*Chapter 3*

# EMPLOYMENT IN THE SERVICE ECONOMY: A REASSESSMENT


## Summary

The long-term rise in the share of the workforce directly engaged in the production of services has attracted much attention, but no consensus has emerged concerning the implications for job availability, job quality or labour market policy. The recent dynamic performance of certain business services – which are innovators in the application of computer technologies and large employers of skilled workers – calls into question past assessments of the predominant character of service employment, including concerns that a worsening of employment opportunities will result. Accordingly, this chapter revisits the topic of jobs in the service economy, tracing the evolution of the sectoral composition of employment through the late 1990s and assessing some of its implications. A sequel chapter is planned for publication in the 2001 issue of the *Employment Outlook* that will analyse the *quality* of service jobs in greater detail, as well as the possible trade-off between the quality and quantity of service employment.

Service employment has continued to grow in OECD countries, approaching three-quarters of all jobs in several countries by the end of the 1990s. Among the four main service subsectors, employment growth was more rapid in producer and social services than in distributive and personal services. The overall service-sector share of employment has become more similar across countries. However, significant differences remain and convergence in the mix of service employment at the level of sixteen disaggregated service activities is weaker. National differences in the composition of service employment appear to persist, even at similar levels of income, and to reflect factors such as differences in female participation, the size of the welfare state, regulatory policy and trade specialisation. Multivariate regression analysis confirms that the overall share of service employment, as well as the distribution of employment across disaggregated service activities, respond to a wide array of economic and demographic factors, in addition to the overall level of economic development.

Workforce characteristics differ between the service and goods-producing sectors, as well as between service subsectors. For example, women occupy a large and disproportionate share of service employment (especially in social and personal services), and educational levels are significantly higher in the service than in the goods sector (especially in producer and social services). However, workforce characteristics in the four main service subsectors differ considerably among OECD countries, as does the mix of service jobs. The relationship between the share of service employment and the overall level of employment also resists easy generalisations. International differences in the proportion of the working-age population that is employed are disproportionately due to employment differences in certain services, but the identity of the "critical" sectors varies depending on which countries are being compared. Despite services having accounted for virtually all recent net gains in employment, it does not appear that the countries most specialised in the fastest growing services have benefited from a large boost to overall employment growth.


## Introduction

A third of a century has passed since the publication in 1968 of Fuchs' path-breaking study of the emerging "service economy" and its implications for economic life. The long-term decline in the share of the workforce directly engaged in the production of goods is now widely grasped, but no consensus has emerged concerning the implications of the service economy for job availability, job quality or labour market policy. Recurrent concerns have been voiced that a worsening of employment opportunities will result. However, the recent dynamic performance of certain business services – which are innovators in the application of computer technologies and large

employers of skilled workers – calls into question past assessments of the predominant character of service employment. Accordingly, this chapter revisits the topic of jobs in the service economy, tracing the evolution of the sectoral composition of employment through the late 1990s and assessing some of its implications.

Section I discusses the knotty issue of how to measure service employment. Attention then turns to documenting recent trends in the growth of the service sector share in employment (Section II). Differences among OECD countries receive particular attention, including an assessment of whether employment shares are becoming more similar. Differences in workforce characteristics between the service- and goods-producing sectors – as well as among service activities – are analysed in Section III. Sections IV and V build upon this descriptive material by analysing two related issues: *i)* the causes of international differences in the service-sector share of total employment; and *ii)* whether international differences in the expansion of service employment are an important contributor to differences in overall employment rates. The concluding section assesses lessons for policy and research.

## Main findings

The chapter's main findings are:

- Service employment has continued to grow in OECD countries over the second half of the 1980s and the 1990s, approaching three-quarters of all jobs in several countries. The service-sector share of employment also became more similar among OECD countries. There appears to be a close link between convergence in income and in the broad sectoral mix of employment, since per capita income is strongly and positively correlated with service employment shares.
- Among the four service subsectors, employment growth was most rapid for producer and social services over the past fifteen years. The employment share for personal services also tended to increase a little, while that for distributive services remained approximately unchanged. The evidence for convergence across OECD countries in the *mix* of the sixteen activities that make up total service employment is weaker than for convergence in the overall service share. National differences in the mix appear to be persistent, even at similar levels of income, and to reflect factors such as differences in female participation, the size of the welfare state, regulatory policy and trade specialisation patterns.
- Despite considerable international differences in the composition of service employment, some qualitative patterns emerge. Among the four major service subsectors, distributive and social services represent the largest shares of total employment in all countries (although producer services has nearly achieved parity with distributive services in the United States). Within distributive services, the largest share of jobs is in retail trade, while health activities are the largest component of social services in most countries. Business and professional services account for the largest share of jobs in producer services, while hotels and restaurants are the largest component of personal services.
- Workforce characteristics differ between the service- and goods-producing sectors and also between service subsectors. Women occupy a large and disproportionate share of employment in social and personal services. Educational levels are considerably higher in the service than in the goods sector, but there is also great variation among the subsectors within each of these two broad sectors. Among service subsectors, educational attainment is highest in producer and social services and lowest in personal services.
- Multivariate regressions using panel-data methods identify a number of explanatory factors that appear to affect the share of total employment in the service sector and its four subsectors. GDP per capita has a positive impact on the overall service share, an effect that is particularly strong for producer and social services. Higher female participation and a larger welfare state are associated with higher employment shares for social and producer services, while stricter employment protection legislation (EPL) is associated with lower employment shares for these same subsectors. Earnings compression and the tax wedge on labour income have opposing effects from one subsector to another, suggesting that these variables capture both labour costs effects, which depress the share of employment for some services (*e.g.* hotels and restaurants), and positive demand effects for other subsectors.
- Producer and social services account for a disproportionate share of OECD-wide differences in the fraction of the working-age population that is employed, but producer services and hotels and restaurants (within personal services) "account" for the EU employment gap relative to the United States. Despite services accounting for virtually all recent net employment growth, the sectoral mix of employment does not appear to have been a major factor determining overall employment growth during 1986-1998. Rather, coun-

tries with rapid employment growth tended to have above-average growth rates across *all* sectors.

# I. Measuring service-sector employment

## A. Total service-sector employment

This chapter follows the common practice of classifying workers according to the industrial *sector* of their employer (or business, should they be self-employed). Service sector workers are defined to be individuals working for pay in a local establishment whose major activity is classified as service production under revision 3 of the International Standard Industrial Classification (ISIC) of all Economic Activity [United Nations (1990)].[1] This definition facilitates comparative analysis since most OECD Member governments collect employment data according to the ISIC or a similar classification scheme.

A sectoral definition of service employment has two potentially important limitations for use in analysing the labour market implications of the continuing evolution of the service economy:

- Defining service sector employment with reference to the employer's main product is somewhat arbitrary because the economic distinction between a good and a service is sometimes unclear. Three characteristics are most frequently cited as differentiating a service from a good: a service has an intangible nature; is difficult to store; and requires direct (often, face-to-face) interaction between the producer and the consumer [Inman (1985)]. By these criteria, a doctor's examination is a service, while an alarm clock is a good. However, other cases are less straightforward (*e.g.* the Windows operating system) and recent changes in technology and business organisation appear to be further blurring this distinction [Economic Council of Canada (1991); Miles and Boden (1998)]. For example, manufacturing firms increasingly emphasise "just-in-time" production of products that are customised to individual customers' requirements, as well as post-sales support (*e.g.* producers of personal computers). Similarly, some service firms have adopted production practices intended to exploit scale economies in the production of standardised products (*e.g.* fast-food restaurant chains) and many information-intensive services are easily stored and transported to distant customers (*e.g.* computer software). Hence, there is an element of convention in the ISIC (and any other) classification of activities as either goods or service production.
- A significant share of service-type work occurs *within* firms whose main product is clearly a good. For example, accounting and legal work performed for an airplane manufacturer will be classified either as service- or goods-producing employment depending on whether the activity is performed in-house or purchased from a specialised service firm.[2] The extent to which goods-producing firms outsource these types of services appears to have increased over time and to vary across countries [Díaz Fuentes (1999); Dighe *et al.* (1995); OECD (1999*a*)]. This means that comparisons of the scope of service sector employment may overstate differences in the types of work actually performed.[3]

Two strategies are adopted in this chapter for mitigating these limitations. First, the sectoral analysis of employment is complemented by some analysis of the occupational mix of employment. This provides an estimate of the extent to which changes in the sectoral composition of employment reflect changes in the mix of work activities. This analysis also provides a rough check on differences in the extent to which service activities in support of goods production are "contracted out" to specialised service firms. Second, the analysis of employment shares in the goods and service sectors is complemented by more disaggregated analysis of industrial groupings *within* these two sectors. Since these narrower industrial groupings are more homogeneous, they escape some of the difficulty in differentiating between goods and services in the aggregate.

## B. The components of service-sector employment

Analysis of the labour market implications of the service economy is greatly complicated by the heterogeneity of service sector employment. In effect, the ISIC defines the service sector residually, as everything except agriculture and industry. This residual category has grown to encompass nearly three-quarters of total employment in some OECD countries, raising the possibility that it is simply too heterogeneous to have much explanatory power as a determinant of employment conditions. Despite the great diversity of the service sector, past research suggests that there are enough similarities for the distinction between the goods and service sectors to be meaningful for labour market analysis, especially when complemented by an analysis of the mix of employment across different service activities within total services.

Dividing the service sector into a moderate number of subsectors involves difficult trade-offs since detailed service industries can be grouped according to many different criteria. The empirical analysis in Sections II to V uses a classificatory scheme developed by Elfring (1988)

to disaggregate total service sector employment into its major components.[4] This scheme regroups detailed service activities from the ISIC in a manner that follows conventional statistical practice in most instances, while being better suited to the chapter's analytical purposes. Aside from its conceptual appeal, using Elfring's classification provides maximum opportunity for comparing results with those reported by other studies, since his scheme (or close variations of it) has been adopted by a number of subsequent researchers [*e.g.* Castells (1996); Esping-Andersen (1999); Storrie (2000)].

Elfring's groupings of service activities reflect three characteristics: the economic function performed by the service; whether business or households are the primary users; and whether market or non-market provision predominates. Total service sector employment is divided into four major *subsectors*: producer services; distributive services; personal services; and social services. Producer and distributive services primarily support production and marketing activities of goods-producing firms, whereas personal and social services tend to be directly consumed by households. Government financing and production predominate for social services in most OECD countries, although market provision of education and health care is important in some countries. Each of the four subsectors is further divided into four service *activities*, yielding a total of sixteen (Table 3.1). Prior research suggests that the distribution of service employment across these disaggregated activities has important implications for employment conditions, but little is known concerning international differences in this relationship.[5]

## II. Trends in the share of service employment, 1984-98

### A. Total service-sector share

The historical reference point for the analysis in this section is provided by Elfring's (1988, 1989 and 1992) study of the share of the service-sector in total employment from 1960 to 1987 in France, Germany, Japan, the Netherlands, Sweden, the United Kingdom and the United States (Table 3.1). He found that the share of services in total employment – averaged over these countries – increased from 46 to 65 per cent. Producer services, the smallest subsector in the 1960s, more than doubled its share. By contrast, distributive services, the largest subsector in the early 1960s, remained stable (except in Japan, where its share grew strongly). For personal services, the pattern varied significantly across countries, but the overall trend was from stability to modest growth after the mid-1970s. Finally, social services were the most expansive, becoming the largest subsector in the 1970s. This section analyses whether Elfring's results generalise to a wider selection of OECD countries and the past fifteen years.

Chart 3.1 compares the broad sectoral evolution of employment over the past 15 years, by presenting the share of employment in a given sector in total employment in 1984, 1989, 1994 and 1998. The broad upward trend in the service employment share has continued, with the service sector now employing twice as many workers as industry and agriculture combined for the OECD area as a whole.[6] Small declines in the service share were observed in a few countries during 1994-1998, but this probably reflected the greater cyclicality of industrial employment rather than an end to the secular rise in the service share.

In the mid-1980s, the share of service jobs in total employment was far larger in Australia, Canada, Denmark and the United States than in most other OECD countries. However, these differences have narrowed over the past fifteen years. Within Europe, the share of service jobs has increased by 8 percentage points and, at the end of the period, countries like Luxembourg, the United Kingdom, Sweden, Belgium, the Netherlands and Denmark have converged with the United States. The increasing trend over the past 15 years was especially accentuated in countries with lower initial shares (*i.e.* Greece, Spain, France and Portugal). This suggests that differences may continue to narrow in the future.

