2. Does productivity help or harm employment growth?

2.1. Introduction

One of the core elements of the International Labour Organization's Global Employment Agenda addresses the twin issues of promoting higher productivity and creating employment opportunities in order for countries to improve standards of living for their citizenry and obtain long-term sustainable growth.[1] Thus, the ILO is not just concerned with the creation of employment, but that of productive employment, making the distinction between the creation of low-quality jobs and the creation of decent-quality jobs.

In their national agendas, both developed and developing countries focus on improving worker productivity as a means to achieving these goals. At the same time, however, there is often fear among workers that increases in productivity are synonymous with the substitution of capital-intensive production techniques for labour, leading to mass destruction of jobs. How then can these two issues be reconciled?

There is no escaping the fact that productivity gains can lead to job losses as technological progress improves the efficiency of the production process, allowing firms to produce more output with fewer workers. At the same time productivity gains lead to employment creation as well, since technology also creates new products and new processes, which lead to the expansion of markets and additional job opportunities. This *creative destruction* of employment means that less productive firms will leave the market, and new more productive ones will take their place, perhaps in different industries, different sectors and even different locations. Thus, analysing what is gained as opposed to what is lost as the result of increasing productivity becomes critically important and the basis for developing responsible employment policies.

In this regard, the growth effects of employment shifts between sectors are as significant as the growth within sectors.[2] In all regions of the world a shift in employment has been taking place – away from agriculture towards non-agricultural sectors. On balance, the increase in sectoral employment has been most dramatic in the service sector, which accounts for over two-thirds of employment in developed economies and between 10 and 80 per cent (and rising) in developing economies. Although jobs in the service sector fall on both sides of

[1] Core element 2 of the ILO's Global Employment Agenda calls for "Promoting technological change for higher productivity and job creation and improved standards of living" (ILO, 2003c).

[2] See, for example, Baily et al., 1992; Pieper, 2001; Piacentini and Pini, 2000.

the "decent work" spectrum, productivity and employment growth have been increasing rapidly in some of the service industries, leading to a win-win situation for the economy as a whole.

In order to harness the development potential of structural changes, however, developing economies, in particular, must focus on a two-pronged strategy of improving the productivity of workers in dynamic *niche* industries and, at the same time, focusing on those sectors of the economy where the majority of labour is concentrated. This focus would give them the tools to move from low- to high-productivity activities. Raising productivity in burgeoning industries, such as those in information and communication technology (ICT) is important for economic growth, but neglecting segments of the economy with greater concentrations of labour can lead to widening inequality. Along these lines, the informal economy, which can constitute a large number of hidden employed persons in the service sector, should not be neglected.

This chapter addresses the specific issue of employment trade-offs in productivity growth. It provides a framework for the analysis by focusing on the time dimension of productivity growth in dynamically changing economies. Its hypothesis is that there will be trade-offs between productivity growth and employment, due to structural and frictional changes – which lead to the displacement of workers at the sectoral level. But, over the longer run – and at the aggregate level – markets have historically compensated for these changes, as higher rates of productivity growth have been accompanied by higher rates of employment growth. Thus, during the medium run it is essential to develop pro-growth progressive policies at the micro- and macro-levels – to ensure growth in the long term – while at the same time providing adjustment strategies (in the form of financial assistance and retraining) for displaced workers.

Section 2.2 provides an overview and conceptualization of the productivity–employment relationship and sets the conditions for a trade-off by focusing on specific time horizons (i.e. short, medium and long run). In section 2.3, this trade-off is examined in a developing-country context of labour surplus and the role of the informal economy is assessed. Section 2.4 shifts to a sectoral analysis in highlighting employment–productivity dynamics. Section 2.5 gauges the contribution of the service sector to aggregate employment productivity growth. Finally, section 2.6 draws the chapter's conclusions.

2.2. How does productivity growth affect employment?

This question has concerned economists and the general public for centuries. There is no denying that rapid and sustained productivity growth has lifted advanced industrialized nations to their present-day standards of living and, by any historical standards, has allowed them to eradicate mass poverty. However, the very technological innovations and capital-intensive investments that are the mainsprings of this productivity growth are constantly feared as instigators of mass job destruction – a description for which they have often, and rightly, been held responsible. Economic growth continues to go hand in hand with structural change, which often entails a fair amount of "creative destruction"[3] as old jobs

are lost in declining industries and new jobs are created in the expanding sectors of the economy. It is a point of history that economies adapt to such changes, but there are particular costs for workers that cannot and should not be ignored. And the minimization of these costs in order to ease the transition of workers should be the focus of policy.

Workers once feared they would be replaced by machines, as they now feel threatened by computer technology. In the 1800s, at the dawn of the Industrial Revolution, a group of English workers (known as the Luddites) launched a campaign to destroy the machinery that was putting their jobs at risk and undermining their way of life. Although these protests were ineffective in slowing the pace of industrialization, they brought to light a number of issues concerning the plight of workers. The demonstrations against the Industrial Revolution were not only concerned with the rise of mechanization but also with the deterioration in workers' rights – decreasing minimum wages, the banning of trade unions and an overall decline in their working conditions. Politically, the Luddite protestors of 1812 were successful in sparking public debate on the negative as well as the positive dimension of the Industrial Revolution. Similarly, today's "anti-globalization" protestors have successfully called for open debate on the "winners and losers" dimension of technological progress and productivity growth.[4]

In our global society, with the asymmetries that characterize globalization, we cannot ignore the dual side of productivity gains or gloss over the fact that productivity gains often lead to job loss. Since 1995, 3 million jobs *per year* have been lost in the manufacturing sector worldwide – due in large part to productivity increases.[5] In order to increase the acceptance of change among workers, there must be a fair distribution of these gains so that society as a whole is better off – not just a privileged few.

This Report acknowledges that the world cannot and should not stop the forces of technological change leading to productivity growth. What society can achieve is to ensure that the worker has a smoother transition and protection in the form of security, opportunities, basic workers' rights and representation, the four main dimensions of decent work.

The link between employment and productivity

Employment, productivity and aggregate output are linked to each other, as follows:

$$Output = Employment \times Productivity.$$

This equation means, for example, that any given level of output can be achieved either with high productivity and low employment (in which case the employment intensity of economic growth is said to be low) or, conversely, with low productivity and high employment (a high-employment intensity).

[3] Joseph Schumpeter coined the phrase "creative destruction" in his seminal work, *Capitalism, Socialism and Democracy* to denote a "process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one".

[4] For a more elaborate discussion on the dimensions of globalization, see World Commission on the Social Dimension of Globalization, 2004.

[5] Alliance Bernstein, 2003.

Thus, the question "As enterprises become more productive, do they need fewer workers and thus shed them?" has no straightforward answer. Four general points can be made, however. First, there is a range of sources of productivity increase that may have no direct or indirect effect on reducing the level of employment. Increases in product quality, greater capacity utilization, the more efficient use of materials and the better organization, training and treatment of labour are changes that can increase productivity without causing declines in employment levels. Second, a productivity increase that leads to expanded market share and therefore employment creation at the enterprise or country level can prompt an employment decrease in competing enterprises or countries. This is the *displacement effect* and would need to be factored into any analysis of net employment effects. Countries are constantly concerned with the loss of industry competitiveness and market share because of their effects on employment and output.

Third, productivity increase based on mechanization and robotization can reduce the demand for labour. At the enterprise level, the net employment effect will be determined by market demand. More specifically, it will depend on *whether the reduced demand for labour in per unit output is offset by an increase in labour demand due to output expansion*. Finally, a decrease in labour demand due to productivity increase may be offset by the increased demand for labour in the same or other sectors, as a result of the creation of new products or the expansion of markets. In developed countries, for example, the decline in rural employment due to tractorization and other advances was offset by increased demand for workers in urban manufacturing and services.

Thus, although the immediate impact of productivity gains can lead to labour displacement in one sector, over the longer term the market can compensate with gains in another sector, depending on the evolution of product demand and output expansion. However, this may take time as labour markets adapt to structural changes. Consequently, many of the misgivings about the relationship between employment and productivity are based on generalizations concerning trade-offs that occur often but not always in the short run between these two variables in a given sector.[6] A more robust evaluation of the relation between employment and productivity growth must be sensitive not only to the timeframe considered, but also to the ways in which markets, actors and institutions respond to the growth of productivity. Such "compensatory mechanisms" and their interrelation are vital to an understanding of how productivity growth at one location in an economy affects employment and output growth at the aggregate level.

A highly stylized view of these compensatory mechanisms is described in table 2.1.[7] A subsequent discussion in this chapter will dwell in greater detail on how reality often stands at some distance from a theoretical or mechanistic view.

[6] The distinction between short, medium and long run varies considerably by industry, but usually constitutes a period of time when certain factor inputs (such as size of the plant) are fixed. Most economists agree on the definition of 3-5 years for the short run, 5-20 years for the medium-long term and 20+ for the very long term.

[7] For a more elaborate discussion of compensatory mechanisms, see Pianta, 2000; Spezia and Vivarelli, 2002; and Vivarelli, 1995.

Table 2.1. Theoretical benefits of productivity growth: Compensatory mechanisms of an economy

Declining product prices	Productivity increases could allow products to be produced at lower cost which, in turn, could result in lower prices. Lower prices could then increase demand for the product, (as well as result in higher real incomes for consumers). However this virtuous scenario assumes that product prices respond to productivity gains and that consumers respond to such price changes through an increase in demand. Suppose, for example, that the demand response is weak compared to the decline in prices, too weak to compensate for the labour-saving effect of productivity increases. Employment would then decline.
Increased wages	The producer could pass along some of the increased profits from productivity gains in the form of higher wages. This, in turn, could boost purchasing power and increased demand for goods and services, not only in the sectors in which the productivity gains have occurred, but in different sectors of the economy where employment growth would as a consequence be stimulated. These benefits, however, assume that producers do not appropriate all of the gains of productivity growth in the form of higher profits.
Increased investment	Not all the gains of higher productivity are likely to be distributed as lower product prices or higher wages. Some gains will be in the form of higher profits which could be reinvested and create more employment opportunities. In a globalizing world, however, the question arises of where the profits have been made, and where the proceeds are reinvested.
Increased employment overall	Even with job displacement in some industries, higher productivity resulting in higher real incomes could lead to shifts in product demand and result in employment creation. Shifts in product demand, however, might not be confined to the domestic market.
New products	Productivity improvements result from product innovations as well as process innovations. The former leads to the creation of new and improved products, expanding output and creating employment opportunities. The latter, however, lead to improvements in the efficiency of production, which can be labour-displacing.

Employment and productivity over the business cycle

For the most part, both employment and productivity growth are pro-cyclical, increasing during boom times and decreasing during recessionary periods. However, due to costs incurred when adjusting their workforce, firms may not react immediately to business cycles, causing employment, including lay-offs and rehiring, to operate with a lag. In an attempt to smooth these costs, changes in employment do not fluctuate as greatly as output.

This lag causes productivity growth to respond in a somewhat inverse manner to employment: productivity may decline more than employment at the onset of a recession, whereas productivity may rise more than hiring in an upturn. One reason for this is that during economic recoveries employers are often hesitant to rehire workers until they are sure the recovery can be sustained; and they will squeeze as much work out of the current workforce as possible. In this case productivity will increase, while employment is stagnating or

even declining. One example is the stagnation in the United States labour market during the recent economic recovery. Although the recession was short-lived (from March to November 2001), employment growth remained weak through the first half of 2004 because employers, unsure about the future, refrained from hiring permanent employees. Using a number of cost-cutting strategies, US companies were able to increase output, with the same number or fewer workers, causing productivity to increase considerably over this period.

A market selection process can also occur during recessions, forcing the more unproductive firms out of the market and leaving only the most efficient firms – those that are able to produce more with the same or fewer resources. In an attempt to increase their competitive positions and consolidate their share in the market, firms trim and re-organize their staff. Firm restructuring of this kind can boost aggregate productivity growth, even though output and employment are declining, creating a counter-cyclical relationship. For example, a study in the United Kingdom presents evidence showing that productivity growth for dying firms was less than that of firms that remained (and those that entered) during the recession of the early 1980s, lending support to the idea that the process of restructuring can increase aggregate productivity growth.[8]

Another, more debatable issue is how business cycles are influenced by structural as well as cyclical factors taking place in the economy, such as stock market crashes or political shocks. Cyclical changes involve temporary shocks in the economy, which can affect demand. These factors can lead to temporary loss of jobs until the economy starts to recover, at which point workers are reinstated in their previous positions. Structural factors, on the other hand, involve more permanent changes in the economy, such as technological changes and changes in the structure of consumer demand. When workers lose jobs as a result of structural change, their jobs are permanently removed and they must seek work in other industries or sectors.

Whether employment gains or losses are cyclical or structural in nature can often be difficult to discern: employment fluctuations that might initially seem to be short run in nature (lasting 3-5 years), could actually be part of a longer term adjustment in the economy. A recent study by the Federal Reserve Bank of New York suggests that both structural and cyclical changes contributed to stagnant employment growth during the most recent recession in the United States (see box 2.1).[9] The bias towards job losses in the manufacturing sector since 2001 gives this idea strong appeal. As shown in figure 2.1, employment in the manufacturing sector declined by 17.1 per cent between the first quarter of 2000 and the first quarter of 2004, a loss of close to 3 million manufacturing jobs. In contrast, in the service sector, employment increased during the same period by 2.2 per cent, a gain of 2.3 million service jobs. This scenario in manufacturing is indicative of the general falling trend in manufacturing employment worldwide.

[8] Disney et al., 2003.

[9] Groshen and Potter, 2003.

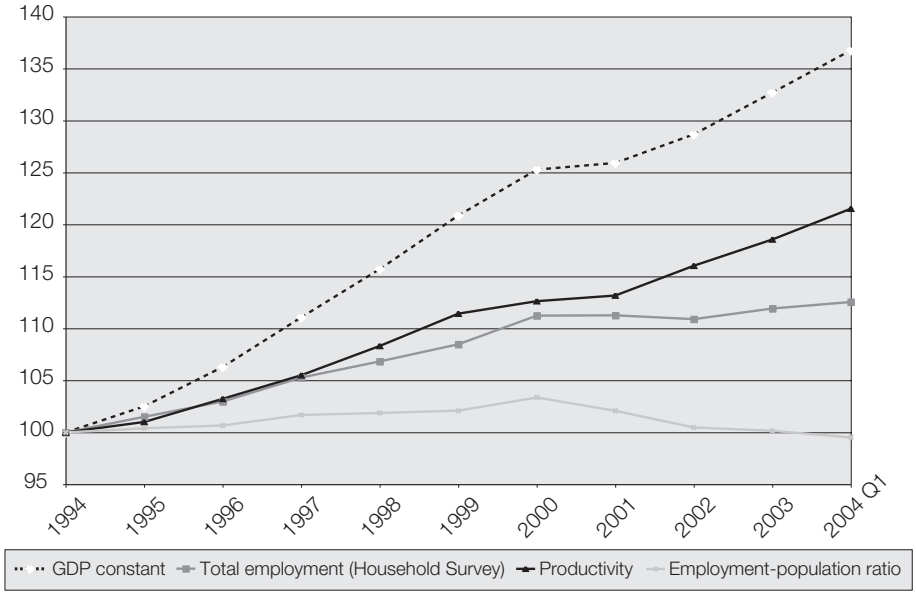
Box 2.1. Jobless growth in the United States

Much attention has been given to the "joblessness" of the economic recovery in the United States following the country's recent recession. While the impact of the recession on GDP growth was brief and relatively mild,[1] its effect on employment has indeed been far more serious and pronounced. Since the onset of the US recession in March 2001, real GDP has recovered and grown by over 7 per cent from its pre-recession level. Employment growth, on the other hand, has only recently begun to recover. An analysis of the causes reveals that the lack of employment growth during the period was of both a cyclical and structural nature.

In the context of the current situation in the United States, it is clear that several cyclical factors are affecting the country's labour market. Most notably, the recent recession was marked by substantial declines in business inventories and investment, a severe correction in the stock market, and a collapse in venture capital and other forms of business and entrepreneurial financing. The initial recovery period in 2001-2002 showed rapid labour productivity gains, despite sluggish growth in output. This was mainly the result of a decline in employment growth (see graph below). Even as output increased after 2002, employment growth continued to be sluggish until early 2004, implying that firms worked off inventories and increased production with existing workers rather than hiring new employees.

