, therefore, be expected to remain with the world trading system for some time.

Figures D.19 and D.20 show trends in the volatility and levels, respectively, of real effective exchange rates for selected regions and countries over time.

(i)   Exchange rate volatility and trade

After a period of 30 years of relative stability of both nominal and real exchange rates under the Bretton Woods system, increased volatility of exchange rates from the early 1970s triggered a lively debate on the channels through which such increased volatility could affect the real economy (Figure D.19).

Particularly strong concerns were expressed by the trading community, which had negotiated substantial reductions in border protection when the Gold Exchange Standard determined exchange rates. At the request of the then Director-General of the General Agreement on Tariffs and Trade (GATT) (on behalf of
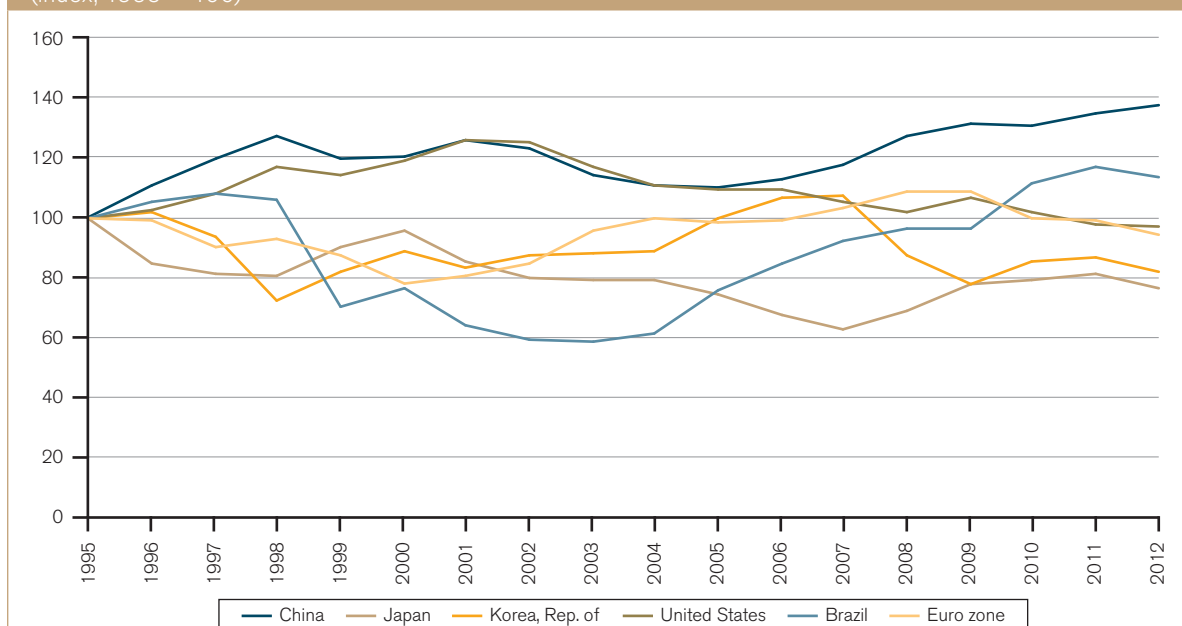
Figure D.19: **Volatility of real effective exchange rates, 1975-2012**
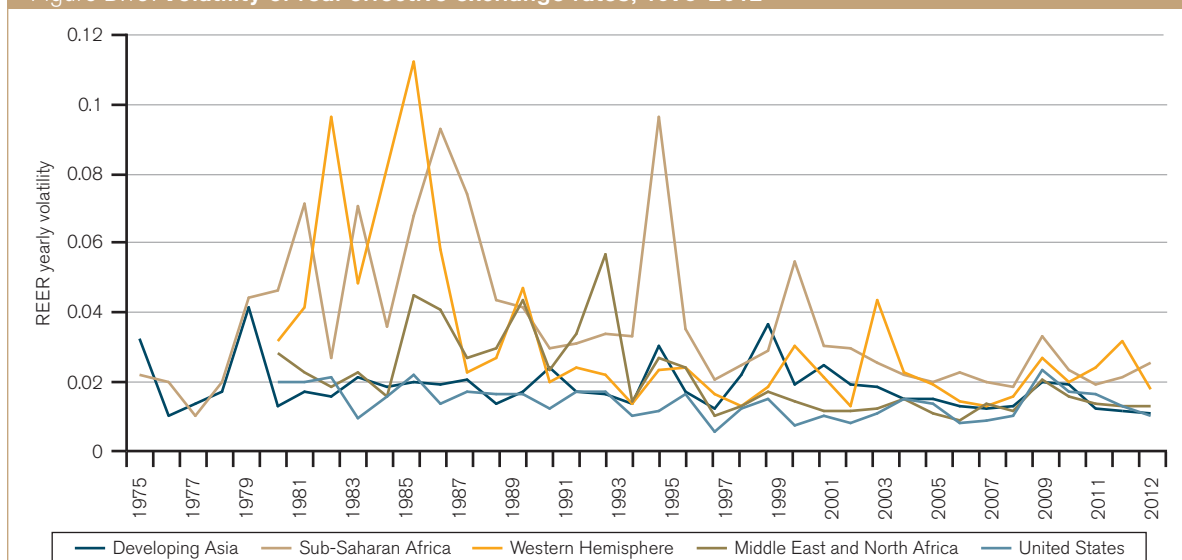
Source: IMF *International Financial Statistics*.
Note: Volatility is computed as the yearly standard deviation of monthly growth in real exchange rates.