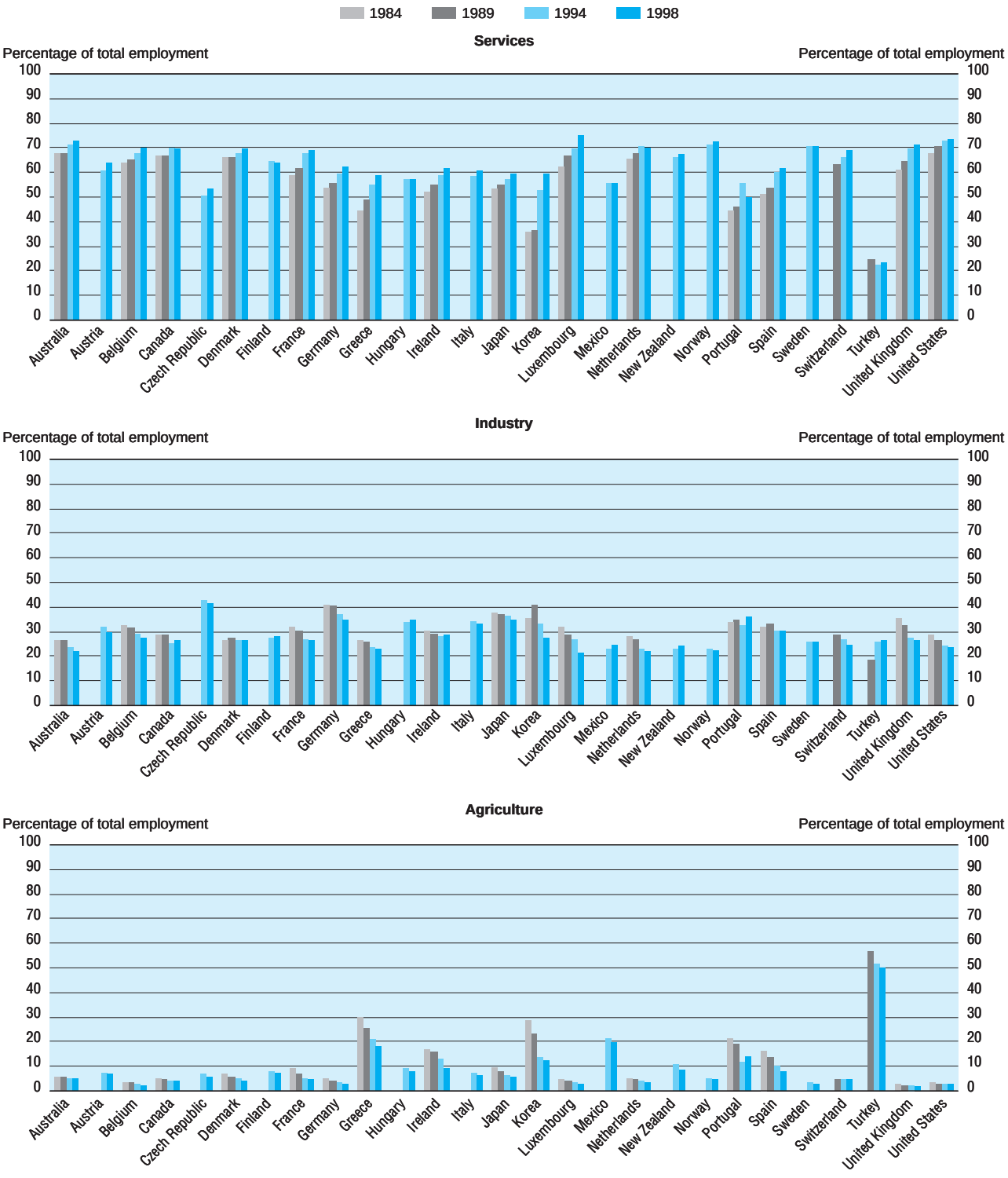
Data on the occupational mix of employment confirm that the secular increase in the service-sector share of total employment represents a real reduction in the number of jobs involving the direct production of goods relative to the number of jobs involving service-type activities. As shown in Table 3.2, the share of "blue-collar" occupations (used here as a proxy for jobs involving the direct production of goods) is strongly negatively correlated with the service-sector share of employment. This suggests that differences in the service share cannot be attributed primarily to differences in the extent to which goods-producing firms outsource service-type work (proxied here by "white-collar" occupations) to firms in the service sector. Rather, a higher service-sector share is associated with an economy-wide increase in the white-collar share of employment, with this share increasing even *within* the goods sector. If higher service-sector shares primarily reflected greater outsourcing of service-type work by goods-producing firms, the overall white-collar share would be unaffected while the white-collar share in the goods sector would be expected to be lower where the service-sector share is higher.

Table 3.1. **Taxonomy of service subsectors and activities: definitions and main characteristics**

| | Producer services | Distributive services | Personal services | Social services |
|---|---|---|---|---|
| **Definition** | *Producer services* are intermediate inputs to further production activities that are sold to other firms, although households are also important consumers in some cases. They typically have a high information content and often reflect a "contracting out" of support services that could be provided in-house. | *Distributive services* move commodities, information and people. Some of these services are final consumption in their own right (*e.g.* vacation travel), but most are ancillary to final consumption (*e.g.* retailing) or production (*e.g.* materials transport). | *Personal services* provide final consumption for households and are characterised by direct contact between the consumer and the service provider. Self-servicing is often a viable alternative to market purchases and market provision predominates. | *Social (and collective) services* provide final consumption for households and are distinctive for their non-market character in most OECD countries. Collective consumption decisions and public financing are common, as is production by governments, non-profit organisations and subsidised private organisations. |
| **Sub-groups: (16 service activities)** | • Business and professional services.<br>• Financial services.<br>• Insurance services.<br>• Real estate services. | • Retail trade.<br>• Wholesale trade.<br>• Transport services.<br>• Communications. | • Hotels, bars, and restaurants.<br>• Recreation, amusements and cultural services.<br>• Domestic services.<br>• Other personal services. | • Government proper (civil or military).<br>• Health services.<br>• Educational services.<br>• Miscellaneous social services. |
| **Evolution of employment during 1960-1987 in seven countries**[a] | The smallest subsector in the early 1960s but grew at about twice the rate for total services. Growth in business and professional services was especially strong in the United States.<br>**1987 share:** 7-14% of total employment. | The largest subsector in the early 1960s, but share remained stable in most countries. Japan had strong growth, surpassing United States as having highest share.<br>**1987 share:** 18-25% of total employment. | Pattern varies across countries, but tendency for approximate stability in the first half of the period to be replaced by expansion, especially in hotel and restaurant services.<br>**1987 share:** 6-13% of total employment. | Strong, albeit gradually decelerating growth resulted in social services overtaking distributive as the largest subsector (except in Japan).<br>**1987 share:** 13-35% of total employment. |
| **Potential implications for labour markets** | At the forefront of knowledge economy, making extensive use of ICT and high-skilled workers.<br>International trade in "strategic" business services is increasing and countries developing a comparative advantage will be able to expand high-wage employment. | Communications and transportation are characterised by large, capital intensive employers who offer relatively good employment conditions.<br>By contrast, retail is a large generator of low-paid and unstable jobs, especially for women.<br>Regulatory policy may have major impact on employment share. | A prime generator of "bad" jobs, but also a crucial source of employment opportunities for low-skilled workers and women.<br>Substitutability between market purchases and self-service by households mean that labour demand is very sensitive to labour costs. | Many jobs require university degrees (education and health services), but others externalise low-skilled, dependent care from the household.<br>Major employer of women, both high and low skilled.<br>Employment share strongly influenced by scale of the welfare state. |

*a)* France, Germany, Japan, the Netherlands, Sweden, the United Kingdom and the United States [Elfring (1992)].
*Source:* Elfring (1988, 1989 and 1992).

## Chart 3.1. Evolution of employment shares of the three main sectors[a]




*a)* Where data are not available for the selected years, the closest year was chosen instead. This affects the following cases: 1985: Korea and the Netherlands; 1986: Portugal and Spain; 1987: Australia and Canada; 1988: Turkey; 1991: Switzerland; 1992: New Zealand and Turkey; 1995: Austria, Finland and Sweden; 1996: Mexico and Norway.

*Source:* See Annex 3.A.

## Table 3.2. The service-sector employment share and the occupational mix of employment [a] in 1998

Shares of employment (percentages)

| | Total economy | | | | Goods-producing sector | | | Service sector | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Service sector | White-collar | Blue-collar | Elementary occupations | White-collar | Blue-collar | Elementary occupations | White-collar | Blue-collar | Elementary occupations |
| Australia | 69.0 | 56.6 | 36.1 | 7.3 | 32.9 | 58.5 | 8.6 | 67.9 | 25.4 | 6.7 |
| Austria | 63.9 | 59.3 | 31.8 | 8.9 | 24.5 | 70.3 | 5.2 | 79.0 | 9.9 | 11.0 |
| Belgium | 71.9 | 67.2 | 23.8 | 8.7 | 34.9 | 56.8 | 8.2 | 81.2 | 9.8 | 8.9 |
| Canada | 73.8 | 66.0 | 23.1 | 10.9 | 32.9 | 55.7 | 11.5 | 77.6 | 11.8 | 10.7 |
| Czech Republic | 52.3 | 55.2 | 36.2 | 8.6 | 29.1 | 61.4 | 9.5 | 78.2 | 13.9 | 7.9 |
| Denmark | 70.8 | 65.2 | 21.9 | 12.7 | 29.5 | 55.7 | 14.8 | 80.9 | 7.2 | 11.9 |
| Finland | 64.0 | 63.1 | 28.5 | 7.7 | 30.5 | 62.8 | 6.3 | 81.1 | 9.6 | 8.5 |
| France | 70.7 | 61.7 | 28.9 | 7.8 | 29.2 | 67.0 | 3.5 | 76.2 | 11.9 | 9.7 |
| Germany | 62.1 | 63.0 | 28.0 | 7.5 | 34.7 | 56.2 | 7.6 | 79.9 | 11.1 | 7.5 |
| Greece | 56.4 | 52.6 | 41.5 | 6.0 | 12.5 | 83.9 | 3.6 | 80.7 | 11.7 | 7.6 |
| Hungary | 58.5 | 53.6 | 37.9 | 8.5 | 23.5 | 69.0 | 7.5 | 75.8 | 15.0 | 9.2 |
| Ireland | 61.5 | 60.6 | 30.2 | 8.9 | 24.0 | 62.2 | 13.7 | 84.6 | 9.5 | 5.8 |
| Italy | 64.1 | 55.5 | 32.3 | 12.2 | 25.0 | 64.3 | 10.7 | 75.2 | 11.6 | 13.2 |
| Korea | 60.0 | 54.5 | 35.0 | 10.5 | 20.4 | 70.5 | 9.1 | 63.0 | 26.1 | 10.9 |
| Luxembourg | 72.7 | 64.4 | 24.8 | 10.5 | 25.4 | 69.0 | 5.7 | 77.4 | 10.6 | 12.1 |
| Netherlands | 71.6 | 70.6 | 19.0 | 7.1 | 42.6 | 48.1 | 7.8 | 83.9 | 9.2 | 6.9 |
| New Zealand | 67.3 | 65.5 | 26.8 | 7.6 | 26.5 | 65.0 | 8.6 | 84.4 | 8.5 | 7.1 |
| Portugal | 55.3 | 42.9 | 44.2 | 12.9 | 14.7 | 76.4 | 9.0 | 70.9 | 12.3 | 16.8 |
| Spain | 63.2 | 52.0 | 33.2 | 14.3 | 18.6 | 67.1 | 14.3 | 72.8 | 12.1 | 14.3 |
| Sweden | 72.9 | 68.9 | 25.6 | 5.3 | 33.3 | 63.4 | 3.2 | 83.5 | 10.2 | 6.1 |
| Switzerland | 63.2 | 69.0 | 24.5 | 6.0 | 38.1 | 56.3 | 5.3 | 81.9 | 11.2 | 6.2 |
| Turkey [b] | 23.5 | 29.6 | 69.9 | .. | 6.0 | 93.7 | .. | 73.5 | 25.7 | .. |
| United Kingdom | 71.0 | 69.9 | 21.3 | 8.1 | 39.2 | 52.3 | 8.6 | 82.4 | 9.1 | 7.9 |
| United States | 73.8 | 63.3 | 22.8 | 13.9 | 34.3 | 56.2 | 9.5 | 73.6 | 11.0 | 15.4 |
| **OECD average** | **63.5** | **59.6** | **31.1** | **9.2** | **27.6** | **64.2** | **8.3** | **77.7** | **12.7** | **9.7** |
| **Cross-country correlation with service-sector share** [c] | | **0.74*** ** | **–0.81*** ** | **0.03** | **0.62*** ** | **–0.57*** ** | **–0.02** | **0.22** | **–0.25** | **–0.01** |

.. Data not available.