Structural changes are also playing an important role in the ongoing employment stagnation in the United States. A recent study by the Federal Reserve Bank of New York[2] notes that an increasing number of lay-offs in the previous two recessions have been permanent, indicating that structural changes such as permanent declines in demand, increasing international outsourcing of employment, technological change and production reorganization are taking place in many industries. As the permanent lay-offs characteristic of periods of increasing structural change force the unemployed to find new jobs (often requiring new skills), longer average job search times and slower employment growth result. Workers in the country's manufacturing sector have been hit the hardest. These workers, whose jobs have been permanently eliminated, need assistance in the form of unemployment benefits, but also access to education and training programmes, so that they can acquire the education and skills needed to move into those industries experiencing job growth.

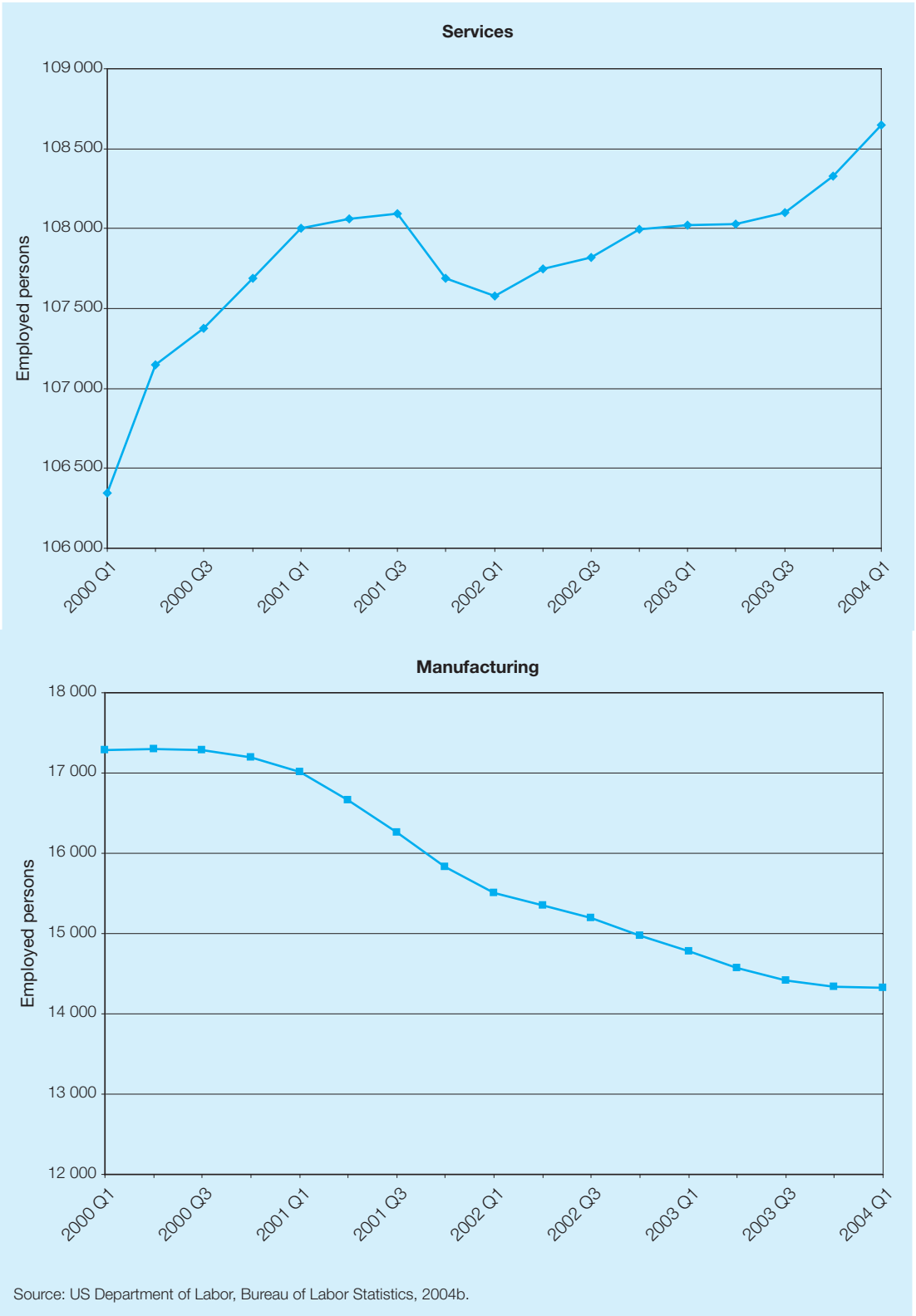
Employment vs. GDP growth in the United States, 1994-2004 (index, 1994 = 100)



[1] The National Bureau of Economic Research estimates that the recession lasted 8 months, from March to November 2001.While the recession's impact on GDP is clear in quarterly data, the downturn does not register in annual GDP figures. [2] Groshen and Potter, 2003.

Graph sources: US Department of Labor, Bureau of Labor Statistics, 2004a; US Department of Commerce, Bureau of Economic Analysis, 2004 and UN Population Division , 2001.

Figure 2.1. Employment in services and manufacturing (in thousands), United States, 2000-2004



Source: US Department of Labor, Bureau of Labor Statistics, 2004b.

A longer-term perspective: Adjusting to structural and frictional changes

An analysis of the trade-offs between employment and productivity growth would be limited unless it looked beyond the short run to a longer-term horizon, in which firms have adequate time to adjust to the demand requirements of the economy. In the short run, labour market disturbances tend to be governed by the business cycle. Over the medium and longer term, labour market institutions, technological change and aggregate demand policies play a greater role in determining the demand and supply of labour. Trade-offs between employment and productivity growth are quite common during business cycles and to some extent even during the medium term, as labour continues to adjust to structural changes in the economy. But over time, most countries show a positive relationship between productivity and employment growth. The reason for this is determined by a number of factors, but one primary reason is that output in an economy is not fixed. An exclusive focus on the supply-side dimension of employment ignores the fact that changes in demand occur over time, increasing output growth and creating jobs to meet a growing demand. This is the case because technological progress ultimately leads to the expansion and creation of new markets. For example, there is now demand for products that were non-existent 15 years ago – and labour markets inevitably adapt to these changes. Thus, while not elaborated in this chapter, the demand-side aspects – including macroeconomic policies and conditions, the overall environment for innovation and investment (and the relation between the two) – would be necessary for a fuller understanding of the link between labour productivity growth and long-run sustainable growth.

The income levels of consumers are a prime determinant of the structure of product market demand. When income per capita increases, people change their tastes and develop new demands directed towards luxury goods and services. Particularly important in this respect is Engel's law, stating that with an increase in income people spend comparatively less on primary products, creating demand for manufacturing and service goods. The shift in consumption towards service goods has been particularly pronounced in developed economies.[10]

Demand patterns heavily influence structural change and employment dynamics, since labour shed in one sector can be absorbed in other sectors. The process is of course not instantaneous and frictions in the market (e.g. skill matching, wages, differences in labour and product market regulation) mean that labour requires time to adjust. This is one reason why it is not surprising in a climate of rapid structural change that a maximum level of employment may be difficult to attain. It is also a strong argument for the role that labour market institutions must play in improving the efficiency of labour markets and providing security for workers.

The employment impact of outsourcing

Outsourcing (the contracting out of business functions previously performed in-house) has heightened concerns among workers about job security. More

[10] Schettkat and Russo, 2001.

particularly, the increasing trend of *offshoring* (the contracting out to foreign as opposed to domestic affiliates) has prompted many to suggest that the phenomenon is leading to a reallocation of jobs from developed to developing economies. Newspapers in some industrialized economies carry headlines warning workers of *"Jobs Lost Abroad"* and cite alarming statistics on job flight to foreign destinations.[11] One study noted that, in the ICT-using sector, "3.3 million jobs in America will move offshore by 2015".[12]

Whether these warnings are justified depends on many factors, but two events that have fundamentally changed the way labour markets function will help put the debate into a better perspective.[13] First, technological change in the form of information and communication technology has increased the number of jobs that can be moved to offshore locations—meaning that the outsourcing phenomenon is no longer limited to the manufacturing sector but also includes the outsourcing of highly skilled jobs in the service sector. Second, the opening up of labour markets in China and India has brought a vast number of low-wage semi-skilled workers into the global production system.

The implication of these two events is a heightened sense of competitive pressure on employees as labour markets become increasingly more integrated on a global scale. This has increased anxiety among workers, particularly those who cannot easily relocate in order to find employment (older workers and single parents with children, for example). At the same time, the globalization of production has helped to drive down wages in certain sectors of developed economies, as they face increased competition from labour in lower-wage economies.

It is certainly true that many multinational firms have shifted production facilities to developing economies to take advantage of lower labour costs – yet it would be an overstatement to assert that a large share of developed economy jobs have gone overseas. Recent statistics based on job losses due to outsourcing in some of the developed economies illustrate the previous point:

- In the United States, by far the largest outsourcer of the industrialized economies, estimates of job losses due to outsourcing represent only a small fraction of jobs lost in a given period. For example in the first three months of 2004 less than 2 per cent of mass lay-offs in the United States were due to outsourcing (this includes domestic outsourcing).[14]
- In Europe the outsourcing phenomenon is not yet as widespread as in the United States. Germany is by far the largest outsourcer in Europe, perhaps due to its proximity to Eastern Europe. Outsourcing in Germany resulted in a loss of roughly 8,000 jobs per year from 1990 to 2001, mainly to Eastern Europe. This figure represents only 0.2 per cent of Germany's labour force, which comprises 40 million people. It is also a small fraction of total jobs lost on a yearly basis.

[11] See, for example, an article in *The New York Times* dated 15 February 2004.

[12] See Forrester Research, 2002.

[13] For a more detailed discussion, see Polaski, 2004.

[14] See box 1.10 in Chapter 1 of this Report for further discussion.

- Additionally, outsourcing is a two-way street: economies might lose jobs due to *outsourcing*, but they also gain jobs as the result of *insourcing*. Another study based on the United States shows that its economy *insources* far more business than it *outsources*: in 2003, it outsourced approximately US$77 billion worth of "business, professional and technical services" to foreigners and insourced over US$130 billion.[15]

But statistics can only give a partial picture, and if one downplays the current statistics and focuses instead on the increasing trend in jobs being outsourced then a different depiction of the phenomenon emerges. For example, half of the major companies in the United States currently engage in some form of outsourcing and more expect to do so in the coming years.[16] Additionally the expansion of outsourcing across occupational groups, including highly skilled jobs in the service sectors suggest that all phases of the production process can be "globalized". As one study notes:

> Even if many of the outsourced jobs are low-skilled call centre positions, reports of software programmers and ... analysts being outsourced creates in millions of workers the fear that a college education and a professional job are no longer enough.[17]

There is also a growing concern that the quality of jobs being created in the developed economies has been declining over recent years – due mainly to outsourcing. The concern is that growth in employment is being driven by jobs with less decent working conditions (in terms of pay and job security) than those that have been lost. The evidence regarding this is mixed. A study by the OECD shows that over the past ten years part-time employment has accounted for half of total employment in the OECD economies.[18] In addition, there has been strong growth in temporary employment. The trend in part-time and temporary employment has been particularly strong among women and youth – and accounts for their growing numbers as employed. The determination of whether this trend represents a decline in working conditions depends on whether part-time and temporary work represents a "choice" or "an option of last resort".

The OECD study also adds that "there is little to support the notion that increased employment is the result of a proliferation of low-paying jobs". Since 1993 in the European Union as a whole and in the United States, employment has grown more in industries and occupations with above-average wages, than those with below-average. The study finds, however, that although earnings inequality has remained low and relatively stable in many of the EU economies and in Japan, in fact it has widened in the United Kingdom and in the United States.

Exactly how outsourcing will ultimately impact on growth and employment in developed and developing economies remains to be seen. Sentiment is strong

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[15] See Parry, 2004. Business, professional and technical services refer to computer programming, telecommunications, legal services, banking, engineering, management consulting, call centres, data entry, and other private services.

[16] Sperling, 2004.

[17] Ibid.

[18] OECD, 2003.

among those in the business community that in spite of today's low figures on outsourcing, the future may bring a massive transformation in how goods and services are produced.[19] The challenge for economies will be how to integrate themselves into the global production process in order to create decent employment opportunities for those seeking work. For developing economies it undoubtedly will require increasing the absorptive capacity of their labour force and institutions – the ability to utilize technology transferred from the developed economies. For developed economies it requires a stronger focus on innovation and expansion into new markets.

The benefits from outsourcing can be derived through a number of channels – global linkages in the supply chain have created opportunities for increased income in the developing economies, which has increased demand for more skill-intensive products in developed economies. The challenge for both the developed and developing economies, however, is to adapt to the rapid changes in technology, which are speeding productivity gains and the rate of job creation and destruction, and to provide social safety nets for workers who are displaced during the process.

As mentioned earlier, it is certainly true that globalization has been the cause of the loss of competitive advantage in certain labour-intensive industries in the industrialized economies, leading to a loss of jobs.[20] But there has been no net transfer of jobs to developing economies – and studies have shown that the decline in industrial employment across economies is due more to gains in the efficiency of production than to the loss of jobs to developing economies – a trend that has been occurring worldwide.[21] Innovations in the production process have increased efficiencies in traditional industrial sectors, not only in developed economies but also in the developing economies, as increasingly more output can be produced with less workers. According to one study, "between 1995 and 2002 roughly 22 million jobs were lost globally, a decline of 11 per cent. Yet over the same period, global industrial production increased by more than 30 per cent – a remarkable gain in productivity".[22]

In addition to social protection for workers, international labour standards are necessary in order to ensure that low-cost labour is not synonymous with the exploitation of labour – and that decent work prevails. Some developing economies that have entered into the global supply chain have done so through the "low road" option to development. These economies compete based on low-cost, low-skilled labour – a growth strategy that is not sustainable, because it often does not lead to productive work. For example, although the quantity of work has been increasing in the manufacturing sector in Mexico with the rise of the *maquiladoras* (maquila factories), the quality of employment has not improved, leading to a "decent-work deficit" (see box 2.2).

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[19] McKinsey and Company, 2004.

[20] See, for example, Kucera and Milberg, 2003.

[21] See, for example, Ghose, 2003.

[22] Alliance Bernstein, 2003.

Box 2.2. Decent work and *maquiladoras* in Mexico

Mexico's recent labour market experiences highlight the distinction between the quantitative and qualitative elements of job creation as noted in the ILO's Global Employment Agenda. In purely quantitative terms the Mexican labour market has, for the most part, been able to absorb its increasing supply of labour. Yet, despite economic restructuring and policy reforms, the Mexican labour market continues to be hampered by a decent work deficit. Although participation rates are comparable to other Latin American countries and unemployment is low, most Mexicans are employed in poorly paid jobs (in both the formal and the informal economy), characterized by stagnant or declining wages, little job security, inadequate social protection and a lack of training.

One illustration of Mexico's labour market is the growth of the maquila economy. During the 1990s, the maquila's size in Mexico's manufacturing sector expanded tremendously in terms of output and employment. Output expanded nearly 40 per cent annually between 1990 and 1999. By 2000, the sector was exporting US$80 billion worth of goods, a figure larger than that of Brazil's total exports (Palma, 2003). Employment nearly tripled from 446,436 in 1990 to nearly 1.3 million in 2000.