Figure D.20: **Levels of real effective exchange rates, 1995-2012**
(index, 1995 = 100)

Source: Bruegel Institute – Real Effective Exchange Rate Database.

the General Council), the International Monetary Fund (IMF) examined the effects of greater exchange rate volatility on global trade.

While concluding that the evidence concerning a negative effect of the increased volatility of exchange rates on global trade was slim, the IMF (1984) highlighted the role of exchange rate risk. This was in line with earlier (1970s and 1980s) theoretical analyses of the relationship between exchange rates and international trade. These studies focused primarily on the commercial risk involved in conducting

international transactions and the uncertainty generated by short-term or long-term exchange rate volatility. The question of how this uncertainty affected the decision to trade, its expected profitability and eventually the allocation of resources between tradable and non-tradable goods and services was the main focus of these studies.

A simple explanation of how exchange rate volatility affects trade is provided by Clark (1973). He explains how the uncertainty about future exchange rates translates directly into uncertainty about future

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receipts in domestic currency and how producers adjust production and exports downwards to reduce exposure to exchange rate risk. The view that an increase in exchange rate volatility will have adverse effects on the volume of international trade is relatively widespread in studies conducted throughout the 1970s and 1980s (see also Baron, 1976; Cushman, 1983; De Grauwe and Verfaille, 1988; Giovannini, 1988; Bini-Smaghi, 1991). However, these conclusions rest on relatively firm assumptions, which have been scrutinized and adapted by other authors – notably the assumption of perfect competition, the large role of the invoicing currency, the absence of imported inputs, the high aversion to risk and the absence of exchange rate hedging financial instruments. This has led to more sophisticated multi-country models with diversified firms, in which the relationship between exchange rates, the supply of goods and the decision to trade become more ambiguous (see Box D.6).

Reflecting the relatively inconclusive state of early theoretical models regarding the effects of exchange rate variability on trade, the vast empirical work produces equally ambiguous results. As argued by Taglioni (2002), "it is customarily presumed that the adverse effect of exchange rate volatility on trade flows, if it exists, is certainly not large". This conclusion is generally shared by Ozturk (2006), who reveals a wide range of empirical evidence, some supporting and some contradicting the hypothesis of a negative relationship between exchange rate volatility and trade.

As aptly summarized by Coric and Pugh (2010), "on average, exchange rate variability exerts a negative effect on international trade. Yet, […] this result is highly conditional. […] Average trade effects are not sufficiently robust to generalize across countries." Results are conditional for the same reasons as identified in theoretical models: the existence of hedging instruments, the presence of imported inputs, the possibility of invoicing in local currency and the capacity to absorb losses due to exchange rate changes and other factors in profit margins. The firms most sensitive to exchange rate volatility may not be the large ones but rather the smaller firms (as shown in Section B.2(f)). In addition, empirical studies tend to find a significant effect mainly in the case of trade with close neighbours, particularly in the case of very integrated economies.

(ii) Exchange rate misalignments

The debate on the trade impact of exchange rates has resurfaced in the past decade, with the build-up of large external global imbalances. After the 2009 global recession, concerns about unemployment and slow recovery have increased the suspicion that some countries are seeking to "export" their way out of the crisis at the expense of trading partners. Hence, the policy debate has shifted from the impact of exchange rate volatility on trade towards the effects of sustained currency misalignment. This means that the emphasis is less on the effects of variability and more on the level of real exchange rates.

Exchange rates can depart from their equilibrium level for two reasons. First, this may be due to government intervention directly aimed at altering the real exchange rate (currency manipulation). In this respect, governments and/or central banks possess a number of policy instruments that can affect the real value of the exchange rate, including the introduction of capital controls or targeted intervention in foreign exchange markets. Secondly, misalignments can be the unintended side effect of macroeconomic policies aimed at achieving domestic objectives or the result of distortions in the international financial architecture or in domestic structural conditions.

The academic and policy debate on currency misalignments concerns two important points. The first is the extent to which the real exchange rate is a variable that policy-makers can influence (Eichengreen, 2007; Rodrik, 2008). The consensus view is that the real exchange rate, being the relative price of traded to non-traded goods, is not under the direct control of policy-makers. However, its level can be influenced by policy in the short to medium term. Eichengreen (2007) provides an illustration by outlining the experience of the Republic of Korea in the 1960s, where a nominal devaluation was combined with fiscal consolidation. The latter helped maintain a lower level of the real exchange rate.