*, ** and *** mean statistically significant at the 10%, 5% and 1% levels respectively.

*a)* Three broad occupational groupings were defined in terms of the nine 1-digit occupations of the ISCO-88: white-collar occupations correspond to occupations 1-5 (*i.e.* legislators, senior officials and managers; professionals; technicians and associate professionals; clerks; and service workers and shop and market sales workers); blue-collar occupations correspond to occupations 6-8 (*i.e.* skilled agricultural and fishery workers; craft and related trades workers; and plant and machine operators and assemblers); and elementary occupations correspond to occupation 9. For national data sources not using the ISCO-88, the most detailed occupational groupings available were used to approximate these three groupings.

*b)* Elementary occupations divided among the white-collar and blue-collar groupings.

*c)* Turkey is excluded from the calculation.

*Source:* See Annex 3.A.

### B. Shares of the four service subsectors and the sixteen service activities

As in previous decades, this evolution has not been homogeneous across service subsectors. Chart 3.2 shows the evolution from 1984 to 1998 of the share of total employment for each of the four main subsectors (see Table 3.C.1 in Annex 3.C for the exact figures). Producer services have been the most dynamic, exhibiting a sharp increase in employment share in most OECD countries in the late 1990s. Employment shares of social and personal services also rose in the majority of countries, but the distributive services share was generally stagnant (and fell sharply in Korea). Employment in social services grew quite strongly in a number of European countries and the United States over the entire fifteen-year period, but increased efforts to restrain public spending are evident during 1994-1998, when the employment share declined in a number of countries. To sum up, the broad evolutionary pattern described by Elfring for the 1960s-1980s has generally continued.

On average, one-third of service employment is now concentrated in distributive services and another third in social services. The rest is equally distributed between producer and personal services. While there is substantial variation around these averages, trends in several of the subsectors suggest that national employment structures may be becoming more similar. Australia, Canada and the United States had a larger share of producer services than other OECD countries in the mid-1980s, but these differences have diminished over time. A similar pattern occurred for personal services. However, distributive services display a different pattern: over the whole period, Australia, Japan and Korea exhibit a higher share than any other OECD country, while the United States and Canada exhibit similar patterns to those observed in the rest of the OECD area and, in particular, France. Concerning social services, in the Anglo-Saxon and German-speaking countries, there has been a significant increase and its share in total service employment has risen to nearly 25 per cent. The Scandinavian countries, Belgium and France have above-average shares, while the Southern European countries and the new OECD Member countries, have below-average shares.

Chart 3.3 shows how total employment in 1998 in each of the four service subsectors is distributed across the constituent service activities:

- In *producer services*, one-half or more of the jobs are in business and professional services (except in Luxembourg). Canada, the United States and the Netherlands exhibit the highest proportion of jobs in business and professional services. By contrast, financial service jobs represent a smaller proportion of producer services in all countries except Luxembourg, where one-half of the producer services are in finance.
- One-half or more of the jobs in *distributive services* are concentrated in retail trade (except in the Czech Republic, Finland, Norway and Sweden). Among the remaining activities, wholesale trade and transportation typically account for a larger proportion of employment than does communication services.
- About one-half of *personal services* jobs are concentrated in hotels and restaurants (except in Australia, France, Mexico and Switzerland where the share is lower). Jobs in recreation and amusement represent a smaller share (one-fourth on average). Domestic services represent more than 20 per cent of all personal services jobs in Mexico, Portugal, France, Spain, Switzerland and Luxembourg, closely followed by Greece, while for the rest of the countries the share is close to zero.
- The Scandinavian countries, Belgium, France and Luxembourg show the highest share of *social services* jobs. The proportions within social services vary significantly across countries. Concerning government proper, there is Mexico and the United States at one extreme, with a proportion close to 4.5 per cent, and Luxembourg at the other extreme with 15 per cent, followed by France, Belgium and Germany with more than 8 per cent. As for health services, there is Mexico, Portugal, Greece, the Czech Republic and New Zealand with less than 5 per cent and Sweden, Denmark, Finland and the Netherlands with more than 13 per cent. Finally, education is the social service activity where shares are most uniform across countries.

### C. Convergence versus divergence

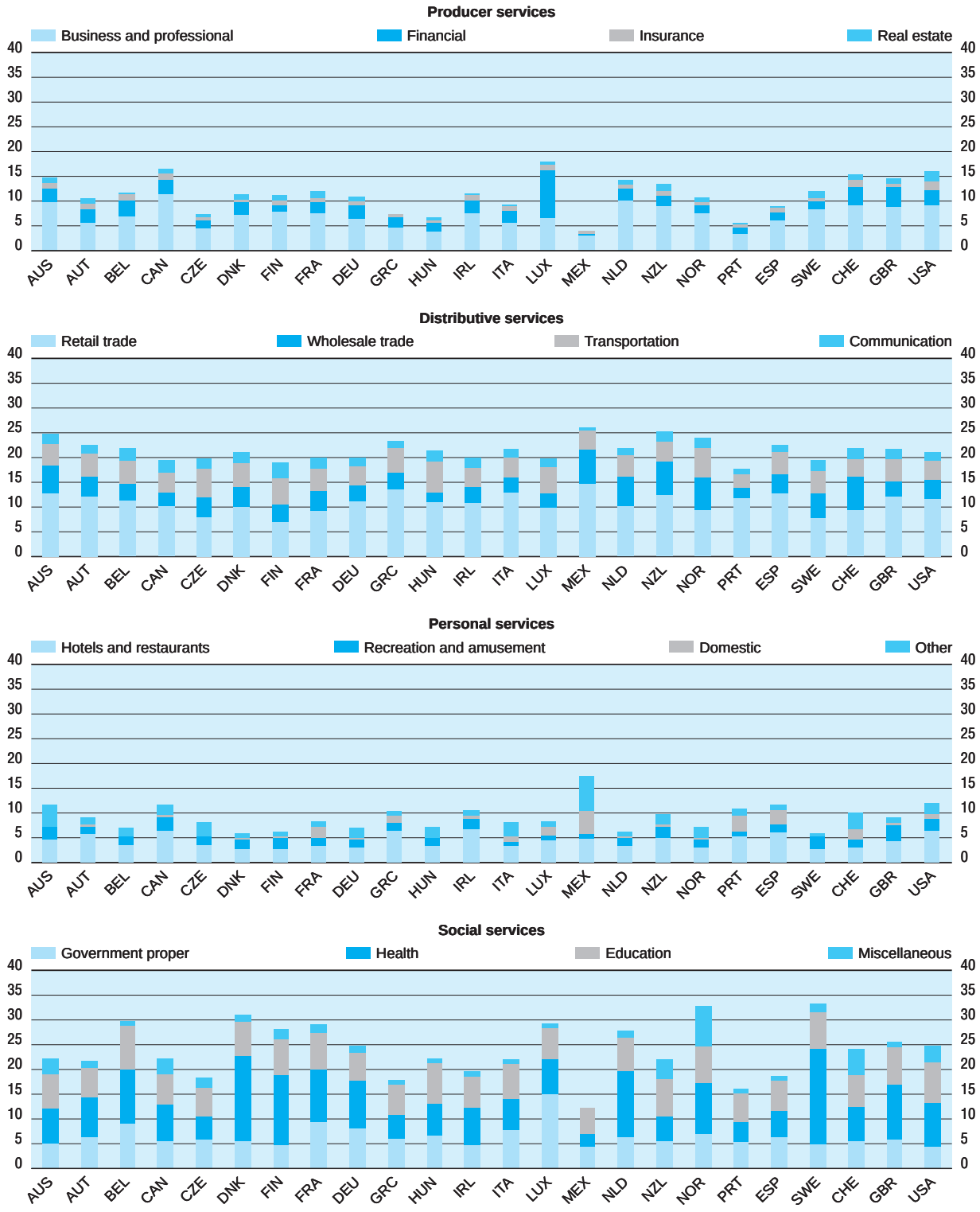
Are OECD countries following a common trajectory, as reflected in the growth and changing composition of service employment? Most discussions of the service economy suggest that changes in technology and the secular rise in living standards will cause the sectoral mix of employment to evolve in a similar manner in all countries [Fuchs (1968)]. However, some considerations suggest that national differences in the size and composition of the service sector could persist, even at the same level of income and technological development [Castells (1996); Esping-Andersen (1999)]. For example, the high social services employment noted above for several northern European countries appears to reflect political orientations supportive of a more expansive welfare state than exists in other countries. The recent increase of international trade

## Chart 3.2. Evolution of the employment shares of the four service subsectors, 1984-1998[a]


*a)* See note *a)* to Chart 3.1.
*Source:* See Annex 3.A.

## Chart 3.3. Employment shares of the sixteen service activities in 1998[a]

As a percentage of total employment



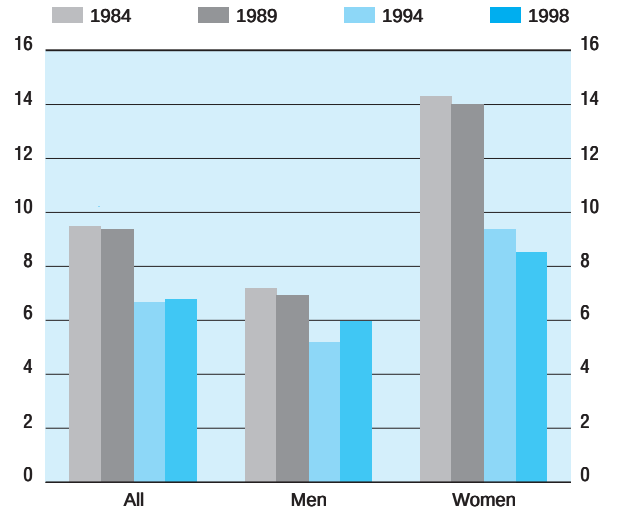

*a)* See note *a)* to Chart 3.1.
*Source:* See Annex 3.A.

in services also raises the possibility that employment in services could differ among countries with similar consumption patterns, due to trade specialisation.

The overall share of the service sector in total employment has become more uniform since the mid-1980s: the standard deviation fell from 9.5 to 6.8 percentage points between 1984 and 1998 (Chart 3.4). This (partial) convergence was largely due to the changing mix of employment for women, for whom the cross-country standard deviation fell by forty per cent. This suggests that a close relationship may exist between the development of the service sector and employment patterns for women, a theme that is developed further in Sections III and IV. When standard deviations are calculated for the four service subsectors (not shown here), three out of the four increase slightly, suggesting that convergence is stronger for the overall service share than for its subcomponents. The standard deviation for social services is approximately twice as large as those for producer, distributive and personal services, suggesting that the overall tendency toward convergence may be weakest in the social services sector, which is heavily influenced by the size of the welfare state.

International differences in service employment are examined in greater detail in Table 3.3, which makes use of a dissimilarity index. This index provides a summary measure of the extent to which the sectoral distribution of employment differs between two countries, indicating the (minimum) percentage of the workforce that would have to be shifted to another sector in the first country, in order to achieve the same sectoral distribution as in the second country.[7] As can be verified in Table 3.3, this percentage increases when the index is calculated for a more detailed set of sectors. Thus, the absolute level is less interesting than relative measures for a given index, such as country comparisons or changes over time. Panel A of Table 3.3 reports index values for comparisons between the United States and each of the other countries in the sample.[8] Panel B reports cross-country statistics, such as the mean dissimilarity value and its change over time. Panel B also reports correlation coefficients of the dissimilarity indices with several factors that may influence the level and composition of service employment.

Chart 3.4. **Cross-country standard deviations[a] of the service-sector share of total employment, 1984-1998[b]**




*a)* Standard deviations calculated for the sixteen countries with data for 1984, 1989, 1994 and 1998 in Chart 3.1.
*b)* See note *a)* to Chart 3.1.
*Source:* See Annex 3.A.