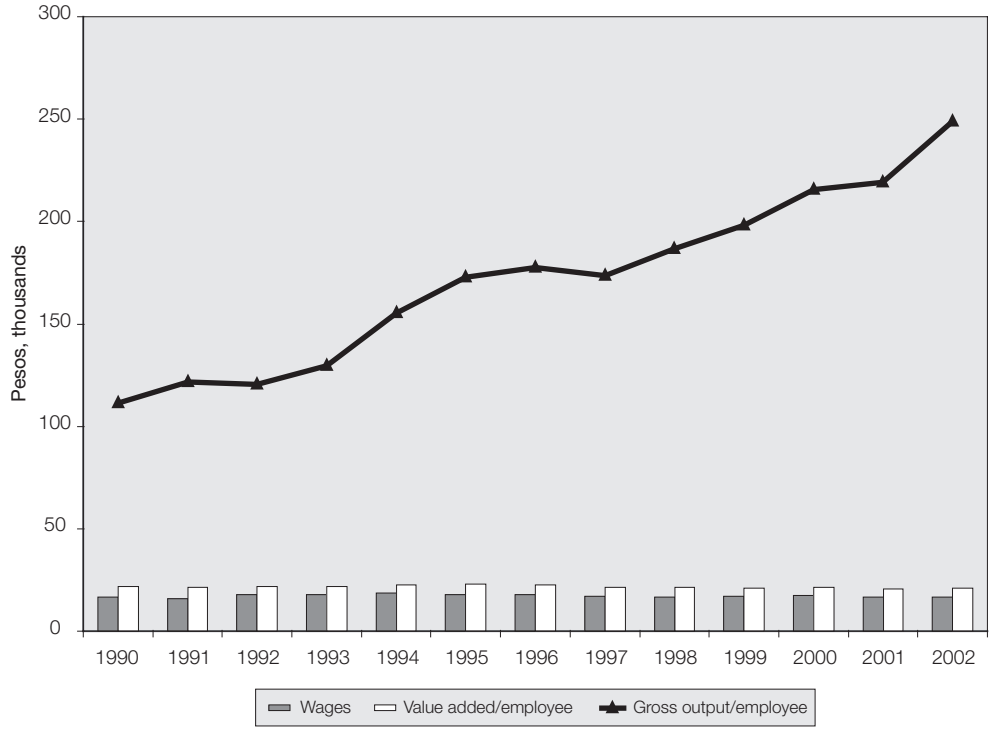
Yet, despite its enormous increases in production, the maquila economy continues to have few linkages with the rest of the Mexican economy. Maquila (which means literally *in-bond plants*) factories were initially developed to allow American companies to take advantage of Mexico's low-cost labour in order to assemble products for re-export to the US market. This was done through a provision that allowed American firms to be taxed only on the value-added component of the imported assembled goods, thus removing any incentive to establish linkages with Mexican industries. For example, under this programme, United States car manufacturers could send unassembled car parts to maquila factories in Mexico for assembly. The assembled car would then be exported back to the United States for sale there and abroad. The US company would only be taxed on the value-added to the car parts during assembly, which was minimal. The strong dependence on imported inputs means that the maquila still adds very little value to the goods being produced. Thus, gross output per employee has increased, but productivity (measured as value added per employee) has not. As a result, wages have remained stagnant (see accompanying graph in this box).

The maquila sector's principal benefit to the Mexican economy is as an employer of mostly unskilled and relatively cheap labour. Recently, however, competitive pressure from other low-labour-cost countries and the slowdown in economic growth in the United States has led to a decline in maquila employment of more than 15 per cent between 2001 and 2003, because large numbers of factories have relocated to China. Preliminary evidence shows that between June 2001 and June 2002, 545 maquila factories left Mexico, equivalent to one in every seven (Palma, 2003).

The future for the maquila economy is tied to its ability to remain internationally competitive without relying on "low-road" development practices. With this aim, second- and third-generation maquila factories have moved away from simple assemblage to manufacturing and knowledge-intensive product design. The shift in work structure has lead to an increase in the skill intensity of maquila labour, as some plants are using more skilled workers and providing more training for current employees (Carillo, 2003). This "high road" competitive strategy has the potential to defray low-cost competition and develop greater linkages with the domestic economy.

(continued overleaf)

Output, productivity and wage growth in maquiladora factories, 1990-2002



Source: INEGI, 2004.

Empirical evidence on employment and productivity growth

Figure 2.2 provides a snapshot of the long-run interaction between employment and productivity growth from 1980 to 2000.[23] Although a weak negative relationship between productivity and employment growth can be distinguished, the global picture is quite diverse. More than two-thirds of the countries are in the northeast quadrant, exhibiting both productivity and employment growth. Within this group there is no positive or negative relationship between the two variables.

A closer look at figure 2.2 suggests a distinctive concentration of specific "country clubs". For example, the four countries in the northwest quadrant (Bulgaria, Czech Republic, Poland and Hungary) and the country in the southwest quadrant (Romania) are all transition economies that experienced a sharp fall in employment during the 1990s, after the collapse of the Soviet Union. The deep transitional crisis and subsequent large structural changes in these economies greatly affected the labour markets of this region. Firms closed, many people

[23] These data are taken from the Groningen Growth and Development Centre (GGDC), Total Economy Database (2004) for a cross-section of 66 countries, in which all parts of the world are included. See also ILO, 2003b, Chapter 18.

Figure 2.2. Relation between average annual growth rates of employed persons and labour productivity, selected economies, 1980-2000

Source: GGDC, 2004, and ILO, 2003b.

lost their jobs, and only the most productive businesses survived. On the whole, the growth rates of output and productivity turned negative or at best remained modestly positive. Hence the loss of jobs during the previous decade was not the result of productivity growth but of stagnating productivity levels during the communist era (see case study on Hungary, box 2.3).

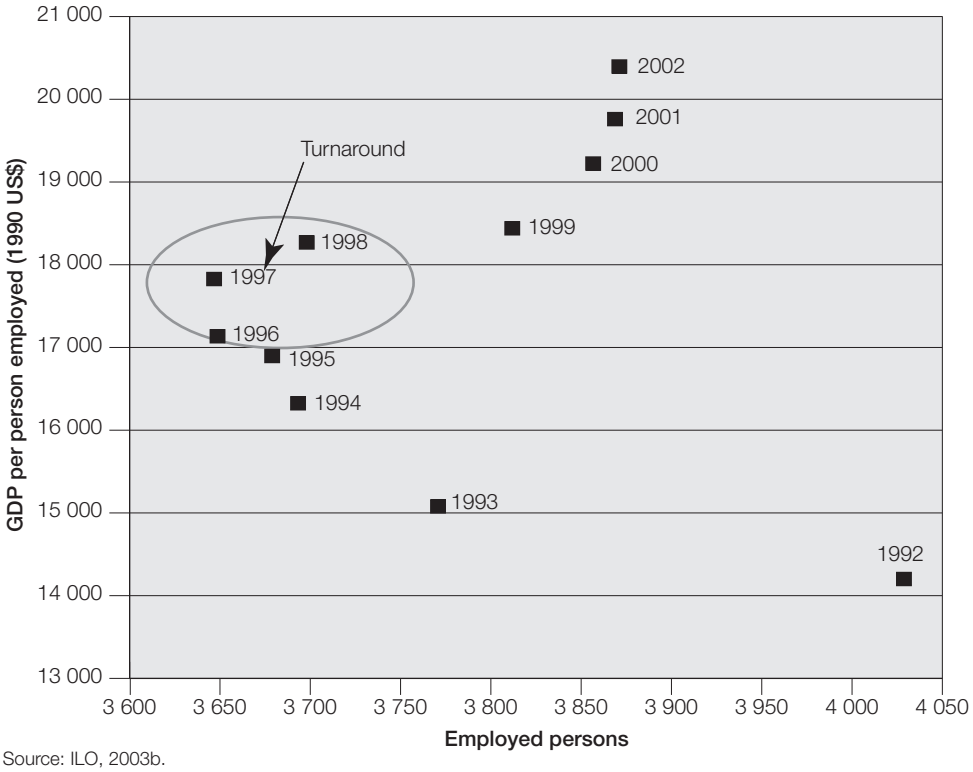
The southeast quadrant of figure 2.2 shows a fair number of economies with positive or even very high growth rates of employment but negative productivity growth. These countries are mainly located in sub-Saharan Africa, Latin America (Brazil, Venezuela and Peru) and the Middle East and North Africa. The high employment growth in these economies is primarily explained by high population growth and growing informal economy activity. Some resource-rich economies such as South Africa and Venezuela also belong to this group because, in spite of their resource abundance, these countries fail to create enough productive jobs to raise average income levels. Because of factors such as political

Box 2.3. Case study: Labour productivity and employment in Hungary

The Hungarian economy provides an interesting example of employment–productivity trade-offs incurred as the result of intense structural transformation due to the change from a centrally planned to a market-oriented economy. As in all centrally planned economies, full employment was achieved and maintained through huge amounts of hidden unemployment. From the beginning of the transition in 1992 until 1997, nearly 2 million jobs were lost. Though output decreased, it was not in proportion to the employment declines, causing labour productivity to increase considerably. Economic growth improved after 1997, leading to a period of employment creation which was also accompanied by continued productivity growth.

Hungary's experience can roughly be divided into two phases: from 1992 to 1997 and from 1998 to 2002 (see the following graph). During the first period, employment declined at the expense of labour productivity gains, owing mainly to the effects of downsizing public enterprises and the need to make them efficient. Unemployment continued to rise during the economic downturn of the early 1990s and even the recovery that followed was unable to create employment opportunities.

Labour productivity and employment (in thousands) in Hungary



Source: ILO, 2003b.

The government introduced a controversial austerity programme in 1995, aimed at speeding up the privatization process and reducing government debt in order to bring interest rates and inflation under control. The reforms encouraged foreign direct investment and stimulated exports, one of the main engines of growth, which increased considerably after 1997 with the devaluation of the Hungarian forint. Although initially employment continued to decline, a closer look at the sectoral composition of employment during this period reveals

an increase in employment in construction, financial services, retail trade, catering, and the transport and communication industries.

By establishing itself as part of the European production network through foreign direct investment, Hungary has been successful in obtaining high growth rates since the mid-1990s, which has also translated into employment creation. At the same time, businesses have adopted more efficient practices, leading to gains in productivity growth.

Although Hungary has achieved impressive labour productivity over the decade, the employment rate is still relatively low. In 1992, employment as a share of the working-age population was 50 per cent. Additionally, rising domestic labour costs mean that Hungary is losing its competitive edge in low-skilled industries. Some multinationals in low value-added industries are already relocating further east to Ukraine, some to Asia (mainly China). To maintain its growth, Hungary needs to improve the skills of its labour force and upgrade its knowledge base through increased investment in research and development (R&D), to be more competitive in higher skilled industries.

Source: Román, 2003.

instability and inequities in the economy many of the jobs created are also in the less productive informal economy.

The upper northeast quadrant is dominated by the high-growth economies of the Asian and Pacific rim (e.g. China, the Republic of Korea, Singapore). Their high growth in productivity and employment can be explained by an export-led growth strategy using an abundant and increasingly skilled workforce that was able to take advantage of its relatively low labour cost to increase its competitiveness and expand into new markets.

In the lower part of the northeast quadrant is a heavy concentration of industrialized economies, showing no discernable pattern between employment and productivity growth. Productivity levels in this region are the highest in the world, which accounts for slower growth than that of the East Asian "catch-up" economies. At the same time, considerable diversity is present in this region, as it comprises economies both within and outside Europe. In essence, nothing has done more to keep the notion of a trade-off between employment and productivity alive than the comparative evolution of these two key variables in the European Union and the United States. This phenomenon, known as "the Atlantic Divide", is discussed in more detail below.[24]

Employment/productivity trade-offs in Europe and the United States: The Atlantic Divide

Table 2.2 separates the growth of aggregate output into the contribution of employment growth and labour productivity growth in Europe and the United States. From 1970 to 1990, the rate of annual output growth was similar in Europe (2.8 per cent) and the United States (3.2 per cent). However, whereas

[24] The European-US employment and productivity differential has generated a large literature. A particularly perceptive analysis is given by Gordon (1997). Various issues of the *World Economic Outlook* by the International Monetary Fund (1995, 1999) have also addressed this topic.

Table 2.2. Employment and productivity in the United States and Europe, 1970-2000 (percentage)

Economic region	1970-1990	1990-2000
United States		
Employment	2.1	1.3
Productivity	1.1	1.9
Output	3.2	3.2
Europe (EU 11)		
Employment	0.4	0.6[1]
Productivity	2.4	1.5[1]
Output	2.8	2.1[1]

Note: Annual growth rates (in per cent).

[1] 1991-2000. For Europe, the growth rates are from 1991 to 2000 rather than from 1990 to 2000 in order to eliminate the only substantial (but artificial) one-time upward shift in the employment series: the inclusion of some 10 million East Germans in the employment statistics.

Source: OECD, various years.

Europeans relied almost exclusively on productivity growth to increase their output, American output growth in the same period was much more labour-intensive, with employment growth contributing two-thirds of output growth. Europe achieved much higher productivity growth than the United States in 1970-1990, which can mainly be attributed to the process of "catching-up". During the catching-up process countries tend to have really high growth rates, then once they catch-up (i.e. their levels converge to the leaders), growth will slow. Part of the strong growth in Europe's productivity during this period was undoubtedly due to its efforts to attain productivity levels similar to those in the United States. During this period, however, Europe was much less successful in providing its slowly growing labour force with jobs (as evidenced by the 0.4 per cent growth rate over the period) than the United States was at integrating a much more rapidly expanding labour force into the labour market. This suggests a trade-off between employment and productivity growth in the two regions.[25]

The numbers for the 1990s, in which the relative productivity performance of the European Union and the United States underwent a fundamental change triggers doubts about the idea of an employment–productivity trade-off. Particularly in the second half of that decade, the United States experienced a marked acceleration of productivity growth, which is widely attributed to the growth of the "new economy" through information and communication technologies. For the first time in the post-war era, the United States outperformed Europe in terms of productivity growth. This "productivity miracle" in no way put an end to the "employment miracle" of the preceding decades. Employment growth slowed somewhat, but this was clearly due to slower labour force growth, as evidenced by

[25] One issue not dealt with here is that a comparison of labour productivity growth and changes in *unemployment* will easily do away with the trade-off hypothesis on the Atlantic Divide. Whereas productivity growth slowed down, and labour input growth slightly accelerated, unemployment rates in many European countries – notably Germany – have continued to rise (Landmann, 2004, figure 2).

the almost continuous fall of the unemployment rate throughout the decade: from 5.6 per cent in 1990 to slightly more than 4 per cent in 2000. Not surprisingly, European productivity growth decreased (as levels converged to those in the United States). The productivity slowdown had no noticeable effect on employment growth and was translated almost entirely into slower output growth.

Productivity growth and better jobs

Another issue in the relationship between productivity and employment concerns the quality of jobs being created. Productivity growth might be related to the creation of more jobs, but if these jobs are of lower quality, for example, with lower skill levels, then a quality trade-off with potential impact on slower income growth may be the result.

Labour quality can be measured in various ways. One way is to measure the labour skills in terms of literacy and educational attainment of the labour force. Measures of labour force quality conclude that the quality of jobs has substantially increased over time, although the direct impact on productivity is hard to show.[26] Another direct measure of labour quality concerns the payment to labour.

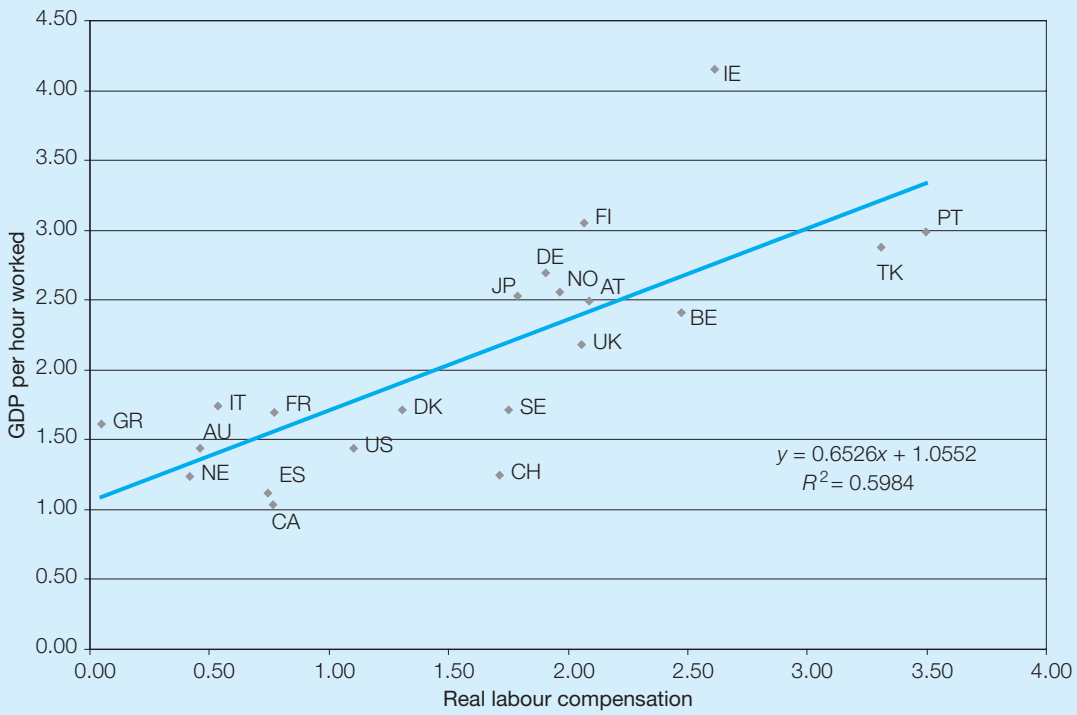
Unfortunately, comprehensive measures of real wages (covering the total economy, all occupations and including all components of labour compensation) can only be obtained for a limited number of countries, mostly for the OECD region. Figure 2.3 shows the relationship between the growth in labour productivity and real labour compensation per hour from 1985 to 2000. A clear positive relationship between the two variables can be seen, strongly suggesting that in the long run, higher productivity is accompanied by higher labour compensation.