The second point relates to the measurement of the equilibrium exchange rate. Ascertaining the equilibrium exchange rates – hence, the cause of a currency misalignment – is difficult in theory and in practice. It is difficult in theory because the exchange rate is a variable determined by a variety of macroeconomic, financial and trade factors. It is difficult in practice because there are a number of different methodologies measuring equilibrium exchange rates, with none being "better" than others. The main methodologies used for the assessment of exchange rates are based on the competitiveness of the tradable goods sector (so-called purchasing power parity), general equilibrium model calculations and estimates required to achieve the equilibrium of the balance of payments (so-called fundamental equilibrium exchange rates). They may lead to a relatively wide range of estimates. The IMF uses a range of such estimates to make its own assessment of equilibrium exchange rates.[55]

Another question concerns trade effects in the long run versus the short run. According to standard economic theory, long run prices are fully flexible and adjust to any policy change (or any other shock). In particular, when markets have no distortions, an exchange rate misalignment – such as a devaluation of

Box D.6: **Overview of the literature on exchange rate volatility and trade**

There are five main strands of literature extending the model of Clark (1973), which only focused on the uncertainty created by exchange rate volatility.

First, the effect of increased volatility of exchange rates on trade depends heavily on the level of risk aversion of traders (De Grauwe, 1988; Dellas and Zilberfarb, 1993). Risk-neutral traders are unlikely to be affected by exchange rate uncertainty but risk-averse traders will be affected, albeit to different degrees. As indicated by De Grauwe (1988), for very risk-averse traders, paradoxically, exporting more could be a response to increased volatility in order to compensate for the expected fall in revenue per exported unit. The existence of such a relationship was later confirmed theoretically by Broll and Eckwert (1999).

A second set of studies account for the possibility of firms hedging against exchange rate risks. The availability of financial hedging through forward exchange markets helps reduce the uncertainty generated by fluctuations of nominal exchange rates although firms have unequal access to hedging facilities and may display different behaviour according to which side of the hedging position they stand. Viaene and de Vries (1992) suggest that forward markets create "losers" and "winners" among exporters and importers that are on opposite sides of the forward transactions. Besides, as noted by the IMF (1984), foreign exchange hedging contracts are not necessarily available in all countries and to all categories of firms. Contracts are typically relatively large, maturities short and fees high. In addition, they only cover a limited share of possible fluctuations during the proposed maturities as it is hard, by definition, to anticipate the magnitude of such fluctuations. Hence, it is generally accepted that larger exporting firms are in a better position than smaller firms to benefit from exchange rate hedging.

A third extension of the literature focuses on adjustment costs. The assumption that exchange rates affect trade because firms cannot adjust inputs according to exchange rate fluctuations has also been relaxed by several authors. De Grauwe (1992) has worked with a wider spectrum of cases than those described by Clark (1973). If firms can adjust factors of production upwards and downwards according to world prices, they are likely to sell more when international prices in foreign currency are high (with a limit set by the production capacity of the "flexible" factor) and less when such prices are low. However, this will depend on risk aversion towards profit uncertainty. The more risk averse firms are, the less likely they are to export more in light of higher profit variance from exchange rate volatility. On the other hand, less risk-averse firms will sell more even with profit uncertainty because the opportunity from price variability can offset the uncertainty.

A fourth set of studies analyses the effect of exchange rate volatility on the composition of trade rather than its gross volume. Some models focus on the extensive rather than the intensive margin of trade (i.e. the number of products traded rather than the volume of trade of a given number of products). Specifically, models of persistence or path dependence in global trade show that the high variability of exchange rates and associated uncertainty can influence the decision to enter or exit foreign trade markets (in particular, Dixit, 1989; Krugman, 1986; Franke, 1991).

Finally, a group of studies removes the assumption that exchange rate uncertainty is exogenous. Bacchetta and Wincoop (2000) examine the impact of volatility on the levels of trade and welfare in a context of both fixed and flexible arrangements. One interesting outcome illustrating the complexity of the exchange rate-trade relationship is that monetary stimulus in one country may lead to the depreciation of the exchange rate of that country without much effect on trade. This is because the depreciation of the exchange rate may on the one hand reduce imports while on the other hand the increase in domestic demand would boost imports in an offsetting movement. Of course, the net effect will depend on a whole set of variables, from demand elasticities for imports to supply-side factors, such as the desire or ability of domestic producers to adjust prices to the depreciation of the currency.

Since 2000, empirical work on the trade impact of exchange rate volatility has continued, notably with cross-country analysis. For example, an OECD study (Huchet-Bourdon and Korinek, 2012) examines the impact of exchange rate volatility on trade in two small open economies, Chile and New Zealand. The study concludes that smaller, open economies tend to be more affected than larger ones by exchange rate changes.

the currency – has no long-run effect on trade flows or on real economic activity, as it would not change relative prices. The short run and medium run, however, can be different. The reason is that, if some prices in the economy take time to adjust (i.e. are "sticky"), movements in nominal exchange rates can alter relative prices and affect both the allocation of resources between non-tradable and tradable sectors and international trade flows.

Open macro-economy models embed the short-term effects of exchange rate misalignments (e.g. Krugman

and Obstfeld, 2009). In particular, when prices are "sticky", a nominal depreciation of the home currency results in a real depreciation of the exchange rate, thereby increasing the price of the foreign good relative to that of the domestic one. This change in relative prices prompts the home economy to import less, as home consumers switch to less expensive domestic goods, and export more, as foreign consumers turn to less expensive home goods. Under these standard macroeconomic models, all other things being equal, the trade balance of the home countries would improve, with increasing exports and falling imports, as a function of this short-term depreciation of the exchange rate.