The dissimilarity indices confirm that the sectoral distribution of employment became more similar in these countries between the mid-1980s and the late 1990s. This tendency is present both for the entire economy and within the service sector. However, convergence has been stronger for the broad shift of employment from goods to service production, than for the distribution of employment across disaggregated service activities. The indices for individual countries indicate that Australia, Canada and the United Kingdom have employment structures the most like that in the United States, while Mexico and several southern and central European countries differ the most. The relative score for several countries differs considerably depending on whether the structure of employment is measured at a higher or lower level of detail. Luxembourg is a dramatic example, being among the countries most similar to the United States when the employment shares of the total service sector or the four subsectors are considered, but among the most dissimilar when the 16 service activities are differentiated. This pattern reflects Luxembourg's position as a large net exporter of financial and government services.

Correlation coefficients between the dissimilarity indices and four economic measures provide some clues about the causes of these international differences and the dynamics of convergence:

- The dissimilarity index is strongly negatively correlated with per capita GDP. Since the United States is a high-income country, the underlying pattern is that countries with an income level more similar to that in the United States also tend to have a more similar sectoral distribution of employment. However, the allocation of total service employment among the sixteen service activities is a partial exception to this

Table 3.3. **Differences in the sectoral composition of employment**

Dissimilarity indices for comparison with the United States[a]

| | Total economy | | | | Service sector | | | |
|---|---|---|---|---|---|---|---|---|
| | 3 sectors | | 21 sectors | | 4 subsectors | | 16 activities | |
| **A. 1998 index values by country**[b] | | | | | | | | |
| Australia | 2.3 | (3) | 10.1 | (4) | 3.7 | (4) | 6.8 | (4) |
| Austria | 10.0 | (14) | 13.5 | (8) | 6.3 | (10) | 8.3 | (6) |
| Belgium | 4.0 | (8) | 13.6 | (9) | 7.5 | (14) | 11.2 | (9) |
| Canada | 3.9 | (7) | 9.5 | (1) | 2.6 | (2) | 6.3 | (2) |
| Czech Republic | 20.7 | (24) | 24.5 | (21) | 10.4 | (21) | 14.1 | (19) |
| Denmark | 4.1 | (10) | 15.7 | (13) | 8.6 | (17) | 13.1 | (17) |
| Finland | 9.4 | (13) | 18.3 | (16) | 8.0 | (15) | 13.0 | (16) |
| France | 4.6 | (11) | 14.6 | (10) | 6.7 | (11) | 11.8 | (13) |
| Germany | 11.2 | (15) | 15.6 | (12) | 5.6 | (7) | 10.0 | (8) |
| Greece | 15.3 | (21) | 21.4 | (18) | 9.6 | (19) | 12.9 | (15) |
| Hungary | 16.3 | (22) | 21.5 | (19) | 8.3 | (16) | 13.2 | (18) |
| Ireland | 11.8 | (16) | 12.8 | (6) | 6.1 | (9) | 6.7 | (3) |
| Italy | 13.0 | (18) | 18.3 | (17) | 6.9 | (12) | 11.7 | (12) |
| Japan | 14.4 | (20) | .. | .. | .. | .. | .. | .. |
| Korea | 14.1 | (19) | .. | .. | .. | .. | .. | .. |
| Luxembourg | 1.8 | (1) | 21.7 | (20) | 5.8 | (8) | 18.6 | (22) |
| Mexico | 18.2 | (23) | 31.3 | (23) | 15.4 | (23) | 20.8 | (23) |
| Netherlands | 3.1 | (5) | 12.9 | (7) | 5.6 | (6) | 11.6 | (10) |
| New Zealand | 6.3 | (12) | 9.5 | (2) | 4.2 | (5) | 5.9 | (1) |
| Norway | 2.1 | (2) | 14.8 | (11) | 9.6 | (18) | 12.3 | (14) |
| Portugal | 23.7 | (25) | 27.4 | (22) | 11.8 | (22) | 15.3 | (21) |
| Spain | 12.1 | (17) | 18.1 | (15) | 7.3 | (13) | 11.7 | (11) |
| Sweden | 2.9 | (4) | 17.5 | (14) | 10.1 | (20) | 14.6 | (20) |
| Switzerland | 4.0 | (9) | 11.3 | (5) | 2.3 | (1) | 9.0 | (7) |
| Turkey | 50.3 | (26) | .. | .. | .. | .. | .. | .. |
| United Kingdom | 3.2 | (6) | 10.1 | (3) | 2.8 | (3) | 7.7 | (5) |
| **B. Cross-country measures** | | | | | | | | |
| 1998 average | 11.2 | | 17.0 | | 7.2 | | 11.6 | |
| 1984-1998 change in average[c] | –3.5 | | –2.5 | | –1.0 | | –0.5 | |
| Correlations of 1998 index with: | | | | | | | | |
| Per capita GDP (PPPs) | –0.74*** | | –0.55*** | | –0.57*** | | –0.25 | |
| Value-added share of services | –0.42** | | –0.06 | | –0.27 | | 0.10 | |
| Employment share of services | –0.96*** | | –0.68*** | | –0.51** | | –0.30 | |
| Female labour force participation rate | 0.19 | | –0.15 | | 0.07 | | –0.21 | |

.. Data not available.
*, ** and *** mean statistically significant at the 10%, 5% and 1% levels respectively.
*a)* Percentage of workforce that would have to change sectors in order to equalise the sectoral mix of employment to that in the United States.
*b)* Values in parenthesis are country ranks.
*c)* Calculated only for countries with data in both years.
*Sources:* See Annex 3.A.

pattern, since there is only a weak negative correlation between this measure of dissimilarity and income.

- The dissimilarity indices for the value-added and employment shares of the service sector also suggest that the structure of employment in OECD countries is following a trajectory that is broadly similar, but leaves considerable scope for international variation – particularly in the detailed composition of service employment.
- Surprisingly, the correlations between higher female participation rates and the dissimilarity indices are never statistically significant. However, these correlations are negative for indices that differentiate among the disaggregated service activities, suggesting that countries with female participation rates similarly high as those in the United States are also more similar in the composition of service employment across the sixteen service activities, but not in terms of the overall service-sector share of employment.

## III. Workforce characteristics

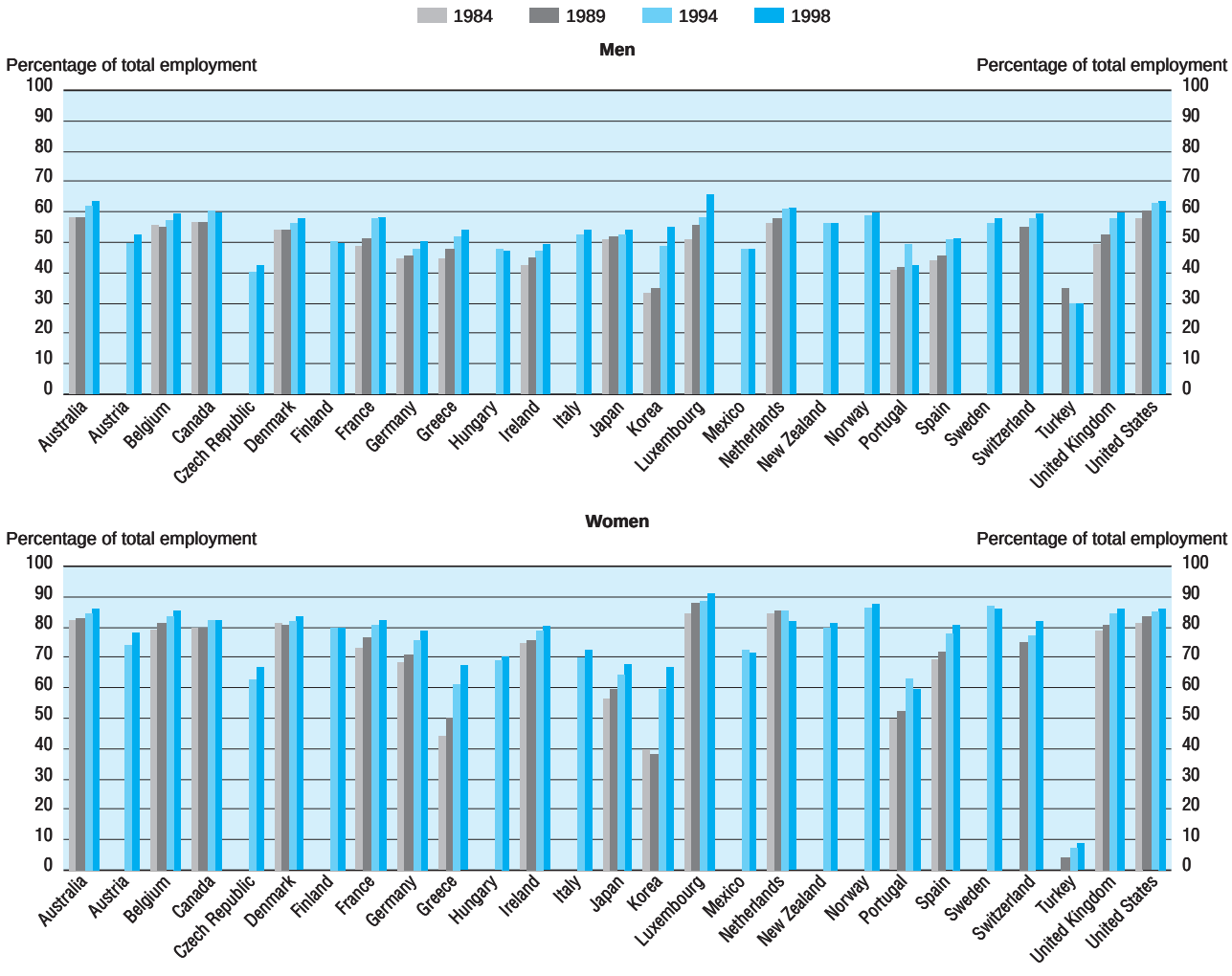
### A. Gender

Charts 3.5 and 3.6 give the shares of service employment in total employment by gender. Concerning the overall evolution, Chart 3.5 shows that in the mid-1980s, the share of services in total male employment was 49 per cent on average, while the corresponding female share was 70 per cent. With only a few exceptions, the shares of services in total employment of both genders increased significantly over the past 15 years.

The gender mix of service employment varies sharply between the four service subsectors. The shares for producer and distributive services are similar for women and men, but gender differences are notable in personal and social services. Roughly speaking, the proportion of women in personal services is twice as large as that of men. In social services, the proportion of women is more than double that of men.

Growth in the service employment share for women has been particularly rapid in countries with initially very low levels. This is especially the case in Southern European countries like Greece and Portugal and in Japan and Korea. The pattern for most countries in recent years is that about three-quarters of all working women have jobs in the service sector. Without exception, the largest share of these

Chart 3.5. **Evolution of service employment share by gender**[a]




*a)* See note *a)* to Chart 3.1.
*Source:* See Annex 3.A.