2.3. Productivity and employment in developing economies

The preceding discussion argues from the standpoint of both theory and evidence the conditions under which employment and productivity growth go together. Often, when economists talk about workers moving into other sectors after job loss, they assume that certain mechanisms are in place to ensure that a beneficial outcome occurs. Unfortunately this is not always the case. For example, the worker who loses her job in the garment industry might be able to find a job of equal or better conditions in the service sector, provided, of course, that sufficient demand exists, that she possesses the adequate skills or can quickly obtain them, that she has access to labour market information, that there is no discrimination in the labour market, and that there are no barriers to mobility. In short, the various "compensatory mechanisms" discussed earlier in section 2.2 and table 2.1 often remain at the level of theory, rather than reality. A case study was done by Karaömerlioglu and Ansal (2000) based on the experiences of Turkey to understand how these "mechanisms" might work in a developing country with some agricultural and industrial research capacity. The results of the study are summarized below in table 2.3.

[26] See, for example, Van Ark et al., 2004.

Figure 2.3. Relation between growth in labour productivity and real labour compensation, 1985-2000 (in 1990 US dollars)



Note: Real labour compensation is measured as total compensation of labour, adjusted for imputed income of self-employed (based on wages of employees) and deflated at the private consumption deflator.

Sources: GGDC, 2004, and ILO, 2003b. Private consumption deflator from OECD, 2004.

In general, national socio-economic factors affect employment creation. The macroeconomic conditions, industrial structure and firm characteristics all determine how productivity gains will impact on employment creation. For most developing countries, reality is often marked by substantial unemployment, underemployment, and poverty – and stalled "structural transformation" out of low-paying activities to higher value-added ones. The reasons are manifold: indeed, to address them is to review the voluminous history of development economics, which is well beyond the scope of the present chapter. The central question, however, is whether the analysis in section 2.2 applies equally well to developing countries, characterized by labour surplus and a variety of institutional shortcomings. Given that in the short term, when output is fixed, a focus on productivity growth could be at the expense of job creation, the question is: Does the productivity–employment trade-off apply equally to developing countries with underutilized or unused labour?

The answer must clearly be in the affirmative for at least four reasons.

1. The first is the general point that no country can afford to neglect improving the productivity of its workforce since productivity drives wage increases and

Table 2.3. Productivity growth and "compensation mechanisms" in developing countries

Does productivity growth lead to:	Scenario in developing economies	Evidence from the Turkey case study
Declining product prices?	Although productivity gains may lead to lower product prices, this may not result in increased demand from consumers and businesses. Firstly, because user and buyer industries do not always exist in a developing economy, which limits the scope for increased demand from industries in the supply chain. Secondly, the slow growth rates in many developing economies suggest that consumer demand may respond weakly to price changes. In this case no additional employment gains will result.	Productivity gains often led to an increase rather than a decline in prices of the product – because of the new features and higher quality of production. When demand did increase as in the case of manufacturing, where demand increased by 211 per cent from 1981 to 1995, the employment gains were minimal.
Increased wages?	Initially any increases in wages will be much lower than the productivity gains, and may also be biased towards those with specific skills. Based on these limitations there may not be sufficient increased demand to stimulate additional job creation.	There were productivity gains in manufacturing during 1980-89, but this did not lead to sectoral wage increases – in fact, real wages in manufacturing declined during this period.
Employment creation from increased investment?	The gains from productivity are not always reinvested back into the business. Profits may instead be consumed or reinvested in other ventures, often outside of the local economy. Additionally, when reinvestment in the firm does occur it can often be in the form of capital-intensive/labour-saving technologies in a drive to increase competitiveness.	Investments were generally in the form of capital intensive/labour-saving technology, which did not result in employment gains.
Employment creation from new products?	Since most of the new technology in developing economies is imported, they do not benefit from employment gains that generally are associated with new product innovation – developing economies are technology imitators, not technology creators at initial stages. Additionally, most of the technology comes to developing economies once it has matured in developed economies so they experience the mainly negative employment effects that are associated with process innovation.	The majority of new technology was imported and only negative employment effects were experienced. Often industries had license agreements with multinationals restricting independent new product development. In few cases where there was new product innovation no significant employment impact occurred.

Source: Karaömerlioglu and Ansal, 2000.

thus brings about an improvement in the standard of living of a country. Moreover, as the rate of economic growth increases, the "lion's share" of this higher rate of growth is typically accounted for by productivity improvement.[27] The employment-displacing effects of productivity growth can in

[27] Due to diminishing returns of capital and labour.

some instances not be avoided: indeed, they ought not to be as they are part of the structural transformation to becoming a wealthier country.

2. The second reason is that no enterprise that operates on global markets, regardless of where it is located, can afford to forego productivity increases, irrespective of their employment consequences. With the exposure to competition that comes with the greater integration of global markets, a company's autonomy to pick and choose its production technologies declines.

3. Strong empirical support is behind the third reason, and that is that productivity and employment growth can go together. The development of the East Asian "miracle economies" with their export-oriented development strategy is, of course, instructive in this regard. Three observations are of particular note here. It will be recalled from figure 2.3 that a positive relation generally exists between productivity and wage growth. A closer look reveals that the relationship is not one-to-one. In fact, over the past decades, labour's share in national income has been declining in many countries. Having wages grow, but grow with a lag, or grow at less than the rate of productivity growth, has in fact been a hallmark of the export-oriented East Asian miracle economies. Limiting wage growth was a means of ensuring the external competitiveness of export industries which, in turn, allowed for expanded market share and thus continued employment and wage growth. Box 2.4 describes the experience of the Republic of Korea in this regard. As a strategy for employment-absorbing output growth, but one that also allows for rising wages and also profits for reinvestment, it proved effective. The second observation is, quite simply, that structural transformation does not happen overnight. The Asian model was characterized by the substantial intervention of the State and well-functioning institutions in the promotion of key industries and, indeed, key firms within those industries. Rapid growth nevertheless coexisted with underemployment and poverty, much as it does at present in China and India. Indeed, even an advanced economy such as Japan combines a highly productive export-oriented manufacturing sector with a relatively low productive and domestic-oriented service sector. The third observation is that early industrialization in the successful Asian economies was based on their factor endowment, the abundance of low-cost labour. While low-cost, labour-intensive production might appear to be the antithesis of a productivity-led growth strategy, such a conclusion would be erroneous. Why? Because even relatively unskilled industrial employment in the early stages of the export-oriented strategy *was more productive than its pre-industrial alternative.* The message here is that a productivity strategy need not be one that ignores the factor that developing countries have in abundance – labour. And, as mentioned in box 2.2, a low-wage, low-skilled development strategy is *unsustainable* in the long run: it can only be viewed as the starting point for the *transition to higher value-added activities* (by establishing linkages with other sectors of the economy

and upgrading the skills of the workforce) which, again, describes the trajectory associated with the Asian miracle economies.

4. The fourth reason is even more compelling. The magnitude of underemployment and poverty in the developing world is a reflection, not of the absence of economic activity of the poor, but of the unproductive nature of that activity. It stands to reason that a focus on improving the productivity of the working poor (those who work but still earn less than US$1 a day) is a direct route to poverty reduction. Evidence of this last-mentioned claim is shown in table 2.4. Chapter 3 of this Report further elaborates the linkage between productivity and poverty reduction.

Table 2.4 presents an empirical exercise undertaken for this chapter in order to investigate the link between productivity and poverty reduction.[28] This exercise examines the relationship between productivity and poverty from 1970 to 1998 and also addresses the link between inequality and poverty reduction. The results show that both productivity growth and levels are strongly, negatively associated with changes in poverty rates. In the case of US$2 a day poverty, productivity appears to have a relatively stronger impact on reducing poverty, whereas in the case of US$1 a day poverty, the impact of productivity is slightly less. The income inequality coefficient has the expected sign, but is not statistically significant in any of the cases.

All else being equal, over a period of 28 years, a US$1000 per worker increase in labour productivity will reduce the US$1 a day poverty rate by 1.5 percentage points. In terms of US$2 a day poverty, the same increase in worker productivity levels is associated with a 2.6 percentage point reduction in the poverty rate.

The results are similar when one examines the impact of *productivity growth* on poverty over the same period. The estimates predict that, all else being equal, for every 1 per cent increase in the rate of productivity growth, the US$1 a day poverty rate will be reduced by 1.75 per cent. Slightly more robust results are obtained when using the US$2 a day poverty rate; a growth in worker productivity is associated with a 2.8 per cent reduction in the poverty rate.

In general, the main reason why productivity growth impacts poverty is because productivity is the main determinant of income growth. Gains in productivity mean that there is more real income in the economy that can be distributed to workers in the form of increased wages. This analysis shows that in developing economies it is not only employment that is necessary for poverty reduction, but also *productive employment* – employment that leads to increased wages, allowing workers to rise above the poverty level.

It is also important to note that there is a two-way relationship or *virtuous* circle between productivity growth and poverty reduction.[29] Productivity growth raises incomes and reduces poverty. But the reduction in poverty can in turn loop back to improved productivity performance as those that move from poor

[28] For a detailed methodology, see appendix 2.1 and Sharpe, 2004.

[29] For a discussion of this relationship, see Sharpe et al., 2002.

Box 2.4. The wage–productivity gap in the Republic of Korea and the role of social dialogue

The Republic of Korea has a history of strong trade union activism dating back to the late 1940s. In particular, its experience in dealing with unions is interesting because of the relationship that unions had with the Government, which in the past exerted considerable wage leadership, and tied growth in wages to growth in productivity.

The active involvement of the State

The Republic of Korea was concerned with minimizing capital–labour conflict to secure industrial peace, and motivating workers to improve productivity. The Government initiated a procedure for announcing wage guidelines in the late 1970s which strongly influenced decision-making by firms. The major purpose of the guidelines was to prevent wages increasing faster than productivity. Although there was no mechanism for enforcement, state control of the allocation of cheap credit and scarce foreign exchange forced compliance from many of the larger firms. Labour costs decreased rapidly due to the Government's direct intervention (which could not have happened in a competitive market). The liberalization of political institutions, which started in 1987 and subsequently led to an explosion in wages, strongly suggests that wage repression was indeed part of the labour market scene prior to this date.

The importance of having a high rate of output growth

As an export economy, the Republic of Korea had to be competitive in international markets, especially in terms of its unit labour costs. Additionally, with such a competitive advantage, the Republic of Korea had a very high rate of output growth, which allowed it to absorb excess labour from other sectors of the economy (such as agriculture). The rate of wage growth was based on labour productivity and the Government was in favour of distributing the profits to workers in terms of wage increases. The State also encouraged firms to provide more social benefits to employees. The rate of real wage increase was 5.7 per cent a year from 1981 to 1986. This rate grew significantly from 1989 to 1992 (as a result of liberalization) and continued to increase through 1996. The productivity gains and increased demand in manufacturing goods lead to substantially higher wages for manufacturing workers and increased employment creation in this sector.

The wage–productivity gap in Korean manufacturing

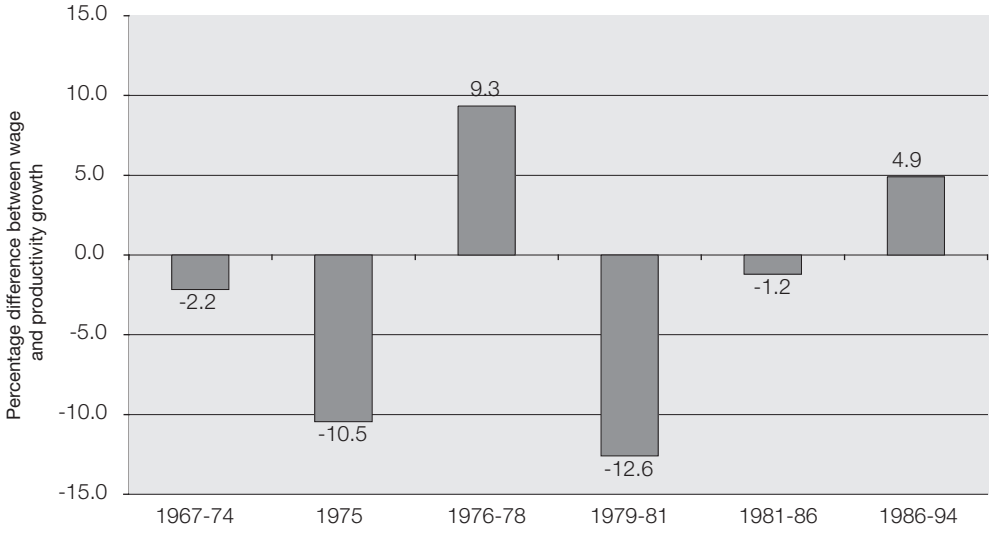
The "wage–productivity gap" (defined as the difference in the percentage growth rate of annual real wage and real value added per worker in manufacturing sector) is shown in the graph opposite. For most of the two decades covered, wages increased slightly below the productivity growth rate and never produced wage inflation, except during the industrialization phase of late 1970s, when the Republic of Korea pushed ahead with an ambitious programme of heavy industrialization, and at the same time there was a serious tightening of the labour market due to massive migration to the Middle East. In 1974 there were 395 Korean workers in the Middle East; by 1981 this number had expanded to 162,000.[1]

Another element in Korean wage history is the sharp fall in the share of wages in each of the two periods following the oil shocks. In order for the economy to rebound after the two oil shocks, there was a sharp fall in wages, which lead to a reduction in unit labour costs. Here again state paternalism was important, since it ordered labour inspectors to ensure that wage increases were accompanied by productivity increases.[2]

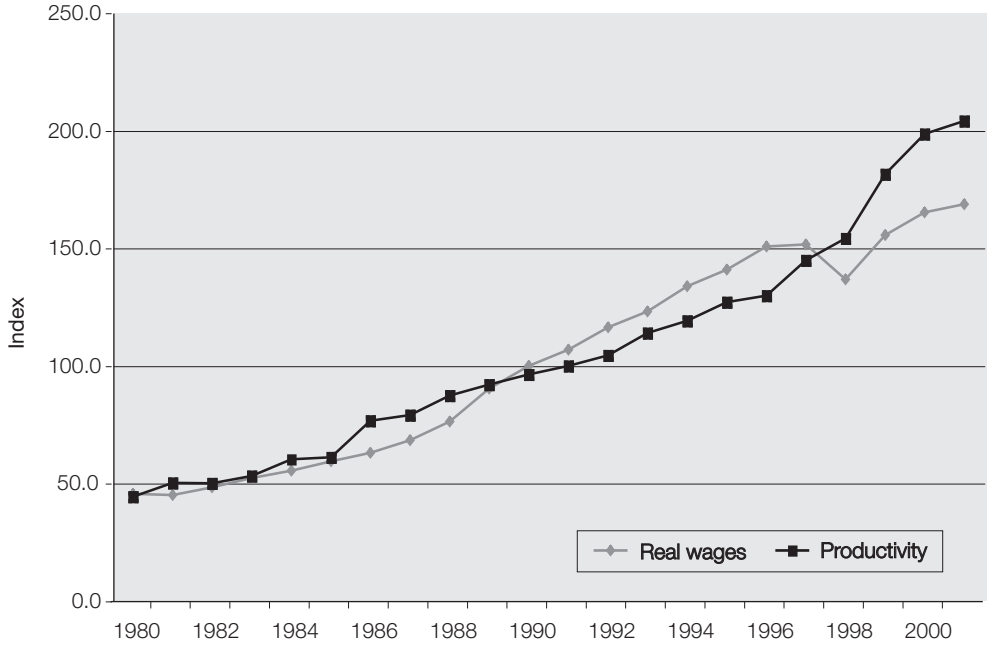
After 1997

After the economic crisis and the subsequent programme imposed by the International Monetary Fund, relations with the Government and the social partners were strained, which lead to the signing of the Social Pact (1998). This three-way dialogue at the national level facilitated the adoption of a set of economic and social measures to cope with the crisis, as well as maintaining social stability in a situation of severe economic downturn. However, once the crisis was over, this tripartite dialogue was abandoned, which lead to new industrial conflicts. Due to the economic buoyancy after 1999, unemployment decreased, but the mistrust between Government and social partners remained. As seen in the graph opposite, after the economic crisis of 1997 real wages decreased considerably and have not kept pace with productivity growth.