There are two important assumptions which must hold in this case: the nominal depreciation ought to result in a real depreciation, thus raising the price of foreign goods relative to home goods; the relative price change must have rapid effects on the quantities imported and exported, and hence on the trade balance. In practice, however, the short-term effects of exchange rate misalignments may be more complex, as these two assumptions may not always apply (depending, for example, on the demand or substitution elasticities for each good). In addition, the trade balance depends on a wide range of others factors, such as income in the home country and the rest of the world.

On the first assumption, recent literature shows that these effects depend, among other things, on the currency in which domestic producers invoice their products. This is, in part, because the currency of denomination affects the extent to which a nominal depreciation results (or not) in a real depreciation of the exchange rate. For example, if producers set their price in the home currency (as generally assumed by standard trade models), there is a good "pass-through" from changes in the nominal exchange rate to the real exchange rate, and an unanticipated devaluation lowers the price of domestic goods relative to foreign goods, as noted above.

However, the trade effect of a devaluation would be different if domestic producers were to set their price in the buyers' currency or in a vehicle currency, such as the US dollar or the euro. This is because the pass-through effect would be less than "perfect" in these cases. For example, the theory suggests that while a devaluation would still have real effects, such consequences would not be equivalent to export promotion but rather to import restrictions (Staiger and Sykes, 2010).

The second assumption, i.e. the short-term impact of currency misalignments, can be questioned. Under the "J-curve effect", the depreciation of the real exchange rate is often synonymous with an immediate deterioration of the trade balance and a subsequent (rapid) improvement. Part of this mechanism assumes that the devaluation is unexpected (hence the change

in prices is unanticipated) and that a certain share of trade is pre-ordered (some share of imports and export orders are placed several months in advance). The value of the pre-contracted level of imports rises in terms of domestic products, which implies that there is an initial fall in the trade balance. The increase in import prices may be partly or fully offset by the substitution, if available, of imported goods by local goods but this implies an adjustment in the capacity of domestic firms which requires time. When these changes have taken place, a real exchange rate depreciation will improve the trade balance relative to its pre-depreciation level. In brief, understanding the short-term impact of an exchange rate devaluation on trade flows and the trade balance in the short and medium run is conceptually more complex than it initially appears.

The above argument does not take into account the possibility of market failures. For instance, in the presence of information problems (e.g. the quality of export goods is unknown to foreign consumers), it has been argued that the level of exports may be inefficiently low (Bagwell and Staiger, 1989; Bagwell, 1992). A high-quality exporter may need to signal quality, which is costly. Firms may also have common uncertainty about the profitability of exporting (Freund and Pierola, 2010). In this context, the undervaluation of the exchange rate may have long-run effects if it allows exporters to enter foreign markets, thus overcoming the initial inefficiency. If this logic is correct, one would expect currency depreciation to be associated with entry into new markets and new product lines (i.e. the extensive margin of trade), and for it not (or not completely) to be undone in the long run when prices adjust. Moreover, as market failures are considered to play a more prominent role in developing as opposed to developed economies, one should expect that these long-run effects are weaker for the latter.

(iii) Looking ahead

Whether exchange rate volatility and misalignment can have a real effect on trade in the short and long run is an empirical question. And the empirics yield mixed findings. As indicated above, a currency undervaluation is sometimes found to have a positive impact on exports but the presence, size and persistence of these effects are not consistent across different studies. As described in Section B.2(e), the complexity of this relationship is not likely to be reduced as global production networks become more prominent in international trade and as business cycles between countries become increasingly interdependent.

For the world trading system, exchange rates are likely to remain a systemic issue. GATT/WTO members have consistently argued that an international monetary system promoting the stability of exchange rates is key to establishing an enabling environment for world trade (see Box D.7).

> **Box D.7: Coherence in global policy-making**
>
> At the end of the Bretton Woods arrangement for fixed but adjustable exchange rates, GATT ministers indicated in the Declaration opening the Tokyo Round in 1973 that "the policy of liberalizing world trade cannot be carried out successfully in the absence of parallel efforts to set up a monetary system which shields the world economy from the shocks and imbalances which have previously occurred. The Ministers will not lose sight of the fact that the efforts which are made in the trade field imply continuing efforts to maintain orderly conditions and to establish a durable and equitable monetary system".
>
> These words are mirrored in the 1994 Ministerial Declaration on the WTO's Contribution to Coherence in Global Policy Making: "successful cooperation in each area of economic policy contributes to progress in other areas. Greater exchange rate stability, based on more orderly underlying economic and financial conditions, should contribute towards the expansion of trade, sustainable growth and development, and the correction of external imbalances."

The debate on the trade impact of exchange rates has surged again recently in the WTO,[56] and is likely to do so each time that it is felt, rightly or wrongly, that the present state of international monetary cooperation does not allow for orderly exchange rate adjustment reflecting balance of payments positions and does allow a particular member, or several members, to enjoy competitive advantages as a result of such a lack of cooperation. While the influence of macroeconomic and structural policies in determining exchange rates is acknowledged (Eichengreen, 2007), the world trading system must regularly "deflect" tensions associated with the perceived trade impact of exchange rates. This has become more frequent in recent years, as growing international inflows and outflows of foreign exchange have the potential to destabilize domestic economic policies and reduce the efficacy of traditional controls (notably restrictions on capital movements).