## Chart 3.6. Evolution of the employment share of the four service subsectors by gender, 1984-1998[a]

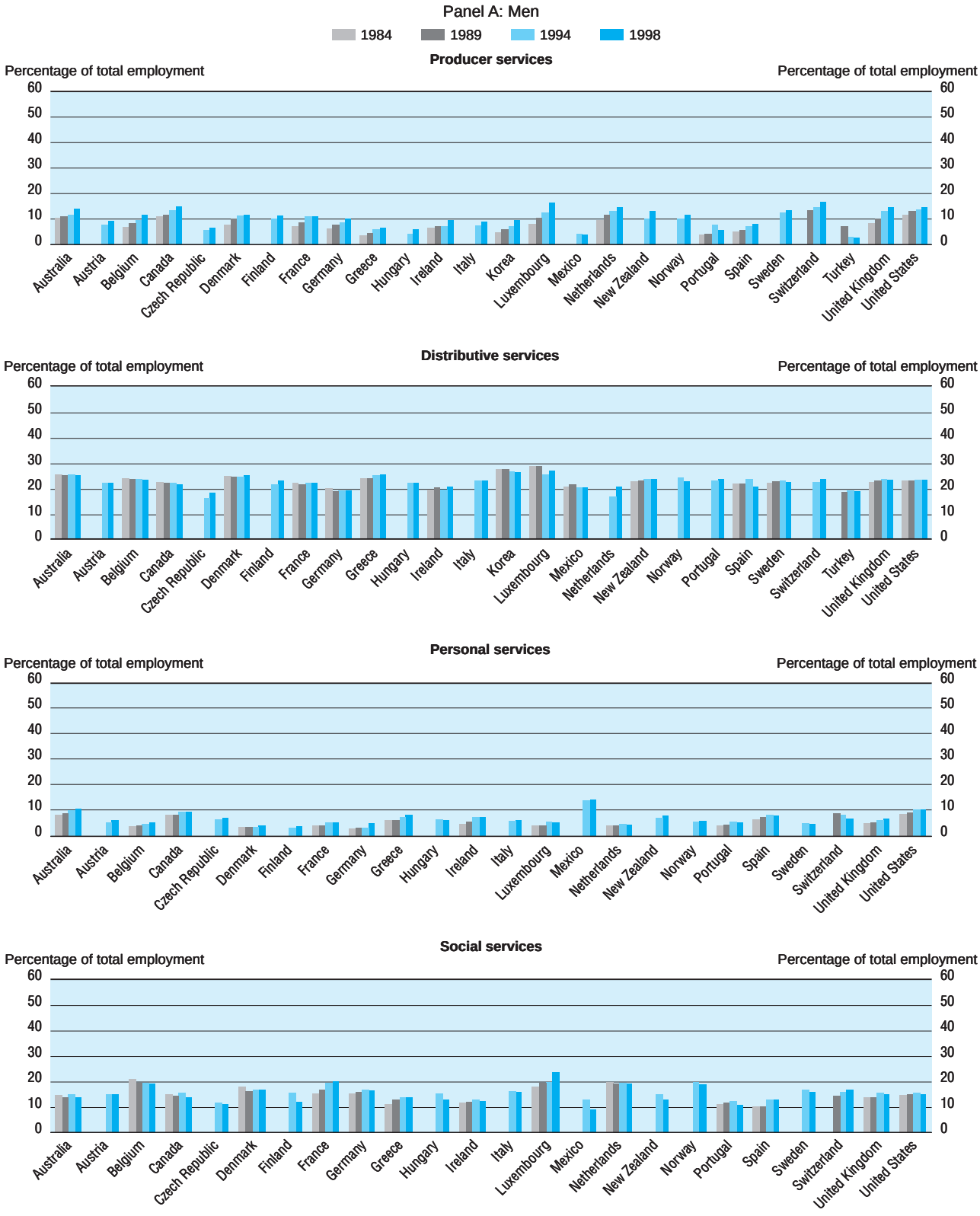


Chart 3.6. **Evolution of the employment share of the four service subsectors by gender, 1984-1998**[a] *(cont.)*


*a)* See note *a)* to Chart 3.1.
*Source:* See Annex 3.A.

women is concentrated in social services. The growth in female services' employment observed over the past 15 years is due to the increase in social services employment and – to a lesser extent – producer services.

The growth in male service employment has been mainly concentrated in producer and – to a lesser extent – personal services. Their share in distributive and social services remained largely unchanged. Yet, the countries that experienced more accentuated growth in the social services share of employment, also saw a substantial growth in male social service jobs (*i.e.* Luxembourg, France, Spain and Greece).

Table 3.4 gives the ratio of the number of women to men working in a given industry grouping in 1998. The table is divided in two main blocks, one for the goods-producing sector, and the other for the service sector. As the first column for each block shows, service activities disproportionately employ women, while the goods-producing sector disproportionately employs men. Within the service sector, personal and social services are primarily female-dominated activities, while producer and distributive services are male-dominated.

Dissimilarity indices provide further insights into gender differences in the distribution of employment across sectors (Table 3.5). Gender segregation by sector is quite extensive. The average index for employment across twenty-one sectors in 1998 indicates that 18 per cent of women would have to shift sectors in order to equalise their distribution to that for men. This figure was significantly lower in the late 1990s than in the mid-1980s.

## B. Education

Table 3.6 shows that workforce qualifications vary significantly across sectors. The top panel shows that the

Table 3.4. **Gender composition in service employment in 1998**

Ratio of women to men, by economic sector

| | Goods-producing sector | | | | | | Service sector | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Agriculture, hunting and forestry | Mining and quarrying | Manufacturing | Electricity, gas and water supply | Construction | Total | Producer services | Distributive services | Personal services | Social services |
| Australia | 0.29 | 0.45 | 0.11 | 0.35 | 0.21 | 0.16 | 1.04 | 0.87 | 0.74 | 0.91 | 1.84 |
| Austria | 0.35 | 0.96 | 0.27 | 0.36 | 0.13 | 0.09 | 1.18 | 1.04 | 0.81 | 1.62 | 1.62 |
| Belgium | 0.25 | 0.41 | 0.16 | 0.31 | 0.13 | 0.08 | 1.02 | 0.72 | 0.62 | 1.17 | 1.66 |
| Canada | 0.37 | 0.39 | 0.20 | 0.48 | 0.29 | 0.12 | 1.15 | 1.01 | 0.67 | 1.25 | 1.98 |
| Czech Republic | 0.45 | 0.49 | 0.17 | 0.66 | 0.29 | 0.09 | 1.23 | 1.02 | 0.95 | 1.01 | 1.97 |
| Denmark | 0.34 | 0.28 | 0.87 | 0.46 | 0.26 | 0.10 | 1.23 | 0.81 | 0.58 | 1.42 | 2.44 |
| Finland | 0.36 | 0.45 | 0.07 | 0.45 | 0.41 | 0.07 | 1.46 | 0.92 | 0.57 | 2.09 | 3.48 |
| France | 0.34 | 0.46 | 0.10 | 0.42 | 0.30 | 0.10 | 1.14 | 0.95 | 0.64 | 1.73 | 1.62 |
| Germany | 0.33 | 0.57 | 0.10 | 0.39 | 0.28 | 0.14 | 1.20 | 0.94 | 0.86 | 1.48 | 1.67 |
| Greece | 0.42 | 0.73 | 0.05 | 0.42 | 0.20 | 0.01 | 0.74 | 0.81 | 0.46 | 0.99 | 1.08 |
| Hungary | 0.47 | 0.32 | 0.20 | 0.70 | 0.33 | 0.09 | 1.24 | 1.08 | 0.77 | 1.15 | 2.16 |
| Ireland | 0.25 | 0.13 | 0.08 | 0.46 | 0.20 | 0.04 | 1.07 | 1.01 | 0.63 | 1.40 | 1.65 |
| Italy | 0.34 | 0.48 | 0.14 | 0.44 | 0.13 | 0.06 | 0.76 | 0.62 | 0.47 | 1.05 | 1.15 |
| Japan | 0.45 | 0.84 | 0.20 | 0.55 | 0.13 | 0.19 | 0.82 | .. | 0.69 | .. | .. |
| Korea | 0.50 | 0.91 | 0.01 | 0.53 | 0.17 | 0.10 | 0.83 | 0.64 | 0.56 | .. | .. |
| Luxembourg | 0.15 | 0.28 | 0.11 | 0.17 | 0.16 | 0.09 | 0.84 | 0.74 | 0.57 | 1.53 | 0.98 |
| Mexico | 0.28 | 0.17 | 0.08 | 0.56 | 0.18 | 0.03 | 0.76 | 0.56 | 0.63 | 0.84 | 1.00 |
| Netherlands | 0.24 | 0.39 | 0.17 | 0.28 | 0.17 | 0.09 | 0.96 | 0.69 | 0.61 | 1.32 | 1.50 |
| New Zealand | 0.35 | 0.43 | 1.22 | 0.42 | 0.22 | 0.13 | 1.18 | 2.15 | 0.77 | 0.91 | 0.86 |
| Norway | 0.26 | 0.34 | 0.20 | 0.34 | 0.22 | 0.08 | 1.26 | 0.72 | 0.74 | 1.27 | 2.25 |
| Portugal | 0.57 | 1.00 | 0.12 | 0.78 | 0.14 | 0.04 | 1.15 | 0.80 | 0.56 | 2.53 | 1.75 |
| Spain | 0.22 | 0.33 | 0.10 | 0.29 | 0.10 | 0.04 | 0.86 | 0.75 | 0.56 | 1.28 | 1.21 |
| Sweden | 0.30 | 0.30 | 0.21 | 0.38 | 0.22 | 0.09 | 1.34 | 0.72 | 0.58 | 1.34 | 2.98 |
| Switzerland | 0.33 | 0.53 | 0.09 | 0.38 | 0.09 | 0.14 | 1.09 | 0.63 | 0.88 | 1.58 | 1.58 |
| Turkey | 0.54 | 0.86 | 0.02 | 0.23 | 0.08 | 0.02 | 0.12 | 0.42 | .. | .. | .. |
| United Kingdom | 0.28 | 0.31 | 0.16 | 0.36 | 0.30 | 0.10 | 1.16 | 0.81 | 0.71 | 1.45 | 2.07 |
| United States | 0.33 | 0.33 | 0.15 | 0.47 | 0.30 | 0.10 | 1.17 | 0.99 | 0.70 | 1.12 | 2.09 |
| **OECD average** | **0.35** | **0.49** | **0.20** | **0.43** | **0.21** | **0.09** | **1.04** | **0.86** | **0.67** | **1.35** | **1.77** |

.. Data not available.
*Source:* See Annex 3.A.

Table 3.5. **Differences in the sectoral distribution of employment by gender, qualification level and age**

Dissimilarity indices for 1998 [a]

| | Women | Less than upper secondary schooling | Youths |
|---|---|---|---|
| **A. 1998 index values by country** [b] | | | |
| Australia | 16.7 (8) | .. .. | .. .. |
| Austria | 17.7 (12) | 28.6 (11) | 36.3 (11) |
| Belgium | 18.0 (15) | 19.2 (4) | 41.5 (21) |
| Canada | 14.8 (2) | 32.8 (14) | 36.0 (10) |
| Czech Republic | 17.3 (10) | 40.5 (17) | 35.9 (9) |
| Denmark | 18.6 (17) | 27.4 (9) | 34.1 (4) |
| Finland | 21.1 (24) | 25.4 (8) | 39.9 (16) |
| France | 16.0 (7) | 19.2 (3) | 41.9 (22) |
| Germany | 16.7 (9) | .. .. | 39.1 (15) |
| Greece | 17.3 (11) | 21.8 (7) | 40.0 (17) |
| Hungary | 15.6 (5) | .. .. | .. .. |
| Ireland | 19.1 (19) | .. .. | 31.2 (2) |
| Italy | 18.1 (16) | 19.2 (5) | 41.0 (20) |
| Japan | 13.9 (1) | .. .. | .. .. |
| Korea | 15.4 (4) | .. .. | .. .. |
| Luxembourg | 19.4 (20) | .. .. | 40.3 (18) |
| Mexico | 22.2 (26) | 18.7 (2) | 23.5 (1) |
| Netherlands | 17.9 (14) | .. .. | 34.6 (5) |
| New Zealand | 18.6 (18) | 16.1 (1) | 32.9 (3) |
| Norway | 21.1 (23) | 35.6 (15) | 37.4 (13) |
| Portugal | 15.6 (6) | 32.3 (13) | 35.7 (7) |
| Spain | 21.0 (22) | 20.7 (6) | 37.5 (14) |
| Sweden | 20.6 (21) | 28.5 (10) | 40.7 (19) |
| Switzerland | 30.0 (27) | 29.2 (12) | 36.4 (12) |
| Turkey | 21.5 (25) | .. .. | .. .. |
| United Kingdom | 17.9 (13) | .. .. | 35.8 (8) |
| United States | 15.3 (3) | 37.0 (16) | 35.1 (6) |
| **B. Cross-country measures** | | | |
| 1998 average | 18.4 | 26.6 | 36.7 |
| 1984-1998 change in average [c] | 9.9 | .. | 5.7 |
| Correlations of 1998 index with: | | | |
| Per capita GDP (PPPs) | 0.01 | 0.47** | 0.02 |
| Value-added share of services | 0.11 | 0.02 | –0.26 |
| Employment share of services | 0.07 | 0.37* | –0.09 |
| Share of specified group in total employment | 0.10 | –0.21 | –0.11 |

.. Data not available.
*, ** and *** mean statistically significant at the 10%, 5% and 1% levels respectively.
*a)* Percentage of the specified group who would have to change sectors in order to equalise their sectoral mix of employment with that for all other workers (index calculated over 21 sectors).
*b)* Values in parenthesis are country ranks.
*c)* Calculated only for countries with data in both years.
*Source:* See Annex 3.A.

goods-producing sector is much more low-education intensive overall than the service sector. The shift toward services clearly increases the economic premium on formal education. Within the service sector, less educated workers are the largest share of the workforce in personal services. By contrast, producer and social services employ far fewer less educated workers.