The wage–productivity gap (%) in the Republic of Korea, 1967-1994



Growth of real wages and productivity in the manufacturing sector of the Republic of Korea, 1980-2001 (index, 1990=100)



[1] Migration News, http://migration.ucdavis.edu/mn. [2] In 1974 and 1975, the LCSPNC (Law concerning the special measures for safeguarding national security), which was enacted in 1972, expanded the scope of compulsory arbitration to all industries.

Sources: ILO, 2003b; Mazumdar, 2004.

Table 2.4. Some determinants of changes in US$1 and US$2 a day poverty rates, 1970-1998

	Variable name	Change in US$1 a day poverty rate	Change in US$2 a day poverty rate
Levels			
(1)	Labour productivity levels	–0.0015(0.000)**	–0.0026(0.000)**
(2)	Gini coefficient	0.0676(0.318)	–0.0623(0.376)
	Constant	24.857(0.044)*	58.389(0.000)**
	R-squared	0.41	0.61
Growth rates			
(1)	Labour productivity growth	–1.754(0.686)*	–3.471(1.043)**
(2)	Gini coefficient	3.299(2.166)	2.763(3.294)
	Constant	–4.910(2.284)*	–8.191(3.474)*
	R-squared	0.26	0.32

Note: Standard errors in parentheses.
* Significant at 5 per cent. ** Significant at 1 per cent.
Source: See appendix 2.1 for details regarding data sources and estimation methodology.

to non-poor status enjoy better health and acquire more education. Both these developments enhance productivity growth.

The results of this analysis provide support for the view that productivity growth is essential for poverty reduction and should be a priority for developing countries. Consequently, the challenge developing countries face is to promote higher productivity growth for long-run sustainable growth while at the same time offering short- and medium-term solutions for providing an abundance of labour with decent employment opportunities. In principle, public policy could play a role by compensating the losers of the growth process, through such avenues as income support and retraining programmes. But in many developing economies there are significant barriers to the development of such programmes, including high cost and ineffective government structures. In these circumstances, most especially, providing employment opportunities for the poor is essential in order for them to "work themselves out of poverty".

The foregoing discussion is consistent both with observed practices in developing countries and, indeed, with ILO policy advice in the area of employment-intensive infrastructure projects. These are self-targeting, poverty reduction projects that are characterized by their more intensive use of labour than equipment. While it cannot be argued that labour-based methodologies are always appropriate, they could be so in certain circumstances. For example, in less competitive contexts, such as in economic activities that are more sheltered from market competition, where capital is excessively expensive relative to the returns on the project, and, of course, where income-generating activities are needed for the poor. Box 2.5 elaborates the concept of employment-intensive methodologies.

Are employment-intensive infrastructure projects a prescription for favouring "employment" over "productivity"? Here, too, such a conclusion would be mis-

Box 2.5. The macro-impact of labour-intensive employment programmes

The critical importance of infrastructure in catalysing development is well known. Opening up and linking isolated rural areas, roads and improved transport may play a critical role in facilitating the growth of poverty-reducing non-farm activities. From the point of view of poverty reduction, there are at least two more reasons for providing particular attention to investment in the infrastructure and construction sector. The first relates to the large size of this sector in a typical developing economy and the second to options available in terms of choice of production technology.

The macroeconomic case for using labour-based – instead of equipment-intensive – technology in the infrastructure and construction sectors has been made in many developing countries on a number of grounds. Labour-based programmes provide lower unit costs, increased employment generation, higher contribution to GDP, higher multiplier effects, higher levels of household income and consumption, reduced foreign exchange requirements and, hence, reduced import dependency. These conclusions apply to countries characterized by surplus labour, low wages and weak local industrial capacity (in tools and equipment production). The labour-based approach should be considered as a strategy for the short and medium term. When a country achieves a certain level of development and the surplus labour becomes exhausted, such an approach should no longer be required.

Although more comprehensive and longer term analysis of the impact on poverty of employment-based investments is required, macroeconomic comparative analyses of labour versus equipment-based investments clearly show that for a given investment, the labour-based approach yields better results on household income and consumption (which increases by at least twice as much). Programme benefits include:

- Stimulating employment in low-income groups by providing at least three times more employment for unskilled labour.
- Spending about 50 per cent more on local resources and at least twice as much on local wages.
- Generating about twice as much indirect employment – mainly through the increased use of local resources and hence strengthened inter-sectoral linkages.
- Saving foreign exchange, improving the current account.

Concrete investment–employment–poverty linkages thus achieve much higher multiplier effects for the economy, and in particular for the poor and low-income groups, than policies that do not explicitly address these linkages.

Labour-based approaches are not limited to rural projects and could also be applied in urban situations where they would contribute simultaneously to an improvement in the living conditions of the urban poor and improvements to the urban environment. Upgrading urban slums (clearing and paving of roads, improving drainage), and management of solid wastes are examples of such activities.

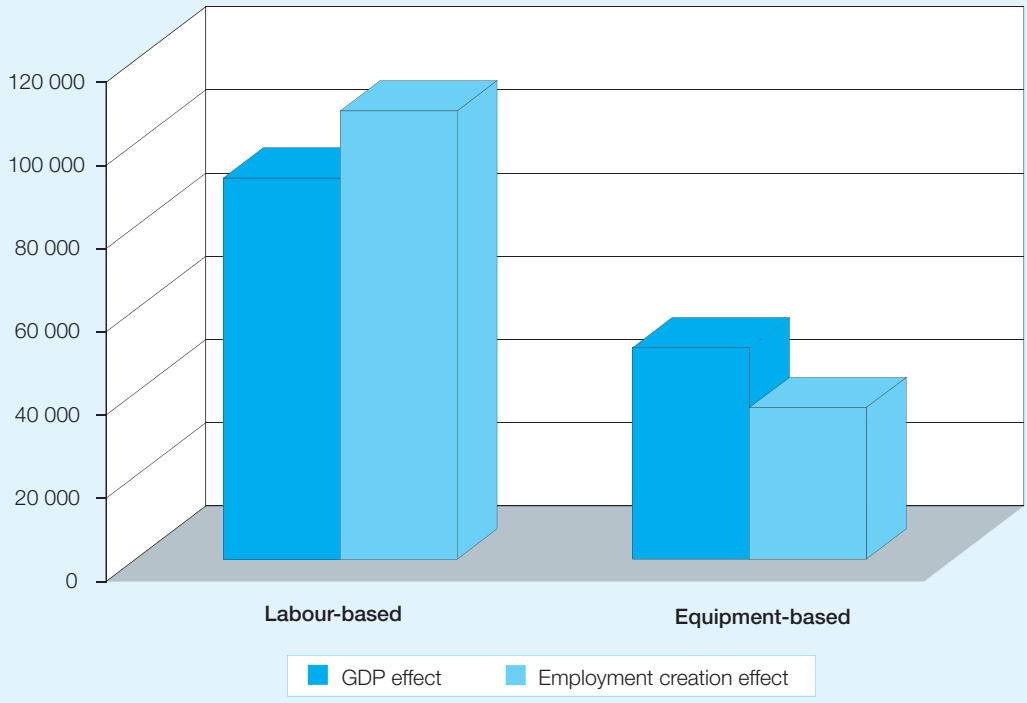
Source: ILO, 2004, p. 5.

leading. First, participants in employment-intensive infrastructure projects are *employed at a higher level of productivity than their alternative economic activities could provide.* The self-selecting nature of their participation in such projects can be taken as a proxy for this. Second, as noted in box 2.5, the multiplier effects of such projects have a more direct and positive spillover effect on the communities

in which poor people live. As a result, employment-intensive infrastructure projects can overcome difficulties in the transmission from sectors where productivity is growing to sectors where poor people live and work. Moreover, the effects are quantifiable, as figure 2.4 shows in a comparison of economic outcomes of employment versus equipment-based production methods in Uganda. The labour-based method yields three times the impact on employment creation and twice as much effect on generating GDP in the economy. Through direct and indirect channels the employment created using labour-intensive methods is estimated to be 107,657 compared to only 36,418 using the equipment-based approach. The reason for the higher GDP impact in the labour-based methodology is that a higher proportion of income and consumption remains in the local economy.

Even in developing economies characterized by underutilized (or unutilized) labour, the statement that countries should focus on employment at any cost, irrespective of productivity, is misguided. Were a country to do so it would be a prescription for widening inequality between it and wealthier countries, where the main source of economic growth and growth in standards of living is through productivity increases. Rather, policy focus needs to be on both employment and productivity growth. That said, two principles are of relevance. First, as

Figure 2.4 Comparison between equipment and labour-based investment project, Uganda, 1996



Note: These are study estimates from a macroeconomic simulation of public investment of 30 million Ugandan shillings in feeder roads rehabilitation and maintenance. GDP figures are in millions of Ugandan shillings.
Source: Taylor and Bekabye, 1999.

the successful economies in Asia have shown, industrialization begins by capitalizing on the abundant factor – low-cost, unskilled labour. It makes economic and social sense to build an economy on the factors in which a country has comparative advantage. Experience has shown, however, that such a strategy is transitional, and that the route to greater wealth and higher incomes is by increasing the productivity of the labour force.

The second principle is that both the labour intensity of early industrialization and the employment bias in employment-intensive infrastructure projects cannot be taken as evidence of opting for employment growth over productivity growth. Such a conclusion neglects the lower productivity associated with alternative economic activities. As the sectors in which productivity is growing most rapidly are unlikely to be those in which productivity growth would have the greatest impact on poverty reduction, it makes sense to focus attention on employment and productivity growth on the sectors and areas where they can have the greatest impact on poverty. This idea is now followed up in more depth by looking at the informal economy, where most underemployment is concentrated. The issue here is: Are productivity improvements in the informal economy feasible and do they constitute a meaningful contribution to structural transformation?

The role of the informal economy in structural change

As noted above, structural transformation is both time-intensive and occurs in an unequally distributed fashion in developing countries. The time-lag for structural change to impact on growth, in combination with the effects of demographic transition, has resulted in an explosive growth of urban sprawl in cities such as Mexico City, Jakarta, Calcutta, and Lagos. As a result, these economies are confronted with large labour surpluses of underemployed people who find their way into informal employment, largely in the service sector. Developing economies have only been partly able to absorb these surpluses by creating new employment opportunities.

This section deals with the specific role of the informal economy in the process of structural change. The crucial question is: Can the informal economy positively contribute to the dynamics of structural change? This section presents the conditions under which this might be the case.

The expansion of the informal economy[30]

With respect to the productivity–employment trade-off, the informal economy is typically biased towards employment growth at the expense of productivity growth. Consequently, the informal economy is characterized by substantial economic activity and substantial underemployment. The informal economy is also heavily biased towards unskilled labour. Despite these drawbacks, it has

[30] This section is based on the ILO's work on skills development in the informal economy. See http://www.ilo.org/public/english/employment/skills/informal/who.htm

also become increasingly recognized that the small-scale enterprises characteristic of the informal economy have substantial growth potential. These informal small-scale enterprises provide many jobs and are an important source of income, as they are easy to start up and rely primarily on unskilled labour. Furthermore, they are a source of capital formation for small entrepreneurs. Facilitating small-scale entrepreneurship by reducing entrance costs for informal economy workers can be considered a labour-biased development strategy to offset the distortionary tendencies (underemployment) of capital-biased technological change.[31]

Only recently have labour statisticians began to capture the informal economy in quantitative terms. Still, there are some problems in defining informal economy employment, and statistics often lack comparability.[32] Nevertheless, some preliminary results and estimates have been published by the ILO, including a percentage share of employment in the urban informal economy in total urban employment, as shown in table 2.5.

Self-employed workers comprise the majority of employment in the informal economy. In many developing countries, the number of self-employed in non-agricultural activities has been increasing as workers are attracted by the possibility of greater opportunities in urban areas. As a consequence, a substantial proportion of urban informal activities are located in the service sector, a topic that will be discussed later in this chapter.

During the 1990s, own-account and family workers[33] represented nearly two-thirds of the total non-agricultural labour force in Africa, half in South Asia, a third in the Middle East, and a quarter in East Asia and Latin America. A dramatic increase in self-employment has also marked the transition process of the former centrally planned economies of Europe. In the 1990s, own-account workers made up a quarter of total employment in Poland, one-fifth in Romania and one-tenth in the Czech Republic, Hungary and Slovenia.

In Latin America the urban informal economy was the primary job generator during the 1990s; informal economy employment increased by 3.9 per cent a year, while formal economy employment grew by 2.1 per cent. On average 60 per cent of new jobs were created by micro-enterprises, own-account workers and domestic services. Urban informal employment in Africa was estimated to absorb about 60 per cent of the urban labour force and generate more than

[31] For further discussion, see Little, Mazumdar and Page, 1987 and Vandenberg, 2004.

[32] The Resolution concerning statistics of employment in the informal economy, adopted by the Fifteenth International Conference of Labour Statisticians, defines the informal economy as "a group of production units, which form part of the household sector as household enterprises or, equivalently, as unincorporated enterprises owned by households ...." Within the household sector, the informal economy comprises (i) "informal own-account enterprise" that is owned and operated by own-account workers, either alone or in partnership with members of the same or other households, which may employ contributing family workers and employees on an occasional basis, but do not employ employees on a continuing basis; and (ii) "enterprises of informal employers" that are owned and operated by employers, alone or in partnership with members of the same or other households, which employ one or more employees on a continuous basis.

[33] Self-employed workers can be separated into employers, own-account workers and unpaid family workers.

Table 2.5. Percentage of total employed in the urban informal economy, selected countries, selected years

Country	Year	Total	Male	Female
Benin	1999**	46.0	50.0	41.0
Ethiopia	1999*	49.2	37.1	64.0
South Africa	1999**	21.3	16.1	28.4
Tanzania	1995**	67.0	59.7	85.3
Brazil	1997**	27.3	27.4	27.1
Mexico	2000**	19.4	17.8	22.2
Peru	1999*	53.8	48.9	60.6
India	2000**	51.3	53.7	40.6
Nepal	1999**	64.8	64.1	60.7
Pakistan	2000**	63.8	64.1	60.7
Philippines	1995**	17.3	15.8	19.4
Georgia	1999**	14.2	20.7	7.4
Lithuania	2000**	41.3	49.6	26.5
Russian Federation	1999*	4.5	4.4	4.7
Turkey	2000*	10.2	10.4	9.4
Ukraine	1997**	4.9	4.5	5.3

* According to the ILO's harmonized definition. ** According to the national definition.
Source: KILM 7a and 7b – Employment in the Informal Economy. ILO, 2003b.

93 per cent of all new jobs in the region in the 1990s. In Asia, it was estimated that the informal economy absorbed between 40 and 50 per cent of the urban labour force, before the 1997 financial crisis, displaying large differences across countries in the region. In the newly industrializing Asian economies, the informal economy accounted for less than 10 per cent of labour absorption, while in countries such as Bangladesh, Nepal and Pakistan it grew by over 60 per cent.

Large share of women in informal employment

There is also a gender-specific dimension to informal employment as represented by the large share of women who hold informal jobs. Women comprise between 60 and 80 per cent of total informal employment and tend to be concentrated in a narrow range of activities in lower-skill, lower-pay tasks (food processing, garment sewing and domestic services). Moreover, in addition to constraints faced by workers and producers in the informal economy with regard to access to assets, markets, services and regulatory frameworks, women face additional gender-specific barriers, which include restrictions to entering into contracts, insecure land and property rights and the constraints of household and childcare responsibilities. The recent widespread strategy of firms in the formal economy of advanced and developing countries to subcontract production to family enterprises has helped to link women's home-based labour to the formal production system under informal, flexible employment arrangements.