The question for the WTO is also systemic because exchange rate shifts increase or weaken the desired or perceived level of protection of domestic operators – and thus seem to have a role in the definition of trade policy. At the multilateral level, the erratic movement of exchange rates is frustrating the desired levels of protection that are negotiated by WTO members through long-term commitments – precisely because policies are aimed at setting predictable conditions of access for producers and traders. In turn, members may seek a way to address cyclical development or exchange rate changes in the trade policy toolkit.

Some empirical studies suggest that contingent trade measures are used in response to trading partners' currency depreciations. For example, Knetter and Prusa (2003) and Niels and Francois (2006) establish a link between anti-dumping cases and the exchange rates for a number of countries: the number of anti-dumping complaints against partners tends to increase when the local currency appreciates relative to the partner's currency and when the current account deficit widens.

In a world of large capital markets, a problem arises for traders and policy-makers alike when exchange rates behave in a disorderly way and do not adjust to economic fundamentals. During the Bretton Woods era, part of the international trading community found a system of orderly adjustment of real exchange rates. The system was not ideal. However, the international trading community felt that there was a system, providing, at least in the early stages, for a sense of organized governance in the international monetary system.

The need for greater coherence for trade and exchange rate policies was included in the GATT rule book at the outset (see Section E.3(c)). The IMF and GATT were created in response to a lack of coordination of economic policies during the Great Economic Depression – these new institutions aimed at dealing with trade and exchange rate policies as a matter of common interest, with the introduction of disciplines to avoid competitive devaluations, to maintain exchange rate stability, to reduce balance of payments crises and to fight protectionism. From the outset, the international monetary and trading systems were linked by a coherent set of rules aimed at the progressive opening of trade and payments. GATT provisions on coherence reflected two things: the attachment of the trade community to exchange rate stability; and the need for that community to ensure that the trading system was not frustrated by the undisciplined use of exchange restrictions or multiple exchange rates. The institutional set-up remains very much one of coherence – and not of conflict – between the two systems.

In the 1994 Ministerial Declaration on the WTO's Contribution to Coherence in Global Policy Making, WTO ministers "recognized, however, that difficulties the origins of which lie outside the trade field cannot be redressed through measures in the trade field alone". This means that the trading system cannot bear excessive expectations with respect to ensuring or contributing to stable and cooperative monetary and macroeconomic conditions. A number of institutions and policy processes are in place to enforce better surveillance of exchange rates and to reduce global imbalances (for example, the G20 and the IMF's Mutual Assessment Process). The question as to

Table D.4: **Currency distribution of foreign exchange transactions, 2001-2010** (percentage shares of average daily turnover in April of the 20 most used currencies)				
Currency	**2001**	**2004**	**2007**	**2010**
US dollar	89.9	88.0	85.6	84.9
Euro	37.9	37.4	37.0	39.1
Japanese yen	23.5	20.8	17.2	19.0
Pound sterling	13.0	16.5	14.9	12.9
Australian dollar	4.3	6.0	6.6	7.6
Swiss franc	6.0	6.0	6.8	6.4
Canadian dollar	4.5	4.2	4.3	5.3
Hong Kong dollar	2.2	1.8	2.7	2.4
Swedish krona	2.5	2.2	2.7	2.2
New Zealand dollar	0.6	1.1	1.9	1.6
Korean won	0.8	1.1	1.2	1.5
Singapore dollar	1.1	0.9	1.2	1.4
Norwegian krone	1.5	1.4	2.1	1.3
Mexican peso	0.8	1.1	1.3	1.3
Indian rupee	0.2	0.3	0.7	0.9
Russian rouble	0.3	0.6	0.7	0.9
Chinese renminbi	0.0	0.1	0.5	0.9
Polish zloty	0.5	0.4	0.8	0.8
Turkish lira	0.0	0.1	0.2	0.7
South African rand	0.9	0.7	0.9	0.7

Source: BIS Triennial Central Bank Survey 2010.

Note: The sum of percentage shares of individual currencies equals 200 per cent as two currencies are involved in each transaction.

whether conditions will be met to set up a more cooperative or binding system of exchange rates at the international level remains open. Some authors (Mundell, 1961; Williamson, 2009) have suggested that international cooperation is enhanced in optimal currency areas and/or when regional currencies reach comparable weights and status. At present, international trade and financial markets are dominated by the US dollar and the euro much more than other currencies (Auboin, 2012).

The current prudent expansion of the Chinese renminbi (RMB) as a trade currency raises the probability that the Chinese currency will play an important role in tomorrow's international monetary system. China has made steady progress to promote the international use of the RMB lately, particularly in international trade transactions. To some extent, the willingness of trade partners to adopt the RMB may reflect a preference to reduce reliance on the US dollar and the euro within the global monetary system as well as an opportunity to cut transaction costs for bilateral trade. However, as pointed out in Section B.2(a), there is still a large discrepancy between China's importance in world trade flows (some 11 per cent of imports) and that of the RMB in trade payments (some 1 per cent).