The bottom panel of Table 3.6 shows the ratios of university to non-university workers by economic activities. The service sector employs a much higher share of university-educated workers than the goods sector, but important differences also occur within these two broad sectors. Among the goods-producing sectors, the highest ratio of university workers is in electricity, gas and water supply. Within the service sector, producer and social services show the highest ratios.

Dissimilarity indices comparing the sectoral distribution of employment between low and more educated workers range widely, from 16 per cent in New Zealand to 41 per cent in the Czech Republic (Table 3.5). It is unclear,

## Table 3.6. Skill composition of service employment in 1998

| | Goods-producing sector | | | | | | Service sector | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Agriculture, hunting and forestry | Mining and quarrying | Manufacturing | Electricity, gas and water supply | Construction | Total | Producer services | Distributive services | Personal services | Social services |
| **Ratio of low-skill to medium/high-skill, by economic sector** [a] | | | | | | | | | | | |
| Austria | 0.39 | 0.88 | 0.48 | 0.32 | 0.10 | 0.33 | 0.22 | 0.18 | 0.24 | 0.42 | 0.14 |
| Belgium | 0.73 | 1.08 | 0.62 | 0.63 | 0.43 | 1.02 | 0.36 | 0.19 | 0.59 | 0.61 | 0.25 |
| Canada | 0.36 | 0.80 | 0.21 | 0.32 | 0.00 | 0.35 | 0.16 | 0.09 | 0.24 | 0.28 | 0.09 |
| Czech Republic | 0.13 | 0.22 | 0.12 | 0.14 | 0.07 | 0.08 | 0.08 | 0.04 | 0.09 | 0.09 | 0.08 |
| Denmark | 0.41 | 0.58 | 0.30 | 0.44 | 0.20 | 0.30 | 0.25 | 0.14 | 0.41 | 0.55 | 0.16 |
| Finland | 0.45 | 0.69 | 3.38 | 0.39 | 0.22 | 0.45 | 0.27 | 0.27 | 0.48 | 0.31 | 0.15 |
| France | 0.61 | 0.89 | 0.61 | 0.54 | 0.17 | 0.75 | 0.42 | 0.31 | 0.52 | 0.77 | 0.34 |
| Germany | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Greece | 2.83 | 9.15 | 1.92 | 1.25 | 0.47 | 3.26 | 0.48 | 0.10 | 0.76 | 1.14 | 0.20 |
| Ireland | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Italy | 2.06 | 5.40 | 1.38 | 1.64 | 0.87 | 2.79 | 0.71 | 0.24 | 1.37 | 1.86 | 0.35 |
| Luxembourg | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Mexico | 0.92 | 1.35 | 0.57 | 0.59 | 0.28 | 1.21 | 0.45 | 0.13 | 0.53 | 0.82 | 0.13 |
| Netherlands | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| New Zealand | 0.73 | 0.95 | .. | 0.72 | .. | 0.54 | 0.39 | 0.26 | 0.82 | 0.52 | 0.15 |
| Norway | 0.24 | 0.32 | 0.13 | 0.24 | 0.13 | 0.22 | 0.14 | 0.08 | 0.22 | 0.21 | 0.10 |
| Portugal [c] | 7.75 | 15.25 | 9.98 | 7.60 | 2.37 | 8.77 | 2.28 | 1.15 | 2.67 | 5.69 | 1.51 |
| Spain | 2.66 | 8.15 | 2.10 | 1.75 | 0.66 | 3.92 | 0.95 | 0.49 | 1.63 | 2.57 | 0.34 |
| Sweden | 0.45 | 0.74 | 0.14 | 0.43 | 0.29 | 0.44 | 0.21 | 0.16 | 0.39 | 0.36 | 0.12 |
| Switzerland | 0.35 | 0.55 | 1.18 | 0.32 | 0.19 | 0.33 | 0.23 | 0.11 | 0.30 | 0.47 | 0.17 |
| United Kingdom | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| United States | 0.21 | 0.46 | 0.18 | 0.18 | 0.05 | 0.26 | 0.13 | 0.06 | 0.16 | 0.35 | 0.06 |
| **OECD average** | **1.25** | **2.79** | **1.46** | **1.03** | **0.41** | **1.47** | **0.45** | **0.24** | **0.67** | **1.00** | **0.26** |
| **Ratio of university to non-university workers, by economic sector** [b] | | | | | | | | | | | |
| Austria | 0.02 | 0.01 | 0.02 | 0.03 | 0.04 | 0.02 | 0.11 | 0.17 | 0.03 | 0.04 | 0.20 |
| Belgium | 0.10 | 0.02 | 0.13 | 0.12 | 0.14 | 0.05 | 0.22 | 0.45 | 0.10 | 0.09 | 0.28 |
| Canada | 0.09 | 0.04 | 0.12 | 0.12 | 0.14 | 0.05 | 0.29 | 0.42 | 0.11 | 0.15 | 0.53 |
| Czech Republic | 0.06 | 0.05 | 0.05 | 0.06 | 0.09 | 0.07 | 0.18 | 0.41 | 0.06 | 0.07 | 0.32 |
| Denmark | 0.02 | 0.01 | .. | 0.03 | 0.02 | 0.00 | 0.07 | 0.14 | 0.02 | 0.03 | 0.10 |
| Finland | 0.08 | 0.04 | .. | 0.11 | 0.11 | 0.05 | 0.20 | 0.30 | 0.06 | 0.07 | 0.32 |
| France | 0.14 | 0.07 | 0.16 | 0.19 | 0.33 | 0.07 | 0.40 | 0.63 | 0.18 | 0.13 | 0.62 |
| Germany | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Greece | 0.03 | 0.01 | 0.03 | 0.07 | 0.11 | 0.02 | 0.28 | 0.81 | 0.08 | 0.07 | 0.64 |
| Ireland | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Italy | 0.04 | 0.02 | 0.09 | 0.04 | 0.05 | 0.04 | 0.19 | 0.32 | 0.04 | 0.05 | 0.39 |
| Luxembourg | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Mexico | 0.06 | 0.01 | 0.25 | 0.10 | 0.26 | 0.09 | 0.22 | 0.82 | 0.10 | 0.06 | 0.72 |
| Netherlands | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| New Zealand | 0.04 | 0.05 | .. | 0.06 | .. | .. | 0.24 | 0.44 | 0.03 | 0.03 | 0.51 |
| Norway | 0.15 | 0.07 | 0.57 | 0.17 | 0.20 | 0.09 | 0.53 | 0.88 | 0.21 | 0.22 | 0.86 |
| Portugal [c] | 0.02 | 0.01 | 0.02 | 0.02 | 0.10 | 0.02 | 0.06 | 0.14 | 0.04 | 0.01 | 0.14 |
| Spain | 0.07 | 0.02 | 0.08 | 0.10 | 0.36 | 0.05 | 0.32 | 0.53 | 0.09 | 0.06 | 0.99 |
| Sweden | 0.06 | 0.02 | 0.05 | 0.07 | 0.07 | 0.03 | 0.19 | 0.25 | 0.05 | 0.09 | 0.29 |
| Switzerland | 0.04 | 0.00 | .. | 0.06 | 0.02 | 0.02 | 0.13 | 0.18 | 0.05 | 0.04 | 0.21 |
| United Kingdom | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| United States | 0.21 | 0.16 | 0.28 | 0.26 | 0.32 | 0.11 | 0.43 | 0.70 | 0.21 | 0.14 | 0.76 |
| **OECD average** | **0.07** | **0.04** | **0.14** | **0.09** | **0.15** | **0.05** | **0.24** | **0.45** | **0.09** | **0.08** | **0.46** |

.. Data not available.

*a)* "Low skill" corresponds to ISCED 0-2 and "medium/high skill" to ISCED 3-7.

*b)* "University" corresponds to ISCED 6-7 and "non-university" to ISCED 0-5, except for the Czech Republic, where "university" corresponds to ISCED 5-7 and "non-university" to ISCED 0-4.

*c)* Year 1997.

*Sources:* For France and Portugal, figures were obtained from the national labour force surveys; for the other countries, see Annex 3.A.

however, whether this variation is primarily due to differences in economic structure (*i.e.* the sectoral mix of skill demand) or to the skill mix of the workforce. The dissimilarity index rises as income and the employment share of services rises (augmenting the concentration of low-skilled workers in goods production), but it falls as the level of educational attainment rises.

### C. Age

Table 3.7 presents the age composition in the service and the non-service activities. The top panel of the table shows that youths are a similar share of the workforce in the service and in the goods-producing sector. However the propositions vary significantly within the service sector. Nearly one in every three workers in personal services is younger than 25. Distributive services also show a high ratio of young workers, mainly due to the large presence of this group in retail trade.

The greatest presence of older workers is found in agriculture, hunting and forestry (bottom panel of Table 3.7). Except for this particular case, older workers are quite equally distributed across broad sectors. However, the concentration varies significantly when more disaggregated service activities are considered. For example, within the distributive services, older workers are twice as concentrated in communications as in any other distributive service activity (not shown here).

Dissimilarity indices show that segregation between youths and adults by sector is more extensive than that between men and women (see Table 3.5). The average index for employment across twenty-one sectors indicates that in 1998, 37 per cent of young workers would have to change sector in order to equalise the distribution of adult workers. This represented an increase of six percentage points over 1984.

## IV. Determinants of the share of service employment in total employment

### A. Overview of the issues

This section analyses the causes of the significant international and intertemporal differences in the level and composition of service employment that were identified in Section II. The potential causes of the secular rise of the share of services in total employment or of international differences in the service-share at a point-in-time, can be classified into three determinants: the rise in income; lagging productivity in services; and exogenous shifts in the demand for services (holding incomes and the relative price of services fixed) [Summers (1985)]. Several econometric studies have confirmed Fuchs' (1968) finding that lagging productivity has been the most important factor causing the service-sector share to increase, that exogenous demand shifts (*e.g.* increased outsourcing of support services by goods producers) have played a secondary role and that rising income has played little or no role [Inman (1985)].

If productivity trends are the central cause of changes in service-sector shares of employment, all countries should experience a similar evolution over time because technological changes quickly diffuse across international borders. However, some researchers put more stress on exogenous demand shifts, such as the secular rise in female labour participation, the expansion of the welfare state and other cultural and institutional factors, which may result in persistent differences across countries [Castells (1996); Esping-Andersen (1999)]. Large differences among service subsectors in productivity trends have also received increased attention [Baumol *et al.* (1985); Pellegrini (1993)]. Indeed, some recent accounts of economic growth suggest that ICT and changes in business organisation are creating demands for new or higher quality services that are being met with innovative products [OECD (1998*a*, 1999*a*)]. Whereas past growth in services employment may have resulted primarily from a combination of lagging service-sector productivity with a stable output share, there may now be stronger demand shifts toward certain dynamic services.

Table 3.8 juxtaposes the overall share of the service sector in the economy with the first two of these explanatory factors: income – measured as per capita GDP expressed in dollars – and the extent to which service-sector productivity lags that in goods production – measured as the ratio of the PPP for services to the PPP for goods. Higher income is strongly associated with both higher relative costs for services (correlation coefficient of 0.88) and an increase in the service-sector share of employment (correlation coefficient of 0.76). The close association between GDP growth and increases in the relative price of services suggests that it may be difficult to differentiate between the contributions of these two factors to increases in the service employment share. In the remainder of this section, multivariate regression techniques are used to estimate the independent contributions of these two factors, as well as those of additional variables intended to capture exogenous demand shifts towards services.