A potential positive contribution for creating better jobs?

The expansion of employment in the informal economy in many developing countries is directly linked to imbalances in the process of structural change. Thus, the challenging task ahead is to transform this large pool of human potential into a more productive one. Increasing the productivity of the informal economy workers will mean higher incomes and subsequently improved working conditions and living standards.

In this regard, it is worthwhile to distinguish between informal activities that are complementary (those that play a role in the vertical chain of formal production) and those that are substitutes for, and thus competing with, formal activities. Examples of the latter are food stalls, street vending, the production of low-quality apparel and shoes or simple mechanical work. These activities are sometimes perceived as a threat to their formal economy counterparts. On the other hand, activities that are considered to be complementary to formal production processes play a different role in the economy. Take, for example, informal transport services, the production of intermediary goods or informal types of education and learning, which are not available in the formal sector and are required to smooth the vertical chain. Lowering entrance costs for these small-scale enterprises, either in the formal or the informal economy, may create beneficial spillover effects for the formal economy.

For small businesses to develop they must gain access to important facilities such as capital loans, market information, simple technology and sufficient protection of property rights. Once this occurs the urban informal economy may even achieve a modest surplus that can be used to develop business linkages with the formal economy. Ultimately, this upgrading will lead to a decline in inequality, and will help to create a sizeable middle class that can stimulate social and political stability and enhance aggregate domestic demand.

Clearly a large informal economy is not a sign of favourable economic development. On the contrary, it points to the existence of a dual economy. But, given the existence of the informal economy and the problems of matching demand and supply of labour in the formal economy, the only option is to focus on the growth potential of the informal economy as an additional means of fighting poverty. The challenge then becomes one of providing assistance and improving the productive performance of these informal small-scale enterprises. Fundamental to this strategy is lowering the costs of formalizing business and building commercial and financial institutions to enhance economic integration of small-scale enterprises (see box 2.6).[34] For more on small-scale enterprises, see Chapter 5 of this Report.

Section 2.4 now discusses the policy strategies conducive to breaking or reducing the trade-off between productivity growth and employment in order to realize long-run growth potential.

[34] For additional literature, see de Soto, 2000.

Box 2.6. Formalizing the informal economy: The role of the National Productivity Institute in South Africa

The burden of turning informal business activities into formal ones lies in the cost of becoming formalized, a process that can be frustrating because of excessive rules and regulations. Formalization often requires the entrepreneur to accept and apply regulations concerning, among other things, the organization of the production process, the hiring and firing of labour, minimum wages, business administration, insurance and responsibility. Implementation of these laws can be costly and at times prohibitive.

The administrative abilities of the entrepreneur are also often unequal to the legal requirements necessary for registering (as a cook, a hairdresser, or a carpenter, for example) in the formal economy. In addition, in many countries, a reliable, extensive network is at least as important as personal or entrepreneurial capabilities in gaining access to the formal sector (de Soto, 2000).

Responding to this need, the National Productivity Institute (NPI) in South Africa developed a programme to help build productive capacity by working with informal businesses – particularly small, medium and micro-enterprises (SMMEs) – and helping them to become formal businesses. The main aim of the NPI is to build the country's productive capacity, by taking into consideration the interests of its three social partners: government, labour and business.

In order to meet the productivity needs of the SMMEs, the NPI instituted the Productive Behaviour and Competencies Programme (PBCP). Its purpose is to provide education and training to small-business owners in order to reduce waste, improve efficiency and utilization of resources, and improve product and service quality. The programme targets key areas of the economy that would most benefit from productivity gains: manufacturing, tourism and hospitality, agriculture, and services.

One outstanding example of the programme's work is with *The Sweet and Chocolate Factory* in Atteridgeville (Pretoria district), which started as a community project supplying sweets and chocolates to schools and the local community. The PBCP programme aided the factory's managers in a more efficient reallocation of resources, by helping them to keep records and identify and correct production-related errors. These small changes, by reducing wastage and allowing managers to keep a closer track of production, have almost quadrupled the factory's daily output.

Source: National Productivity Institute, 2003.

2.4. Focusing on sectors where employment is concentrated

Increasing productivity and employment for long-run sustainable growth requires a twin strategy of investing in dynamically growing sectors while at the same building capacity in sectors where the majority of labour is employed. A strategy of investing only in dynamic sectors in attempts to "leapfrog" may not be enough to reduce poverty, mainly because the fastest growing sectors may often not be where the majority of the poor are employed and may require skills and training that the poor do not possess. The growing ICT sector in India (as described later, in box 2.8) is a case in point. Currently India's ICT sector employs about 800,000 people, a figure that is expected to increase to 2 million

by 2008.[35] But job growth in the rest of India's economy has not been sufficient to provide adequate employment opportunities for the over 400 million people who make up the labour force, two-thirds of whom are located in the rural sector and lack the education and skills to compete for these ICT jobs. The challenge then is to *broaden the dynamic sectors of the economy, such as ICT, while deepening their linkages with other sectors in the economy – sectors where the majority of labour is employed.* At the same time, it is paramount to ensure that workers can be provided with skills and training for labour absorption in these growing areas of the economy, a strategy that requires increasing the productivity of workers in labour abundant industries.

This strategy will have the largest impact on workers' lives not only in the short and medium run, but also in the long term. In the short and medium term it will provide workers with decent employment opportunities, defined by security, opportunities, basic workers' rights and representation; in the long term, workers will be equipped with the necessary skills and training to compete for job opportunities in a dynamic economy.

A dynamic economy is exemplified by a great deal of "job churning", meaning that jobs are created and destroyed on a continuous basis. This process takes place both within (intra) and between (inter) sectors. Understanding employment dynamics at the sectoral level is helpful to appreciate how trade-offs between employment and productivity growth at the sectoral level may or may not exist at the aggregate level.

Table 2.6 illustrates the trend in sectoral employment growth by world region from 1950 to 1990. In all regions a considerable shift has been taking place away from agriculture towards the non-agricultural sectors of the economy, i.e. industry and services. On balance the service sector attracted the largest share of the increasing pool of labour, whereas the employment trends in industry diverged quite substantially between the advanced regions on the one hand, and developing regions on the other.

The shift in employment towards services is a "stylized fact" of post-war economic development. Table 2.7 shows that as an economy becomes more developed (i.e. moves towards high income) the contribution of its service sector to GDP increases. Nevertheless, compared to productivity growth rates in industry, the service sector trailed industry in most countries. Labour apparently does not exclusively shift towards the productivity champions as most theories on structural change predict. In spite of lower productivity growth rates, the service industry was the largest contributor to net employment creation. How can this be explained?

The attraction of labour by services is a very diverse process. First, economic growth in general implies the increasing contribution of services as a response to an increased demand for trade, transport, communication and social services. This service–employment growth effect can be considered partly as a classic type

[35] *The Economist*, 2004.

Table 2.6. The sectoral distribution of employment, according to region, 1950-1990

	Total employment(thousands)				Percentage distribution		
	Agriculture	Industry	Services	Total	Agriculture	Industry	Services
World							
1950	809 864	179 203	217 457	1 206 524	67	15	18
1970	930 196	317 957	408 001	1 656 154	56	19	25
1990	1 225 709	500 702	779 448	2 505 859	49	20	31
Europe							
1950	100 360	81 015	72 072	253 447	40	32	28
1970	64 120	123 563	116 581	304 264	21	41	38
1990	42 496	126 345	179 878	348 719	12	36	52
North America							
1950	9 389	26 711	36 767	72 867	13	37	50
1970	4 518	31 731	61 922	98 171	5	32	63
1990	4 128	37 003	101 348	142 479	3	26	71
Oceania							
1950	1 737	1 678	1 975	5 390	32	31	37
1970	1 964	2 499	3 865	8 328	24	30	46
1990	2 563	2 857	7 419	12 839	20	22	58
East and South-East Asia, excluding China							
1950	95 191	15 007	24 729	134 927	71	11	18
1970	104 620	34 240	54 793	193 653	54	18	28
1990	135 283	62 191	108 063	305 537	44	20	35
Asia							
1950	578 785	51 688	79 082	709 555	82	7	11
1970	699 140	124 841	167 168	991 149	71	13	17
1990	964 963	263 750	331 787	1 560 500	62	17	21
Latin America and the Caribbean							
1950	32 573	11 559	16 015	60 147	54	19	27
1970	40 107	21 145	34 140	95 392	42	22	36
1990	44 515	41 364	89 326	175 205	25	24	51
Africa							
1950	87 020	6 553	11 547	105 120	83	6	11
1970	120 347	14 178	24 324	158 849	76	9	15
1990	167 043	29 384	69 391	265 818	63	11	26

Source: ILO, 2003a.

Table 2.7. Share of the service sector in economy, according to income level, 1980-2000

Income level	Services share (% of GDP)	
	1980	2002
Low-income countries (≤$735)	38	46
Lower middle-income countries ($736-$2935)	39	56
Upper middle-income countries ($2936-$9075)	48	60
High-income countries (≥$9076)	58	71[1]

Note: $ = US$.
[1] 2001 value.
Source: World Bank, WDI, 2004.

of economic development based on the integration of markets, the increase of scale-enhancing specialization and the division of labour. As a result, many service activities have become independent activities, outsourced from agriculture and, to an even larger extent, the industrial sector in which they were once embedded.

Secondly, employment growth in the service sector can be a residual – and result from a lack of productivity growth in the rest of the economy. In particular, demographic pressures in rural areas, which lack sufficient employment opportunities, have caused large flows of rural–urban migration. These migrants are mostly absorbed by the urban informal service sector. The service sector is much more able to absorb hidden unemployment than the industrial sector, because of the possibilities of small-scale production and less capital-intensive work.

Many service activities are labour-intensive and, as noted above, the possibilities of raising productivity may be limited. Debate is ongoing on just how limited these possibilities are. Although the service sector has the most employment and represents the lion's share of output in developed economies, it has historically been characterized as technologically *non-progressive*, with little opportunity for productivity growth and facing relative constraints on wages and prices of goods in the sector.[36] An even more dire view was that the expansion of the service economy was akin to an urban crisis, as in Baumol's much-cited 1967 article, "Macroeconomics of unbalanced growth: The anatomy of urban crisis".[37]

It should be noted that productivity levels in some service sectors are already fairly high, particularly in many modern business service sectors. The inherent problems of measurement in this industry have caused productivity in many of the service industries to be underestimated (see box 2.7). Evidence is mounting that other "more traditional" industries in the service sector (such as distribution, retail, and transport and communication) are profiting from technological and organizational innovations in the economy, and also exhibiting substantial increases in productivity growth. Contrary to Baumol's view, more recent studies[38] have shown that rapid changes in ICT have expanded the productivity and marketability of many service industries that serve as the primary employer for a large proportion of the labour force. Not only are some service industries the highest productivity performers in the economy but also the most progressive, as they are the strongest users of ICT and have greatly expanded their market size and tradability by e-commerce.

[36] Adam Smith, in *Wealth of Nations* in 1776, and Karl Marx, in *Das Kapital* in 1873, adopted the physiocratic concept of productive and unproductive labour; neither gave the service sector an explicit treatment as a distinct activity. In this framework, the service sector was implicitly viewed as immaterial and unproductive, because it could not reproduce the economic system or create wealth for nations by adding value to materials (as could agriculture and manufacturing).

[37] Baumol, 1967.

[38] Miles and Kastrinos, 1995; Triplett and Bosworth, 2003; Andersen and Corley, 2003.

Box 2.7. Productivity measurement in the service sector

One of the most interesting debates surrounding productivity measurement involves the apparent *productivity paradox*. The term derives from Robert Solow's celebrated 1987 phrase, "You can see the computer age everywhere but in the productivity statistics." This paradox arose because those industries using new technology the most seemed to have the lowest levels of measured productivity. Numerous reasons have been advanced for this apparent paradox, one explanation being that the attempts to measure productivity in these industries were (and for the most still are) based on flawed statistics. This has been particularly the case in the ICT-using industries in the service sector.

As productivity statistics are derived from output measures, any errors in output will automatically feed into productivity measures. Measurements of output in the service sector do not fit the standard definitions, which were derived based on concepts for the manufacturing sector. Three issues underlie the problems in measurement of output and productivity in the service sector: definition, aggregation and quality consideration.

Defining the service and its output

Often, service sector production is not as clearly definable in tangible terms as in, for example, a "goods"-producing sector such as manufacturing. The intangible nature of some service industries makes it difficult to quantify (and sometimes even identify) an industry's output. For example, what is the output of a bank? Is its primary service the provision of customer accounts, or loans, or an optimal portfolio? How the primary service is perceived will determine a different mix of outputs (and inputs) that will alter the productivity measurement.

Another difficulty in defining a service is the role of customer involvement. "Goods"-producing industries produce an output, which is then sold to the market. Even if no one purchases the product, the industry has still generated an output, which can be stored in inventory. But what happens in the case of a service where the role of the consumer is implicit in determining output? A teacher, for example, is teaching – to an empty classroom. Here there is no output because there is no consumer involvement. But place just one student in the classroom and an output is produced. It is the same teaching, the same service, but without a consumer involved in the process, no output is generated.

Aggregation

Another issue in defining a service is the heterogeneity of units within types of services. Service transactions are generally not as homogeneous as manufactured goods because of the personalized aspects of the service sector (e.g. banking and finance) and consumer services (e.g. medical care, cleaning, and computer services). This is especially a problem when aggregating the number of transactions undertaken. The concept of aggregation of heterogeneous services is referred to as "bundled services". The difficulty in their measurement lies in first identifying and then finding some way of aggregating these diverse units. To return to the example of the banking industry, a bank account may provide services such as online banking, the use of ATM and bankcards, or safekeeping of funds. All these services must be aggregated to take account of their heterogeneous nature.

(continued overleaf)

Quality considerations

Finally, conventional measures of output and productivity do not capture the effect of quality changes in a good or service, unless this effect shows up in the price measure. And conventional measures of price movements (consumer price indices, producer price indices) do not consider changes in the quality of a good or service. A classic example here is the personal computer, whose prices have decreased steadily but whose quality continues to increase over the years.

This has lead to the concept of *hedonic* pricing, which takes quality into consideration. This statistical technique derives the relationship between a product's price and its characteristics. It is used to adjust the price index so that it removes the effects of variation in quality over time. Not applying hedonic prices will underestimate the output measure based on the volume of goods and services produced if there has been an increase in their quality. This is of particular importance in the increased quality of the healthcare industry and the computer industry, for example, both of which have been underestimated.

Hedonic pricing is more widely used in the United States to deflate output in industries (such as health services and telecommunications) where rapid technological changes have occurred. Thus, when estimating productivity for these industries, a more realistic picture is derived of changes in output, which is reflected in higher productivity figures. The effect is also to raise the average rate of productivity growth for the country. Such measures are not generally taken into account in many countries, which may be one of the reasons their economies seem to lag behind the United States in terms of productivity growth. For example, the British Office for National Statistics (ONS) recalculated productivity growth in the computer industry using hedonic pricing and found that growth rates had tripled.

Source: Andersen and Corley, 2003.

A word of caution should be noted here, because this does not apply to all service industries. Employment in this sector comprises the dual sides of the decent work spectrum: both high-skilled, high wage jobs and low-skilled, low wage components. The interesting question of how the sector has contributed to productivity growth for the economy as a whole is explored in section 2.5.

2.5. The impact of service sector growth on productivity growth

The service sector is important for a policy focus because it represents an overwhelming majority of output and labour in most developed economies. Additionally, in the developing economies the growth of services is expanding rapidly in terms of output, employment and in some cases productivity. Thus, both employment and productivity gains can be achieved in this rapidly expanding sector, warranting further investigation into the impact of the service sector expansion on the total economy.

As mentioned above, employment in this sector lies at both ends of the decent work spectrum. In some economies, the growth in services is attributed to a lack of employment in agriculture and industry, which pushes labour into less

productive urban service sector jobs, such as those in petty trade and personal services.

In other economies, labour is pulled by high productivity service sectors. The impressive growth in India's service sector is one example (see box 2.8). In sum, increasing service sector employment can either indicate a successful transition of the economy towards higher productivity levels, or reflect high numbers of hidden unemployed people in low-productivity services.