To be successful at the international level, the market for a currency needs to be large, liquid and global – even if used for trade purposes only (international traders ask routinely for currency hedging, requiring a development of the derivatives markets). In 2010, according to the BIS, the US dollar accounted for

85 per cent of foreign exchange transactions followed by the euro which accounted for 40 per cent. The RMB accounted for only 0.9 per cent of global foreign exchange transactions in 2010 (see Table D.4; BIS, 2010). There is little doubt, however, that in the medium to long term the RMB will expand as one of the world's key currencies. The gradual lifting of restrictions on the use of the RMB in other transactions – in particular, inward and outward investment and international fund raising – will also push forward the RMB's internationalization.

4. Conclusions

The future of global trade will, to a significant extent, depend on the socio-economic context at the national, regional and global level. This section has provided a detailed discussion of the possible environmental, social and macroeconomic challenges that lie ahead. The nature of the challenges differs substantially across the three domains and their relationship with the multilateral trading system has evolved differently over time. Yet, each of these concerns has been high on policy-makers' agendas in many countries. It is possible that public perceptions of the relationship between trade and these concerns can turn into a pressure point for protectionism. Decisions in these three areas will therefore undoubtedly affect trade flows in the future, either directly or through their effect on trade policy decisions.

In this rapidly changing global environment, it will be crucial to ensure that policies in socio-economic

domains, such as labour markets, environment and finance, are well aligned with trade policies. Openness is likely to generate greater benefits in economies characterized by a strong enabling environment for enterprises and well-designed education and training policies. Individuals find it easier to cope with changes in the competitive environment in economies equipped with social protection systems. Well-designed environmental policies can be both economically and environmentally beneficial. Open economies flourish when appropriate regulation guarantees stability in financial markets and when access to finance, including trade finance, is facilitated, particularly for SMEs.

In many areas, the desirable alignment across policies can be achieved by cooperation between relevant ministries at the national level. However, in other areas, greater cooperation at the global level may be necessary. In the area of environment, for instance, collective efforts that result in agreed policy approaches towards global environmental problems may limit the scope for environmental policies to unnecessarily distort trade.

The interconnectedness between trade, the labour market and macroeconomic policies was already on the mind of negotiators when the original GATT legal texts were designed.[57] Indeed, the need for greater coherence between trade and exchange rate policies has been explicitly reflected in the GATT legal texts. Current concerns about jobs and inequality, macroeconomic stability and environmental sustainability may give a new relevance to this interconnectedness.

The recent period of economic turmoil has also created a situation that may lead to increased calls for protectionism. This highlights the importance of the WTO's monitoring and surveillance role as well as its place in the institutional framework of global governance, as will be further discussion in Section E.

Endnotes

1   See Jansen and Von Uexkull (2010) for a discussion of the employment effects of trade in low and middle-income countries during the Great Recession.

2   When this Report was written, the World Top Incomes Database contained information on the income share of the top 1 per cent of income earners for 27 countries, of which most were OECD countries. China, India and South Africa were the only BRICS countries represented in the database. Information on China and India is reflected in Figure D.2. In South Africa, the share of the top 1 per cent income earners increased from 9.9 per cent in 1990 to 16.6 per cent in 2010.

3   Authors' calculations based on World Bank, World Development Indicators.

4   See, for instance, Milberg and Winkler (2011).

5   Autor et al. (2012), for instance, find evidence regarding an increase in the use of invalidity insurance in reaction to increased imports from China.

6   See Goldberg and Pavcnik (2007) and Pavcnik (2011) for overviews of the relevant literature.

7   The presence of an export wage premium may depend on workers' skill levels. Klein et al. (2010), for instance, find that low-skilled workers in German manufacturing have an export wage discount, while higher-skilled workers have an export wage premium.

8   Different components of globalization may also interact through political economy mechanisms. Peters (2012), for instance, argues that increased possibilities to invest abroad and offshore production has reduced US firms' lobbying efforts to facilitate immigration.

9   See the opening quote in Bacchetta and Jansen (2003).

10 See WTO (2009) and specifically adjustment to trade reform in Bacchetta and Jansen (2003).

11 Under this so-called "fair wage" hypothesis, workers are assumed to expect higher wages from firms that are economically successful.

12 These frictions occur when looking for jobs and or looking for potential employees is associated with costs.

13 Based on the OECD-WTO Trade in Value Added (TIVA) database available at: http://stats.oecd.org/Index.aspx?DataSetCode=TIVA_OECD_WTO.

14 See Francois et al. (2011) and Davidson and Matusz (2010) for overviews.

15 Individuals affected by job loss during adjustment periods are likely to suffer both in the short run (unemployment) and possibly in the medium to long run (lower wages). See, for instance, the work by Kletzer (2000; 2001) and by Ebenstein et al. (2009).

16 Hasan et al. (2012) use state and industry-level data for India. They do not find any evidence of unemployment increasing following trade reform. Their state-level analysis reveals that urban unemployment declines with trade opening in states with flexible labour markets and larger employment shares in net exporter industries.