Panel models are estimated for the period 1984-1998 that take maximum advantage of the data for service-sector employment shares that was presented in Section II. This approach allows both the variation across countries and the variation over time (within countries) to be exploited in

## Table 3.7. Age composition of service employment in 1998 [a]

| | Goods-producing sector | | | | | | Service sector | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Agriculture, hunting and forestry | Mining and quarrying | Manufacturing | Electricity, gas and water supply | Construction | Total | Producer sercives | Distributive services | Personal services | Social services |
| **Ratio of youth to adult, by sector** [b] | | | | | | | | | | | |
| Austria | 0.18 | 0.06 | 0.18 | 0.19 | 0.04 | 0.27 | 0.15 | 0.11 | 0.19 | 0.25 | 0.09 |
| Belgium | 0.12 | 0.08 | 0.08 | 0.12 | 0.07 | 0.16 | 0.08 | 0.08 | 0.09 | 0.15 | 0.06 |
| Canada | 0.14 | 0.17 | 0.12 | 0.15 | 0.03 | 0.12 | 0.18 | 0.13 | 0.23 | 0.44 | 0.09 |
| Czech Republic | 0.16 | 0.09 | 0.09 | 0.18 | 0.13 | 0.19 | 0.17 | 0.15 | 0.19 | 0.27 | 0.11 |
| Denmark | 0.16 | 0.14 | 0.00 | 0.16 | 0.02 | 0.20 | 0.20 | 0.14 | 0.35 | 0.57 | 0.10 |
| Finland | 0.10 | 0.05 | 0.21 | 0.12 | 0.10 | 0.08 | 0.11 | 0.09 | 0.14 | 0.25 | 0.06 |
| France | 0.09 | 0.07 | 0.04 | 0.10 | 0.02 | 0.12 | 0.09 | 0.07 | 0.12 | 0.16 | 0.06 |
| Germany | 0.13 | 0.10 | 0.06 | 0.11 | 0.08 | 0.18 | 0.12 | 0.11 | 0.13 | 0.17 | 0.10 |
| Greece | 0.11 | 0.08 | 0.07 | 0.13 | 0.03 | 0.16 | 0.11 | 0.10 | 0.14 | 0.20 | 0.03 |
| Ireland | 0.23 | 0.09 | 0.10 | 0.30 | 0.09 | 0.27 | 0.23 | 0.23 | 0.30 | 0.42 | 0.09 |
| Italy | 0.13 | 0.07 | 0.06 | 0.15 | 0.06 | 0.13 | 0.08 | 0.08 | 0.10 | 0.15 | 0.03 |
| Korea | 0.07 | 0.01 | 0.05 | 0.10 | 0.06 | 0.07 | 0.12 | 0.13 | 0.11 | .. | .. |
| Luxembourg | 0.09 | 0.08 | 0.08 | 0.08 | 0.05 | 0.13 | 0.10 | 0.07 | 0.17 | 0.17 | 0.07 |
| Mexico | 0.42 | 0.38 | 0.15 | 0.51 | 0.12 | 0.35 | 0.32 | 0.30 | 0.35 | 0.41 | 0.16 |
| Netherlands | 0.14 | 0.20 | 0.01 | 0.14 | 0.02 | 0.15 | 0.17 | 0.13 | 0.29 | 0.40 | 0.07 |
| New Zealand | 0.14 | 0.11 | 0.00 | 0.15 | 0.00 | 0.15 | 0.23 | 0.19 | 0.38 | 0.71 | 0.05 |
| Norway | 0.14 | 0.15 | 0.07 | 0.13 | 0.08 | 0.16 | 0.15 | 0.09 | 0.19 | 0.37 | 0.10 |
| Portugal | 0.19 | 0.05 | 0.06 | 0.26 | 0.06 | 0.25 | 0.15 | 0.19 | 0.19 | 0.19 | 0.07 |
| Spain | 0.17 | 0.12 | 0.07 | 0.19 | 0.04 | 0.18 | 0.13 | 0.11 | 0.17 | 0.21 | 0.05 |
| Sweden | 0.09 | 0.08 | 0.04 | 0.10 | 0.00 | 0.10 | 0.10 | 0.10 | 0.14 | 0.26 | 0.05 |
| Switzerland | 0.16 | 0.12 | 0.09 | 0.15 | 0.21 | 0.22 | 0.15 | 0.14 | 0.19 | 0.27 | 0.10 |
| United Kingdom | 0.14 | 0.14 | 0.05 | 0.15 | 0.14 | 0.13 | 0.17 | 0.14 | 0.26 | 0.40 | 0.07 |
| United States | 0.13 | 0.20 | 0.10 | 0.11 | 0.04 | 0.15 | 0.19 | 0.13 | 0.24 | 0.45 | 0.10 |
| **OECD average** | **0.15** | **0.12** | **0.08** | **0.16** | **0.07** | **0.17** | **0.15** | **0.13** | **0.20** | **0.31** | **0.08** |
| **Ratio of old to non-old, by sector** [c] | | | | | | | | | | | |
| Austria | 0.10 | 0.28 | 0.06 | 0.06 | 0.13 | 0.07 | 0.07 | 0.09 | 0.07 | 0.07 | 0.07 |
| Belgium | 0.07 | 0.21 | 0.06 | 0.05 | 0.10 | 0.07 | 0.07 | 0.06 | 0.08 | 0.08 | 0.07 |
| Canada | 0.12 | 0.27 | 0.09 | 0.10 | 0.07 | 0.12 | 0.10 | 0.12 | 0.10 | 0.09 | 0.10 |
| Czech Republic | 0.10 | 0.12 | 0.06 | 0.09 | 0.14 | 0.09 | 0.10 | 0.12 | 0.08 | 0.09 | 0.13 |
| Denmark | 0.14 | 0.34 | 0.03 | 0.11 | 0.16 | 0.13 | 0.12 | 0.12 | 0.09 | 0.15 | 0.13 |
| Finland | 0.12 | 0.24 | .. | 0.09 | 0.06 | 0.12 | 0.09 | 0.11 | 0.08 | 0.08 | 0.10 |
| France | 0.08 | 0.20 | 0.07 | 0.06 | 0.05 | 0.08 | 0.08 | 0.07 | 0.06 | 0.10 | 0.08 |
| Germany | 0.15 | 0.30 | 0.07 | 0.14 | 0.17 | 0.14 | 0.15 | 0.14 | 0.15 | 0.16 | 0.16 |
| Greece | 0.31 | 0.68 | 0.08 | 0.11 | 0.07 | 0.15 | 0.11 | 0.08 | 0.14 | 0.12 | 0.09 |
| Ireland | 0.15 | 0.45 | 0.10 | 0.07 | 0.15 | 0.10 | 0.10 | 0.07 | 0.10 | 0.10 | 0.13 |
| Italy | 0.12 | 0.33 | 0.12 | 0.08 | 0.08 | 0.14 | 0.13 | 0.10 | 0.14 | 0.12 | 0.13 |
| Korea | 0.30 | 1.31 | 0.15 | 0.08 | 0.10 | 0.11 | 0.13 | 0.17 | 0.12 | .. | .. |
| Luxembourg | 0.06 | 0.19 | 0.08 | 0.06 | 0.14 | 0.03 | 0.07 | 0.05 | 0.06 | 0.05 | 0.10 |
| Mexico | 0.16 | 0.28 | 0.13 | 0.08 | 0.10 | 0.10 | 0.11 | 0.07 | 0.13 | 0.13 | 0.07 |
| Netherlands | 0.09 | 0.21 | 0.10 | 0.08 | 0.13 | 0.07 | 0.07 | 0.06 | 0.07 | 0.06 | 0.08 |
| New Zealand | 0.12 | 0.26 | 0.00 | 0.07 | 0.00 | 0.10 | 0.07 | 0.08 | 0.07 | 0.00 | 0.08 |
| Norway | 0.18 | 0.36 | 0.08 | 0.16 | 0.23 | 0.13 | 0.15 | 0.15 | 0.14 | 0.09 | 0.18 |
| Portugal | 0.26 | 1.12 | 0.16 | 0.10 | 0.15 | 0.08 | 0.15 | 0.10 | 0.18 | 0.18 | 0.12 |
| Spain | 0.15 | 0.36 | 0.08 | 0.11 | 0.13 | 0.10 | 0.12 | 0.08 | 0.13 | 0.14 | 0.13 |
| Sweden | 0.20 | 0.50 | 0.33 | 0.17 | 0.28 | 0.18 | 0.19 | 0.17 | 0.18 | 0.15 | 0.21 |
| Switzerland | 0.20 | 0.39 | 0.13 | 0.18 | 0.16 | 0.13 | 0.17 | 0.15 | 0.16 | 0.20 | 0.18 |
| United Kingdom | 0.15 | 0.32 | 0.12 | 0.14 | 0.08 | 0.15 | 0.13 | 0.12 | 0.13 | 0.14 | 0.14 |
| United States | 0.14 | 0.25 | 0.13 | 0.13 | 0.10 | 0.11 | 0.15 | 0.15 | 0.14 | 0.11 | 0.16 |
| **OECD average** | **0.15** | **0.39** | **0.10** | **0.10** | **0.12** | **0.11** | **0.12** | **0.11** | **0.11** | **0.11** | **0.12** |

.. Data not available.
*a)* See Annex 3.A for a description of the sectoral classifications.
*b)* "Youth" includes the workers aged 15-24, and "adult" those aged more than 25.
*c)* "Old" includes the workers aged 55 or more, and "non-old" those aged less than 55.
*Source:* See Annex 3.A.

— Table 3.8. **Per capita GDP, the relative price of services and the size of the service sector, 1998**[a] —

| | GDP per capita[b] | Relative price of services (PPPs)[c] | Service share of value added[d] | Service share of employment |
|---|---|---|---|---|
| Luxembourg | 34 701 | 1.07 | 76.1 | 75.1 |
| United States | 30 394 | 1.25 | 72.2 | 73.8 |
| Germany | 27 569 | 1.08 | 66.6 | 62.6 |
| Norway | 26 611 | 0.99 | 63.9 | 72.7 |
| Switzerland | 26 297 | 1.28 | 63.0 | 69.2 |
| Denmark | 26 297 | 0.90 | 71.3 | 69.5 |
| Iceland | 24 716 | .. | 60.5 | .. |
| Canada | 24 106 | 1.04 | 64.0 | 69.9 |
| Japan | 24 103 | 0.91 | 61.1 | 59.4 |
| Belgium | 24 003 | 0.95 | 69.8 | 70.2 |
| Austria | 23 073 | 1.01 | 64.5 | 63.8 |
| Netherlands | 22 887 | 0.98 | 69.3 | 70.2 |
| Australia | 22 697 | 0.90 | 70.4 | 73.3 |
| Ireland | 22 429 | 0.87 | 51.0 | 61.7 |
| France | 22 089 | 1.06 | 70.8 | 69.2 |
| Italy | 21 999 | 0.84 | 66.5 | 60.8 |
| Finland | 21 677 | 0.95 | 63.0 | 64.2 |
| United Kingdom | 21 218 | 0.92 | 69.9 | 71.4 |
| Sweden | 21 162 | 1.04 | 67.9 | 70.9 |
| New Zealand | 17 801 | 0.79 | 64.5 | 67.4 |
| Spain | 16 743 | 0.85 | 64.9 | 61.7 |
| Portugal | 15 242 | 0.58 | 60.2 | 50.2 |
| Greece | 14 411 | 0.73 | 68.5 | 58.8 |
| Korea | 13 543 | .. | 50.2 | 59.7 |
| Czech Republic | 13 133 | 0.38 | 51.6 | 53.1 |
| Hungary | 10 530 | 0.42 | 60.2 | 57.6 |
| Poland | 7 989 | 0.42 | 58.7 | .. |
| Mexico | 7 953 | 0.62 | 65.6 | 55.6 |
| Turkey | 6 723 | 0.43 | 52.6 | 23.5 |
| Correlation coefficient with: | | | | |
| GDP per capita | | 0.88*** | 0.58*** | 0.76*** |
| Relative price of services | 0.88*** | | 0.62*** | 0.75*** |

.. Data not available.
*, ** and *** mean statistically significant at the 10%, 5% and 1% levels respectively.
*a)* Countries listed in descending order by GDP per capita.
*b)* GDP per capita measured in USD using purchasing power parities (PPPs).
*c)* 1996 PPP for services divided by PPP for goods.
*d)* 1998 data except 1997 for Japan, Turkey and the United States; 1996 for Sweden; 1995 for New Zealand; 1991 for Switzerland.
*Sources:* Population: *OECD Main Economic Indicators (MEI)* except for Belgium and Greece which were estimated using MEI benchmarks and trends from the UN population database for 1998; GDP: OECD (1999*b*); Service share of value added: OECD (2000*a*); Purchasing Power Parities: OECD (1999*c*); Service share of employment: see Annex 3.A.

estimating the impact of the explanatory variables on the service share. Fixed country effects are included in the model since it is not possible to include explanatory variables that control for all of the factors that may create cross-country differences in employment shares. The random-effects, generalised least squares (GLS) procedure for unbalanced panels is used to estimate the coefficients of this model, since relatively few degrees of freedom are available for estimating the time-invariant country effects. This model involves strong identification assumptions that need to be verified on a case-by-case basis.

The regression models include a series of explanatory variables that economic theory suggests may be important determinants of the service employment share [see Annex 3.B for definitions and sources of the regressors used]. As much as possible, the selection of regressors was guided by prior research. In order to provide qualitative guidance to the possible impact of policy choices on the composition of output, emphasis was placed on including variables reflective of international differences in policy. The regressors can be divided into three groups:

- The two *core regressors* are the income and relative price variables presented in the first two columns of Table 3.8. Coefficient estimates are presented for a *restricted model* that only includes these two regressors, since these results can more easily be compared with the results from prior econometric studies [*e.g.* Curtis and Murthy (1998)].