To delve deeper into this issue, the contribution of service sector productivity and employment to growth in the economy as a whole is examined. This is done based on calculations of employment and productivity differences by sector. First, the difference between productivity growth in the service sector and the total economy is calculated, which tells us whether sectoral growth is contributing positively or negatively to growth in the economy as a whole. Next, employment is calculated similarly to determine whether those sectors that exhibited above-average productivity increases also saw increases in employment. This exercise is done for a sample of countries that had service productivity data available in the ILO's KILM database. The countries available represent both developed and developing economies.

Figures 2.5a and 2.5b give the results of calculations for two service industries (transport and communications, and wholesale and retail trade), as well as the manufacturing sector, for two periods: 1980-2001 (figure 2.5a) and 1995-2001 (figure 2.5b). Although the figures obtained do not cover all the sectors in the total economy, transport and the retail trade industries represent approximately 25 per cent of employment in the economies analysed.[39] Figures 2.5a and 2.5b demonstrate i) the contribution of the service sector to productivity growth for the economy as a whole, and ii) whether or not there are employment–productivity trade-offs.

Figure 2.5a shows that, in transport and communications, all 15 economies, with the exception of Indonesia and the Republic of Korea, have above-average productivity growth, meaning that productivity gains in this industry contributed positively to growth in the economy as a whole. Additionally, in over two-thirds of the economies that showed gains in productivity growth, this was accompanied by gains in employment. Thus, in these cases, employment was pulled into high-productivity activities in the service sector. An impressive employment performance in transportation and communication services can be seen in India. Contrary to its recently lagging industrial development, high employment and productivity growth in this industry indicate that India's service sector can be a vital source of employment creation. In stark contrast to India, employment in Indonesia is being pushed into low-productivity services as employment has failed to rebound from the impact of the Asian crisis in 1997 (for more on South-East Asia, see Chapter 1 of this Report).

[39] Additionally, these figures do not include the community and personal services industry, which was the main focus of Baumol's analysis. However, Triplett and Bosworth (2003) and the US Bureau of Labor Statistics calculate labour productivity for personal services in the United States, obtaining figures of 1.8 per cent and 1.7 per cent respectively for 1995-2000, which was higher than growth for the total economy during that period (1.2 per cent).

Box 2.8. Growth in India's software industry

The service sector in India has recently been dominated by growth in the information and communication technology (ICT) sector. Numerous American and European companies are increasingly shifting their ICT services (back-office and call-centre operations, long-distance sales, insurance and medical data entry services) to India, either by opening their own businesses there or by outsourcing processes to Indian service providers. The ICT sector has become an oft-repeated success story and has placed the country on the global map of rapidly growing industry.

India's service sector is the most dynamic sector in the economy, primarily due to growth in the ICT sector, which accounts for 20 per cent of goods exported and over 3 per cent of the country's GDP.

The Indian software industry has grown by roughly 50 per cent in the past 6 years. Although this constitutes only a small fraction of total employment, the number of jobs in software and related industries jumped from just over 500,000 in 1999 to 700,000 in 2004.

India's success in the ICT business has been principally due to domestic capabilities and domestic entrepreneurs. Conventional explanations for the country's success in this industry highlight the comparative advantage argument. The software industry uses those resources (low-cost, high skilled human resources) in which India has international comparative advantage (and uses less physical infrastructure and financial capital where it has a comparative disadvantage). For example, the annual average wage for computer professionals is 10-20 per cent of that in the United States. This wage factor is one of the main reasons for this boom; India's wages are lower than their counterparts both in the United States and Europe. In addition, India has one of the largest reserves of English-speaking scientists and engineers in the world.

On the supply side, India is the largest producer of human capital for the software industry, producing over 100,000 ICT professionals in the late 1990s and over 65,000 engineers annually. In addition, over 200,000 Indian expatriates are working as ICT professionals in the United States as part of the H-1B visa programme. This undeniably helped India in establishing networks between American and Indian companies. As in all success stories, a little luck is always involved, which came in the opportune form of the ICT industry boom and the liberalization of the Indian economy in the early 1990s. Another plus is the difference in time zones, complementing India's working hours with those of the United States and allowing round-the-clock project work between the two countries.

Finally, the spread of the Indian diaspora in the United States, particularly in Silicon Valley, was instrumental in the development of this sector. First, it created networks that facilitated economic exchange and increased the transfer of knowledge between the two countries. Second, the "brain drain" has evolved into a vital mechanism for India's booming ICT sectors, with Indian workers being trained in software development in the United States.

Source: Arora et al., 2001.

In the wholesale and retail trade industry, a different scenario is found to that of the transportation and communication industry. Over half of the economies had productivity growth that trailed growth for the total economy. In some economies, such as Brazil and Mexico, employment growth accompanied negative labour productivity growth, resulting in a (reversed) employment–productivity trade-off. This can be explained by labour flowing in the direction of the low-productive urban service sector, as a result of increasing population pressure and lagging employment opportunities in (rural) agriculture and (urban) industry. In other words, labour is not pulled by high service sector productivity growth, rather it is being pushed by lagging dynamics in other sectors. The United States, Sweden and Taiwan, China, were the only economies having both above average gains in productivity and employment growth in this sector.

Performing a similar analysis for the manufacturing sector provides a useful benchmark for comparison across sectors. As expected, productivity growth in this sector has contributed positively to productivity growth for the economy in all of the countries in the sample. At the same time, the gains in productivity have accompanied trade-offs in employment in all economies, with the exception of India and Indonesia.

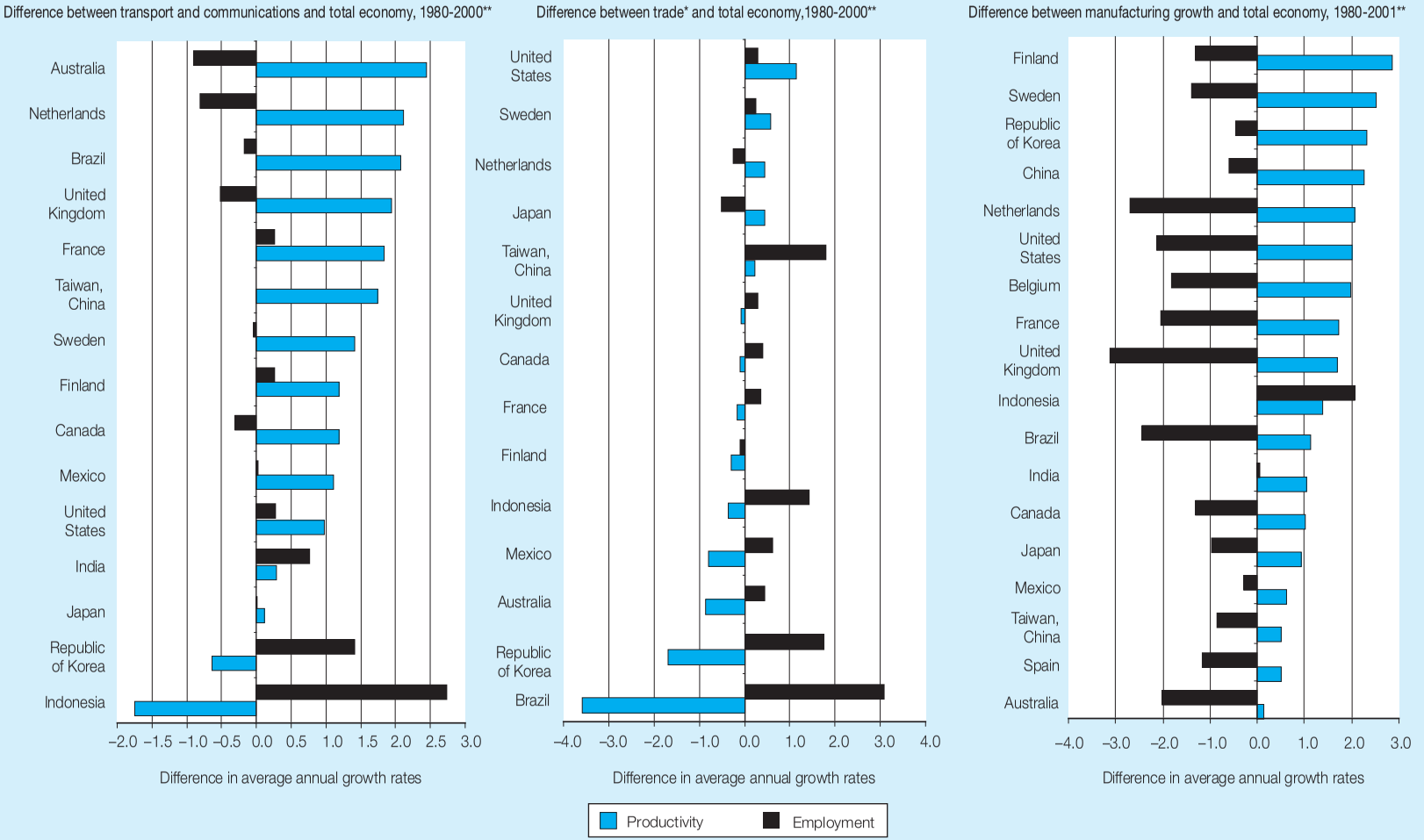
An interesting note is that productivity growth in the transport and communication industry is just as high as in the manufacturing sector, suggesting that growth in employment-intensive service industries can substitute for employment losses in the manufacturing sector – without fear of negative long-term effects on wages and sustainable growth.

How has the situation changed over time? Figure 2.5b presents the same analysis performed from 1995 to 2001 to see if these relationships have held over time.

In the transport and communication sector there was a substantial increase in productivity gains. Most economies still had productivity gains that were above average for the economy, while two-thirds of those economies also had above-average gains in employment. Japan, the Czech Republic and Indonesia were the only three economies with productivity gains less than the average for the total economy. During the 1990s, India also showed a slowdown in employment growth in this sector, possibly as the result of increasing gains in productivity. Across the board, however, employment gains remained above average for most of the sample economies.

In the wholesale and retail sector there was an increase in productivity growth from the previous period. Half of the economies have above-average productivity growth and, of those economies, about three-quarters also have above-average growth in employment. Mexico, which had negative productivity growth in the 1980-2000 period, is characterized by a significant increase in both productivity and employment growth. At the same time, the considerable increase in productivity in the United States (which can partly be explained by the ‘Wal-Mart effect”, i.e. the presence of big-box retailing which came onto the

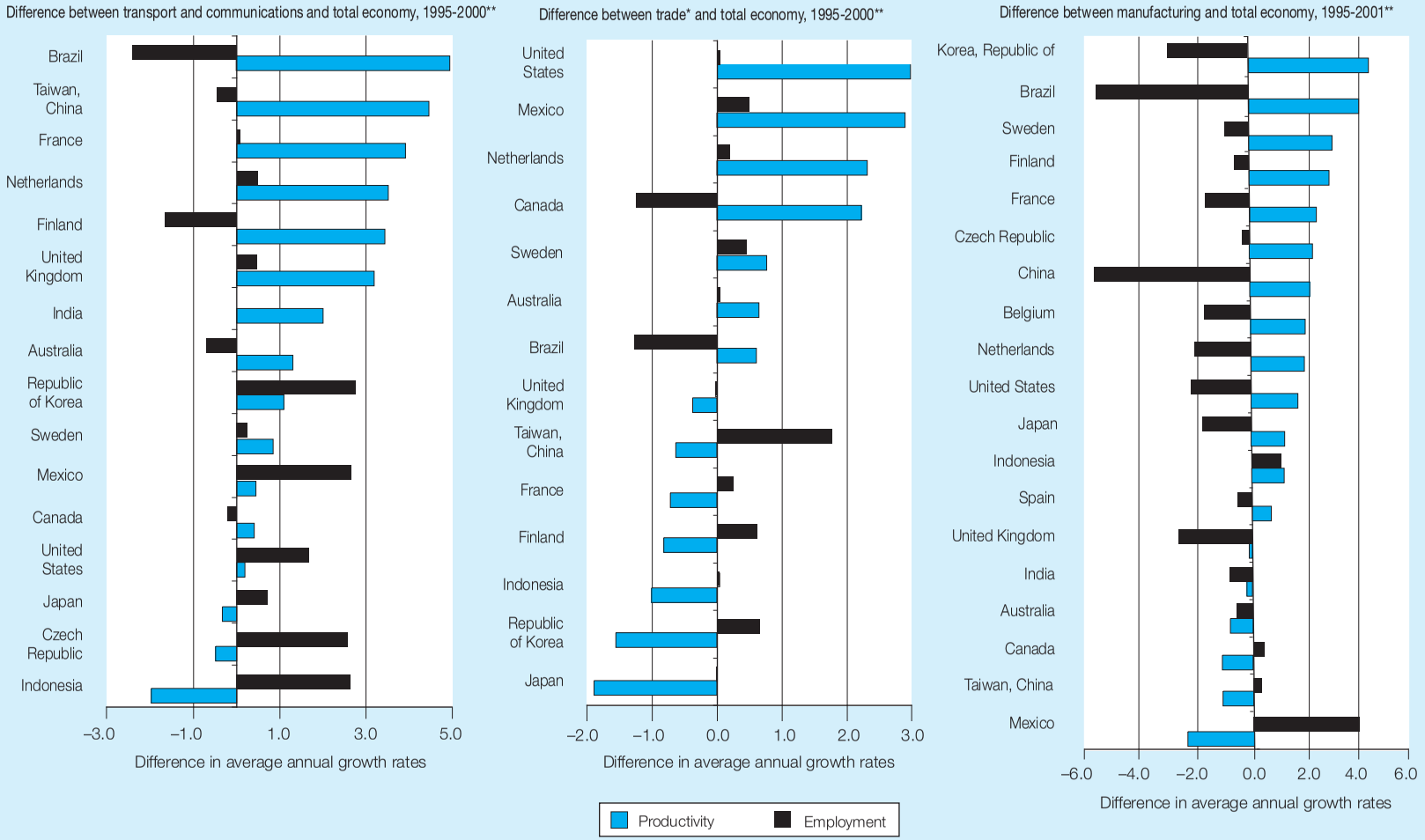
Figure 2.5a. Difference between sectoral and total economy annual average growth in productivity and employment, 1980-2001



* Denotes wholesale and retail trade. ** Not all economies had data available for this period; see appendix 2.2 for details.

Source: Author's calculations based on ILO, 2003b data, and GGDC, 2004.

Figure 2.5b. Difference between sectoral and total economy annual average growth in productivity and employment, 1995-2001



* Denotes wholesale and retail trade. ** Not all economies had data available for this period; see appendix 2.2 for details.

Source: Author's calculations based on ILO, 2003b data, and GGDC, 2004.

scene in the 1990s pushing out many of the smaller, boutique-style establishments) appears to have had almost no impact on job creation in the trade sector. This is arguably a cyclical phenomenon and can be explained by the recession of 2001, which led to a decline in employment for the economy as a whole. During the 1990s a reverse pattern is also observed in Brazil. Employment shifts out of services towards industry, indicating that labour is released from the low-productive service sector as industrial activity picked up. However, in most economies with below-average productivity growth, there is higher than average employment growth, suggesting that employment is being pushed into low-productive jobs.

Again, in the manufacturing sector, productivity gains are well dispersed across the regions, but the trade-off is still quite strong, and a number of economies became productivity laggards in this sector. In descending order of magnitude, Canada, Australia, Taiwan (China) and Mexico all had productivity growth less than the total economy average during this period, while India saw a reversal of its above-average employment gains from the previous period. Canada, Taiwan (China) and Mexico showed higher than average employment gains. Mexico's astounding growth during this period can be linked to growth in the maquila sector, which doubled from 1,703 establishments to 3,590 between 1990 and 2000 (INEGI, 2002).

Thus, although labour has been pushed into low-productive services in some instances, the majority of cases show that *employment has been drawn to service employment that is highly productive.* Why has productivity and employment been on an increasing trend in this sector and become stronger over time? One reason is the rise in incomes in many countries. As income rises, earners spend more on leisure and service-related activities such as health, education and financial services, many of which are still mainly provided by people – thus leading to employment creation. Additionally, advances in ICT have deepened connections within the sector, having a strong impact on productivity in the service industries and increasing their tradability and expanding their market share by e-commerce. Consequently, the results show that service sector expansion can have a positive impact on productivity and employment growth for the economy as a whole.