17 The expectation that opposition to opening is determined by the sector of employment stems from the so-called "specific factor model". The Heckscher-Ohlin model predicts that factors that are relatively scarce in a country lose from trade and may thus oppose opening . Firm size matters in the

so-called new-new trade models and one of the specificities in these models is that factors employed in relatively small firms are more likely to lose from trade opening.

18 Mayda and Rodrik (2005) use information contained in the International Social Survey Programme (ISSP) that covers more than 20,000 individuals in 23 countries.

19 Other survey evidence indicates that individuals may also be concerned about the country-wide employment effects of globalization. Anderson and Gascon (2007), for instance, report that 75 per cent of respondents in a US survey replied that "outsourcing hurts American workers". Another survey shows that about half of North Americans and Europeans think that "freer trade" results in more job destruction than job creation (German Marshall Fund, 2007).

20 See evidence from Eurobarometer discussed in Bacchetta and Jansen (2011).

21 Authors' calculations based on a larger set of countries in the PEW Research Global Attitudes Project database.

22 See Bertola et al. (2006) for an extensive discussion of the role of inequality in macroeconomic frameworks.

23 Grigg (1994) as cited in Fieler (2011).

24 This may change in the future as the country's production of high-end manufactured goods is well under way.

25 In the light of disruptions in financial markets in the wake of and during the Great Recession, numerous recent research projects have drawn attention to the role of inequality in a world where financial markets are imperfect. It has, for instance, been argued that inequality can act as an amplification channel for trade-related aggregate shocks (Pothier and Puy, 2012). Kumhof and Ranciere (2010) illustrate that inequality can even be the main trigger of major financial crises.

26 This is in line with Haltiwanger (2011) who emphasizes the importance of functioning credit markets to ensure smooth adjustment to trade reform.

27 Lin (2010) and Pisano and Shih (2012) are only two examples of a vast recent literature on the role of public and private sector actors in determining growth paths. While Lin (2010) focuses on developing country challenges, Pisano and Shih (2012) analyse relevant challenges from an industrialized country's point of view. Bourguignon et al. (2006) examine whether international policies on aid, trade or factor movements can affect the international distribution of income. They find that trade opening in high-income countries can contribute to a better distribution of income at the global level.

28 Casacuberta and Gandelman (2010) and Muendler (2010) show that trade opening in Uruguay and Brazil resulted in higher job destruction than job creation. Displaced workers were not absorbed by the most competitive industries but moved into non-trading sectors or out of formal employment.

29 See Goos and Manning (2007) and Autor et al. (2006) on job polarization.

30 See also Mitra and Ranjan (2011), Paci et al. (2009) and Jansen and von Uexkull (2010) on the role of social protection in open economies.

31 The so-called Brundtland Report defines sustainable development as progress that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987).

32 Principle 12 of United Nations Conference on Environment and Development (1992).

33 Preamble to the Marrakesh Agreement Establishing the World Trade Organization. Available at: www.wto.org.

34 Emissions data are taken from European Commission Joint Research Centre (2011). More recent emissions data are not yet available at the worldwide level.

35 Biodiversity measures are taken from World Bank (2012c).

36 Adjusted Net Saving, an indicator developed by the World Bank, captures the economy's true savings rate once investments in human capital, depletion of natural resources and damage caused by pollution are taken into account. The Environmental Performance Index, developed by Yale and Columbia Universities in the United States, is a composite index that covers 22 variables, including child mortality, SO_2 emissions per capita, pesticide regulation, forest loss and CO_2 emissions per capita (Yale Center for Environmental Law and Policy and Center for International Earth Science Information Network, 2012). The Ecological Footprint, developed by the Global Footprint Network, measures the ratio of land and water requirements to available resources in order to sustain the living standard of a country. The (absolute and proportional) Environmental Impact indices, developed by Bradshaw et al. (2010), measure the proportional and absolute environmental impact with respect to each country's (and the world's) available resources in terms of natural forest loss, natural habitat conversion, marine capture, fertilizer use, water pollution, threatened species, and carbon emissions. In order to facilitate interpretation, the Environmental Impact indices measures have been transformed as follows: -Environmental Impact + 200.

37 The top CO_2 emitters in 2008 were China, United States, the Russian Federation, Indonesia, India, Japan, Democratic Republic of the Congo, Germany, Brazil, Canada, United Kingdom, the Republic of Korea, Mexico, Italy, Australia, France, Kingdom of Saudi Arabia, Iran and South Africa.

38 The top SO_2 emitters in 2008 were China, United States, India, the Russian Federation, Australia, Kazakhstan, Indonesia, Japan, South Africa, Canada, Kingdom of Saudi Arabia, Brazil, Mexico, Chile, Turkey, Chinese Taipei and Peru.

39 The top NO_x emitters in 2008 were China, United States, India, the Russian Federation, Central African Republic, Brazil, and Sudan.

40 Data for 2007, which is the latest available year.

41 Cristea et al. (2011) note that one kilogramme of cargo flown one kilometre on a plane generates between 50 and 200 times the emissions of that same kilogramme/kilometre on a bulk cargo carrier.

42 The factor endowments hypothesis is based on the following stylized facts: developed countries tend to be capital abundant relative to developing countries; and the pollution intensity of an economic sector tends to go hand in hand with its capital intensity.

43 The relocation of pollution-intensive production could entail a relocation of pollution-intensive industries from countries with stringent environmental policy to countries with lax environmental policies, or an increase in the production (and net exports) of pollution-intensive goods in countries with lax environmental policies.

44 Under the pollution haven hypothesis, the higher a country's per capita income level, the more stringent its environmental policy, see Copeland et al. (2003).

45 The method or "technique" used in production can be loosely defined as pollution per unit of output.

46 For example, McAusland (2004) uses a partial equilibrium model of trade to illustrate a so-called "California effect", through which domestic firms see an increase in their rents following a requirement to use cleaner inputs. Even if the stricter requirement does not apply overseas, foreign firms have an incentive to comply with it. Since production is subject to increasing returns and demand in the country with the stricter requirement is large, it is cheaper for foreign firms to comply with the requirement to use cleaner inputs. Nonetheless, using cleaner inputs drives up the production costs of foreign firms by more than those of domestic firms and shifts world demand towards domestic firms.

47 A "fossil fuel channel" has been suggested as an additional channel for carbon leakage. This involves a decline in international fossil fuel prices (due to a decrease in demand for fossil fuels in constrained countries), which may trigger additional energy demand and emissions in unconstrained countries (Morgenstern et al., 2007).

48 Studies often express carbon leakage as a ratio of the increase in CO_2 emissions of unconstrained countries and the reduction in the emissions of constrained countries. Most estimates of carbon leakage range from 5 per cent to 20 per cent (Elliott et al., 2010).

49 The most common form of emissions trading scheme is known as cap-and-trade. Under this system, an overall limit on the amount of carbon emissions is set by a central authority, which then issues pollution allowances or permits equivalent to that ceiling. The permits are allocated to entities whose activities contribute to emissions in accordance with specific rules and conditions, and may be traded among participants. Emissions allowances may be auctioned off or distributed at no cost to the recipient. See Serres et al. (2010).

50 Feed-in tariff schemes offer a guaranteed price or premium (on the market price for electricity) for each unit of electricity fed into the grid and produced from renewable energy. Under quota systems, governments typically establish an obligation on a utility company or group of companies to provide a pre-determined minimum share of renewable energy of either installed capacity or electricity generated. Quota systems are variously known as renewable portfolio standards, renewable electricity standards, renewables obligation and renewable energy targets. Previous dispute settlement cases show that WTO rules give space for countries to adopt a wide range of policies in pursuit of legitimate environmental objectives. At the same time, such space is disciplined by specific conditions aimed at ensuring measures are not applied arbitrarily and are not disguised restrictions on international trade. For instance, the use of a domestic content requirement in the operation of a feed-in-tariff was found to be inconsistent with WTO Members' obligations under the TRIMS Agreement in the recent Canada – Renewable Energy / FIT Program cases (WT/DS412/AB/R; WT/DS426/AB/R, Canada – Certain Measures Affecting the Renewable Energy Generation Sector – Canada – Measures Relating to the Feed-In Tariff Program – AB-2013-1 – Reports of the Appellate Body, 6 May 2013).

51 Short-term finance is necessary for most international trade transaction because a time-lag exists between the production of the goods and their shipment by the exporter, on the one hand, and reception by the importer, on the other. Generally, exporters would require payment, at the latest, upon shipment (at the earliest upon ordering), while importers would expect to pay, at the earliest, upon reception. This time lag generally justifies the existence of a credit or a guarantee of payment. The credit can either be extended directly between firms – a supplier or a buyer's credit, or by banking intermediaries, which may offer the exporter or the importer to carry for them part of payment risk (and some other risks involved in the international trade transaction) for a fee. For example, under a letter of credit, the bank of the buyer provides a guarantee to the seller that it will be paid regardless of whether the buyer ultimately fails to pay. The risk that the buyer will fail to pay is hence transferred from the seller to the letter of credit's issuer.

52 For example, the 2009 IMF-BAFT survey covering the period from the third quarter of 2008 to the first quarter of 2009 indicates that the flows of secured or unsecured trade finance to developing countries had fallen more than the flows of trade in 2008, calculated on a year-on-year basis.

53 In its Financial Stability Review of June 2012, the European Central Bank (ECB) is concerned that the deleveraging process could adversely affect the supply of credit to the real economy in the Euro area. According to the ECB, such concerns are more relevant for the Euro area than for other large economies, owing to the predominant role of banks in the financing of the economy.

54 In its 2010 *Annual Report*, the BIS estimated that in the two years between the onset of the financial crisis and the publication of that report, international banks had experienced cumulated losses on write-downs of assets of some US$ 1.3 trillion, met by total recapitalization of US$ 1.2 trillion. Since then, the BIS no longer reports this figure but it is likely to have increased.

55 More details on the IMF normative estimates of equilibrium exchange rates can be obtained on the IMF website (www.imf.org). Of particular interest is the 2012 methodological note: "External Balance Assessment (EBA): Technical Background of the Pilot Methodology".

56 See in particular the seminar held by the WTO Working Group on Trade, Debt and Finance, available at http://www.wto.org/english/news_e/news12_e/devel_27mar12_e.htm.

57 See also Section D.7 of WTO (2007) on this issue.