2.6. Concluding remarks

This chapter addresses the existence of trade-offs between employment and productivity in both developed and developing economies, using a framework that focuses on the relationship over the short, medium and longer term, and pays specific attention to employment–productivity dynamics as the result of structural change.

Trade-offs between employment and productivity growth exist, most often, in the short and medium term as the result of short-run deviations and structural and frictional changes in the economy. Structural change in the form of shifts in employment across sectors is part of the "creative destruction" process and is necessary to achieve long-run sustainable growth.

In the longer term, in most economies, productivity and employment growth go hand in hand. This is particularly the case in the industrialized economies of Europe, North America, and many parts of Asia. This has not been the case in developing economies in either the African or Latin American regions where growth in employment and productivity has followed different trajectories, suggesting that a focus on productivity gains is a prescription for low employment growth.

The analysis in this chapter has shown that such a suggestion is not warranted. The presence of long-run trade-offs between productivity and employment in developing economies does not mean that this theory is not applicable to developing economies, but rather that there are inadequacies in the markets, conditions and institutions which block these economies from experiencing such gains. *No country can afford to neglect to focus on improving the productivity of its workforce. Productivity is the engine that drives wage increases and leads to improvements in the standard of living of a country.* At the same time a strategy focusing on maximizing employment does not have to mean a sacrifice in productivity – as the experience of employment-intensive investment programmes has shown.

A policy strategy for increasing productivity and employment over the long run should therefore entail a dual strategy of investing in dynamically growing sectors of the economy while also building capacity in sectors where the majority of labour is employed. Focusing on sectors where the majority of labour is employed is one way to bridge the gap between trade-offs in the interim and long-run growth in both. This has significance for both developed and developing economies alike. For developing economies, this entails investing in strategic growth sectors by acquiring and internalizing the knowledge developed elsewhere if they are to "catch up", while at the same time improving worker productivity in traditionally low-productivity sectors, such as in the informal economy. It also means establishing forward and backward linkages in the supply chain between fast-growing sectors and those in which labour is dominant. For developed economies, it entails being at the forefront of knowledge expansion and innovation in order to create new technology, which provides workers with opportunities to expand into new markets and, at the same time, maintaining the employability of those workers in declining markets.

History shows that economies adapt to structural change. However, in order to increase the acceptance of change there should be a smoother transition for workers and a distribution of productivity gains from the "winners" so that society as a whole is better off, rather than a small segment of the population. This strategy calls for additional measures such as compensation for dislocated workers during periods of loss, skills retraining and employability – for example, making training systems more demand-driven and facilitating self-employment and business start-ups through interest-free credit programmes for those who have difficulty relocating. In developing economies where such programmes cannot be made available, providing technical assistance to informal entrepreneurs, facilitating the legalities

of becoming formal businesses and providing productive employment opportunities (through labour-intensive programmes) are essential in order for the poor to "work themselves out of poverty".

References

Alliance Bernstein. 2004. *US weekly economic update*, various issues.

—. 2003. *US weekly economic update*, various issues.

Andersen, B.; Corley, M. 2003. *The theoretical, conceptual, and empirical impact of the service economy: A critical review*, UNU WIDER Discussion Paper No. 22.

Arora, A.; Arunichalam, V.S.; Asunoi, Jai; Fernandes, Ronald. 2001. "The Indian software services industry", in *Research Policy*, No. 30, pp. 1267-1287.

Baily, M.N.; Hulten, C.R.; Campbell, D. 1992. "Productivity dynamics in manufacturing plants", *Brookings Papers on Economic Activity*, pp. 187-249.

Baumol, W.J. 1967. "Macroeconomics of unbalanced growth: The anatomy of urban crisis", in *The American Economic Review,* No. 3, pp. 415-426.

Borensztein, E.; De Gregorio, J.; Lee, J.W. 1998."How does FDI affect economic growth?", in *Journal of International Economics*, Vol. 45, pp. 115-135.

Carillo, J. 2003. "Los retos de las maquiladoras ante la pérdida de competitividad", in *Comercio Exterior*, Vol. 53, No. 4, April.

De Soto, H. 2000. *The mystery of capital: Why capitalism triumphs in the West and fails everywhere else* (New York, Bantam Press).

Disney, R.; Haskel J.; Heden, Y. 2003. "Restructuring and productivity growth in UK manufacturing", in *The Economic Journal*, No. 113, pp. 666-694.

Groningen Growth and Development Centre (GGDC). 2004. *Total economy database*, available online at http://www.ggdc.net/homeggdc.html

Forrester Research. 2002. *3.3 million US services jobs to go offshore*, Forrester Research Brief, 11 November.

Ghose, A.K. 2003. *Jobs and incomes in a globalizing world* (Geneva, ILO).

Gordon, R.J. 1997. "Is there a trade-off between unemployment and productivity growth?", in D. Snower and G. de la Dehesa (eds.): *Unemployment policy* (Cambridge, Cambridge University Press), pp. 433-463.

Groshen, E.L.; Potter, S. 2003. "Has structural change contributed to a jobless recovery?" in *FRBNY Current Issues in Economics and Finance*, No. 8 (www.newyorkfed.org/rmaghome/curr_iss).

Hussmanns, R.; du Jeu, B. 2002. *ILO compendium of official statistics on employment in the informal sector* (Geneva, ILO), STAT Working Paper, pp. 16-28.

ILO. 2004. "Productive employment for poverty reduction and development", GB.289/ESP/2.

—.2003a. *Economically active population 1950-2010: ILO database on estimates and projections of the economically active population (5th edition)* (Geneva, LABORSTA, LABPROJ) (http://laborsta.ilo.org).

—.2003b. *Key Indicators of the Labour Market (KILM), 3rd Edition* (Geneva).

—.2003c. *Global Employment Agenda* (Geneva) (http://www.ilo.org/public/english/employment/empframe/practice/index.htm).

—.1999. *Key Indicators of the Labour Market 1999 (KILM)* (Geneva).

—.1997. *World Labour Report 1997-98* (Geneva).

International Monetary Fund (IMF). 1995. *World Economic Outlook* (Washington, DC).

—.1999. *World Economic Outlook* (Washington, DC).

Instituto Nacional de Estadística, Geografía e Informática (INEGI). 2004. *Industria maquiladora de exportación, indicadores anuales* (Mexico City) (http://dgcnesyp.inegi.gob.mx/bdine/j15/j1500601.htm).

Karaömerlioglu, D.; Ansal, H. 2000. "Innovation and employment in developing countries", in M. Vivarelli and M. Pianta (eds.): *The employment impact of innovation: Evidence and policy* (London, Routledge).

Kucera, D.; Milberg, W. 2003. "Deindustrialization and changes in the manufacturing trade: Factor content calculations for 1978-1995", *Review of World Economics*, No. 2, pp. 601-624.

Landesmann, M.; Stehrer, R. 2001. "The European unemployment problem: A structural approach", in P. Petit and L. Soete. (eds.): *Technology and the future of European unemployment* (Cheltenham, Edward Elgar).

Landmann, O. 2004. "Employment, productivity and output growth", background paper for the *World Employment Report 2004-05*, available on the CD-ROM version.

Little, I.; Mazumdar, D.; Page, J. 1987. *Small manufacturing enterprises: A comparative analysis of India and other economies* (New York, Oxford University Press).

Mazumdar, M. 2004. "Employment elasticity in manufacturing", background paper for the *World Employment Report 2004-05*, available on the CD-ROM version.

McKinsey and Company. 2004. *Offshoring roundtable – transcript* (http://www.mckinsey.com/ideas/offshoring/roundtable/).

Migration News (http://migration.ucdavis.edu/mn).

Miles, I.; Kastrinos, N. 1995. *Knowledge-intensive business services: Users, carriers and sources of innovation* (Luxembourg, Commission of the European Communities, Directorate General for Telecommunications, Information Market and Exploitation of Research, Innovation Programme), EIMS Publication No. 15.

National Productivity Institute. 2003. *Report on the productivity capacity building programme for SMMEs* (South Africa).

OECD. 2004. *Economic outlook* (Paris).

—.2003. *Economic outlook* (Paris).

—.1999. *OECD Economic surveys: Hungary* (Paris).

Palma, G. 2003. *Trade liberalization in Mexico: Its impact on growth, employment and wages* (Geneva, ILO), Employment Paper No. 55.

Parry, R. 2004. "Globalization: Threat or opportunity for the US economy?", in *FRBSF Economic Letter*, No.12, 21 May.

Piacentini, P.; Pini, P. 2000. "Growth and employment", in M. Vivarelli and M. Pianta (eds.): *The employment impact of innovation: Evidence and policy* (London, Routledge).

Pianta, M. 2000. "The employment impact of product and process innovations", in M. Vivarelli and M. Pianta (eds.): *The employment impact of innovation: Evidence and policy* (London, Routledge).

Pieper, U. 2001. *Sectoral regularities of productivity growth in developing countries – A Kaldorian interpretation*, Maastricht Economic Research Institute on Innovation and Technology.

Polaski, S. 2004. *Job anxiety is real – and it's global*, Policy Brief, Carnegie Endowment for International Peace, May.

Román, Z. 2003. "Labour productivity and employment in the Hungarian economy", background paper for the *World Employment Report 2004-05*, unpublished (Geneva, ILO, Employment Sector, Employment Trends Unit).

Sala-i-Martin, X. 2002 *The world distribution of income (estimated from individual country distributions)*, National Bureau of Economic Research, Working Paper No. 8933, May (www.nber.org/papers/w8933).

Schettkat, R.; Russo, G. 2001. "Structural dynamics and employment in highly industrialized economies", in P. Petit and L. Soete (eds.): *Technology and the future of European unemployment* (Cheltenham, Edward Elgar).

Sharpe, A.; St-Hilaire, F.; Banting, K. 2002. *The review of economic performance and social progress: Towards a social understanding of productivity* (Ottawa and Montreal, Institute for Research on Public Policy, Centre for the Study of Living Standards, distributed by McGill-Queens University Press) (www.csls.ca).

Sharpe, A. 2004. "Productivity growth and poverty reduction in developing countries", background paper for the *World Employment Report 2004-05*, available on the CD-ROM version.

Sherwood, M.K. 1994. "Difficulties in the measurement of services", in *Monthly Labour Review*, 11-19 March.

Sperling, G. 2004. *The effects of offshoring*, Progressive Politics, Vol. 3, No. 2, June (http://www.americanprogress.org/site/pp.asp?c=bijrj8ovf&b=105690).

Spezia, V.;Vivarelli, M. 2002. "Innovation and employment: A critical survey," in N. Greenan, Y. L'Horty and I. Mairesse (eds.): *Productivity, inequality and the digital economy* (London, MIT Press).

Spletzer, J.R.; Faberman, R. Jason; Arber, Sadeghi; Talan, David M.; Clayton, Richard L. 2004. "Business employment dynamics: New data on job gains and losses", in *Monthly Labour Review*, pp. 29-42, April.

The Economist. 2004. "The remote future", 19 February.

—.1997. "One lump or two?", 23 October.

The New York Times. 2004. "Jobs lost abroad: Host of new causes for an old problem", 15 February.

Taylor, G.; Bekabye, M. 1999. *An opportunity for employment creation: Labour based technology roadworks – The macro-economic dimension* (Geneva, ILO), Employment-Intensive Investment Branch Working Paper.

Triplett, J.E.; Bosworth, B.P. 2003. "Productivity measurement issues in service industries: Baumol's disease has been cured", in *FRBNY Economic Policy Review*, September, pp. 23-33.

UN Population Division. 2001. *World population prospects: The 2000 revision* (New York).

US Department of Commerce, Bureau of Economic Analysis. 2004. *National income and product account* (http://www.bea.doc.gov/bea/dn/home/gdp.htm).

US Department of Labor, Bureau of Labor Statistics. 2004a. *Current population survey* (http://data.bls.gov/servlet/SurveyOutputServlet).

—.2004b. *Current employment statistics* (http://data.bls.gov/servlet/SurveyOutputServlet).

Van Ark, B.; Frankema, E.; Duteweerd, H. 2004. "Productivity and employment growth: An empirical review of long and medium run evidence", background paper for the *World Employment Report 2004-05*, available on the CD-ROM version.

Vandenberg, P. 2004. "Productivity and SMEs: Conceptual and empirical issues related to employment impacts and poverty reduction", background paper for the *World Employment Report 2004-05*, available on the CD-ROM version.

Vivarelli, M. 1995. *The economics of technology and employment: Theory and empirical evidence* (Aldershot, Edward Elgar).

World Bank. 2004. *World Development Indicators 2004* (Washington, DC).

World Income Inequality Database (WIID). 2000. Version 1.0, 12 September, available online at http://www.wider.unu.edu/wiid/wiid.htm

World Commission on the Social Dimension of Globalization. 2004. *A fair globalization: Creating opportunities for all,* (Geneva, ILO).

Appendix 2.1

Methodology and sources for section 2.3 of Chapter 2

The results in table 2.4 of the chapter examine the relationship between productivity, poverty and income distribution. The first step in constructing the database needed to undertake multivariate analysis of the relationship between poverty, labour productivity and income inequality was to select match countries from the Penn World Table and World Income Inequality databases for which Sala-i-Martin (2002) provided poverty rate estimates. The countries for which Gini coefficient time-series were available were then retained for at least ten years. There were only 27 countries left after the selection: 12 in Latin America (Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Jamaica, Mexico, Panama, Peru, El Salvador, Venezuela), 13 in Asia (Bangladesh, China, Hong Kong, Indonesia, India, the Republic of Korea, Sri Lanka, Malaysia, Pakistan, Philippines, Singapore, Thailand, Taiwan (China) and two in Africa (Ethiopia, Tanzania).

Initially, the intention was to undertake a cross-sectional analysis for the years 1970 and 1998 using levels of each of the three variables. But because of the incomplete Gini coefficient time-series, a cross-sectional analysis for the earliest year for which the Gini coefficient was available (and closest to 1970) and another one for the latest year (and closest to 1998) was done. Associating labour productivity levels to Gini coefficients was easy because labour productivity estimates are available for each year from 1970 to 1998. But this was not the case for poverty rates. Therefore, poverty rates had to be assigned to Gini coefficients on the basis of closeness to the years of availability. For example, if the earliest year of availability of a Gini coefficient was 1972, it was assigned the 1970 poverty rate. The Ordinary Least Square procedure and linear functional form were then used to estimate the coefficients.

To study the relationship between variations over time in each variable, the earliest and latest year available were used to calculate average annual growth rates for labour productivity and Gini coefficients and percentage change for the poverty rates. Therefore, the growth rates for some countries were for shorter periods than for others. Then the same statistical procedure was used as that for level comparisons. Some similar regressions were also run with World Bank data for both levels and growth rates, with results broadly supporting those discussed in section 2.3 of this chapter.

Appendix 2.2

Methodology and sources for section 2.5 of Chapter 2

The difference between industry and total economy annual growth rates in productivity and employment was estimated by:

1. Calculating the compounded annual average growth rate in employment and productivity in the particular industry and in the total economy for the same period.
2. Subtracting the growth rate of the total economy from the growth rate of industry to determine the sector's contribution to the total economy.

Thus, the sectoral contribution was obtained as follows:

$$\hat{LY}_{iC-TC} = (\hat{LY}_{iC} - \hat{LY}_{TC}); \text{ and } \hat{E}_{iC-TC} = (\hat{E}_{iC} - \hat{E}_{TC}),$$

where $\hat{LY}$ = growth in productivity, $\hat{E}$ = growth in employment, í = each sector (transport, trade, manufacturing), T = total economy, and C = particular country.

The above calculations were made for countries with sectoral data available during the period 1980-2001. For some economies data were not available for these specific years, in which case the closest year that data were available was used (see table A2.1).

Table A21. Sectoral data available by country

Sector	Country	Latest year data available
Transport and communication	Australia	1998
	Brazil	1996
	Canada	1998
	Czech Republic	1998
	France	1998
	United Kingdom	1999
Trade	Australia	1999
	Brazil	1996
	Canada	1998
	France	1999
	Japan	1998
	United Kingdom	1999
Manufacturing	Australia	2000
	Brazil	1998
	China	1999
	Czech Republic	2000
	India	2000
	Spain	2000
	Sweden	2000