- Regressors primarily reflecting differences in *labour costs* that may effect the sectoral composition of employment. These include the tax wedge on labour income, the strictness of employment protection legislation (EPL), the strictness of product market regulation and the extent of earnings compression. Although these are all economy-wide measures, they may have a disproportionate effect on employment in services, or in those service subsectors that are especially sensitive to the unit costs of employing specific skill groups[9] or experience high rates of turnover.

- Regressors primarily reflecting differences in the *composition of final demand.* These include a measure of the size of the welfare state and the labour force participation rate for women.[10] Product market regulation (*e.g.* shopping hours restrictions) may also operate through its influence on the composition of final demand.

When estimating employment-share models for the four service subsectors or disaggregated service activities, additional regressors are sometimes added that are especially relevant for the specific industries being considered.

While providing an indication of the factors that influence the share of employment in the service sector, the regression results are subject to several caveats. First, endogeneity bias is a potential problem since an element of mutual causation may exist between service employment shares and several of the regressors, particularly female participation rates[11] and earnings inequality.[12] Another difficulty is that a single coefficient may reflect the net effect of off-setting influences. For example, higher earnings inequality may encourage the expansion of personal services that make intensive use of low-skilled workers, by lowering their relative pay. But greater earnings compression may also result in a more equal distribution of income which, in turn, may lead to higher demand for some types of services. Finally, some of the explanatory variables are quite strongly correlated with each other, and may also proxy for omitted variables, making it difficult to differentiate among their effects.

## B. Determinants of the overall service employment share

Table 3.9 presents the results for regression models relating international differences in the overall service employment share to the explanatory variables. The first

Table 3.9. **Panel regressions to explain the overall service share of employment** [a]

| | Restricted model | Full model | Modified full model (Version 1) | Modified full model (Version 2) |
|---|---|---|---|---|
| GDP per capita in PPP | 0.7 *(26.1)**** | 0.4 *(9.5)**** | 0.7 *(18.1)**** | 0.7 *(15.1)**** |
| Relative price of services [b] | 8.5 *(2.0)** | 5.0 *(0.5)* | 7.1 *(1.0)* | 7.2 *(1.0)* |
| Average tax wedge | | 0.2 *(1.5)* | 0.1 *(0.8)* | 0.1 *(0.7)* |
| EPL | | –1.0 *(2.4)*** | –0.5 *(1.1)* | –0.4 *(0.8)* |
| Product market regulation | | –4.9 *(1.6)* | –3.3 *(1.3)* | –1.2 *(0.4)* |
| Earnings compression | | 2.6 *(0.7)* | | |
| Female participation rate | | 0.3 *(5.6)**** | | |
| Size of the welfare state | | 0.8 *(5.1)**** | 0.1 *(0.8)* | 0.2 *(1.1)* |
| Relative tax wedge (Version 1) [c] | | | | –0.9 *(0.2)* |
| Co-ordination and centralisation [d] | | | | –5.1 *(2.2)*** |
| Number of countries | 25 | 15 | 18 | 15 |
| R-squared | 0.60 | 0.61 | 0.63 | 0.70 |
| Wald test [e] | 707*** | 835*** | 514*** | 407*** |
| Breusch and Pagan test [f] | 1 238*** | 678*** | 764*** | 405*** |
| Hausman test [g] | 0.0 | 4.7 | 5.0 | 11.3** |

*, ** and *** mean statistically significant at the 10%, 5% and 1% levels respectively.

*a)* Generalised Least Squares (GLS) estimates for the random-effects (unbalanced) panel model over fifteen years (1984-1998). Absolute values of *t*-statistics in parenthesis. Regressions also contain a constant term.

*b)* PPP for services divided by PPP for goods.

*c)* Ratio of the tax wedge of a married couple with two children where both partners work, divided by the tax wedge of a married couple with two children where only one partner works. See Annex 3.B for more details.

*d)* Average of indices of the centralisation and co-ordination of collective bargaining.

*e)* Wald test for joint significance of regressors (Chi-square statistic).

*f)* Breusch and Pagan Lagrangian multiplier test for presence of country effects (Chi-square statistic).

*g)* Hausman test for misspecification of the random-effects model (Chi-square statistic).

*Sources and definitions:* See Annex 3.A for the dependent variable and see Annex 3.B for the explanatory variables.

column presents the regression coefficients for the *restricted model* that only includes an intercept, per capita GDP and the relative price of services. Column two presents the *full model*, which incorporates six additional explanatory variables reflecting differences in *labour costs* and the *composition of final demand*. The final two columns present two variations of the full model that are intended to assess the robustness of the estimation results to possible endogeneity bias.

The estimated coefficients for the *restricted model* imply that both higher income and higher relative costs for services lead to an increase in the service share, as was suggested by the bivariate analysis of Table 3.8. The fit of this model is quite good, with an R-squared of 0.60 and the Wald test indicating that the two regressors are jointly significant at the 1 per cent level.[13] An important difference from the relatively few prior econometric studies on this topic is that the GDP variable continues to have a positive coefficient, which is large and highly statistically significant, despite the inclusion of a measure of the relative cost of services in the model. This finding suggests that the expansion of the services sector is not simply a matter of the "cost disease" diagnosed by Baumol (1967). Rather, some services appear to be luxury goods with income elasticities greater than unity (see Box 1 for guidance to the interpretation of the regression coefficients).

The estimation results for the *full model* are somewhat disappointing overall, since three of the six additional regressors fail to reach conventional levels of statistical significance and the overall fit of the model is only slightly enhanced (Table 3.9, column 2).[14] The two regressors aimed at capturing differences in the composition of final demand are statistically significant and take the expected sign, with increases in the size of the welfare state and female participation both increasing the service employment share. However, among the four cost variables, only the index for EPL is statistically significant with stricter employment protection being associated with a lower service share of employment. The coefficients for GDP and the relative price of services remain qualitatively similar when the additional regressors are added to the model. The relative importance of the income effect is even somewhat enhanced since the relative price variable is now less precisely estimated and no longer statistically different from zero.

In order to assess whether two of the regressors in the full model – earnings compression and female participation – cause endogeneity bias, two modifications of the full model are also presented in Table 3.9. The first (version 1 in column 3), simply omits these two variables. The second (version 2 in column 4) substitutes two proxies for these variables, which are less likely to be jointly determined with the services employment share: earnings compression being proxied by an index of the co-ordination and centralisation of collective bargaining [OECD (1997*a*) suggests these two are highly interlinked] and female participation by a measure of the country-specific tax "penalty" on female participation (*i.e.* the tax wedge for a married working couple relative to the tax wedge of a one-earner married couple). The results suggest that endogeneity bias is not an important problem for the full model. In both modifications of the full model, the qualitative results for the other regressors are similar, although the (absolute) magnitudes and significance levels of the coefficients for EPL and the size of the welfare state are somewhat reduced.

### C. Determinants of the employment shares of the four service subsectors

The descriptive analysis in Sections II-III highlighted the heterogeneity of the service sector. This diversity suggests that the determinants of employment shares almost certainly differ among the service subsectors. Accordingly, Table 3.10 presents estimation results for separate regression models explaining the employment shares of each of the four service subsectors. Two sets of coefficients are presented for each subsector, those for the *restricted model* and those for the *full model*, as defined above for the models of the overall service employment share. The results suggest the following conclusions:

- The four subsectors differ in terms of the signs, magnitudes and statistical significance of the estimated coefficients, confirming that it is important to differentiate among service subsectors when analysing the determinants of employment shares. The fit of the model also varies across the four subsectors, suggesting that using the same regressors for each subsector – as is done here – fails to fully reflect the differences in the underlying determinants.
- GDP per capita has a positive effect on every service subsector share which is almost always statistically significant.[15] However, this effect is considerably stronger for producer and social services than for personal and distributive services. The strong association between higher income and a higher employment share for social services suggests that many of these services are luxury goods in final consumption. The strong association for producer services is more likely to reflect greater intermediate demand for such services in more developed economies.
- A higher tax wedge on labour income reduces somewhat the share of distributive and personal services, but enhances the share of social services. Since social

## *Box 1.* Explanatory note for interpreting the regression coefficients

### Theoretical framework

In Baumol's (1967) model of *unbalanced growth*, the economy is composed of two sectors: one sector (*i.e.* the goods sector) is characterised by more rapid productivity growth than the other (*i.e.* the service sector). With a number of ancillary assumptions [*e.g.* constant returns to scale (CRS) production functions, iso-elastic consumption demand, perfect competition], it is possible to derive a simple equation of motion describing the evolution of the service-sector share of total employment:

$$\lambda_s = (\alpha - 1)r_g + (1 + \beta)(r_g - r_s) + \Delta \ ,$$

where $\lambda_s$ is the growth rate of the service-sector share of total employment, $r_g$ and $r_s$ are the growth rates of labour productivity in the goods- and service-producing sectors, $\alpha$ is the income elasticity of demand for services ($\alpha > 0$), $\beta$ is the price elasticity of demand for services ($\beta < 0$) and $\Delta$ represents exogenous shifts in the demand for services.

The three terms of the equation can be interpreted as follows:

1. The *income effect* (*i.e.* $(\alpha - 1)r_g$) demonstrates that rising income causes the service share of employment to rise if and only if services are a luxury good (*i.e.* if $\alpha > 1$). Note that income grows at rate $r_g$ since the output of the goods-sector is adopted as the numeraire.
2. The *differential productivity effect* [*i.e.* $(1 + \beta)(r_g - r_s)$] represents the net impact of two, off-setting (sub)effects. First, slower productivity growth in services than in goods causes the employment share of services to increase for a fixed output mix, due to the differential trend in unit labour requirements (the labour-requirements effect). Second, slower productivity growth in services causes the relative price of services to rise and, hence, consumers to substitute goods for services (the substitution effect). The substitution effect will overpower the labour-requirements effect if and only if the demand for services is price elastic (*i.e.* $\beta < -1$).
3. The *exogenous shifts* term (*i.e.* $\Delta$) reflects all other factors (*e.g.* changes in demography or tastes) that alter the relative demand for services, holding constant income and the relative price of services. This term was not present in Baumol's theoretical model, but is sometimes added in empirical applications. (Note too, that Baumol used somewhat different notation and contrasted the service sector with manufacturing.)

### Empirical implementation

The regression models which are reported in Tables 3.9-3.11 are essentially Baumol's equation of motion converted to level form. This is the model specification strategy adopted by the few prior econometric studies, although log-log or semi-log versions are sometimes estimated instead of the linear specification estimated here. The *restricted model* only contains regressors representing the first two terms of the structural equation, while the *full model* also contains a series of regressors intended to capture the third term.

The three terms are operationalised as follows:

1. The *income effect* is modelled by including per capita GDP in USD (converted by PPPs) as a regressor.

   The significant positive coefficients estimated for this variable suggest that services are a luxury good (*i.e.* the share of services in total expenditures rises as income rises). By contrast, most previous research concluded that the service share is not significantly affected by the level of per capita income (*i.e.* $\alpha \cong 1$).
2. The *differential-productivity effect* is modelled by including the ratio of the PPP price index for total services to the PPP index for total goods as a regressor. (The assumptions of CRS and perfect competition imply equality between the ratio of sectoral output prices and the inverse of the ratio of sectoral productivities.) The predominance of positive, but small and often insignificant coefficients suggests that the demand for services is moderately price inelastic, causing the labour-requirements effect to outweigh slightly the substitution effect. By contrast, previous studies have concluded that demand is quite inelastic and that lagging productivity accounts for most of the growth in the service-sector employment share.
3. The full model includes additional regressors that represent factors that may have caused *exogenous shifts* in the demand for services. These regressors fail to explain much of the in-sample variation in the employment share of services, but several serve to identify factors that are associated with significant differences in the size of certain of the service subsectors.

The regression coefficient for the relative price of services raises particular difficulties of interpretation, since it may not correspond very closely to the theoretical construct analysed by Baumol. If the model's assumptions of CRS technology or perfect competition do not hold, then the relative price of services may not provide a good measure of relative productivity in the two sectors of the economy. Furthermore, Baumol's model of unbalanced growth depicts a *closed* economy and does not take account of the ways in which international trade could alter the impact of sectoral differences in productivity growth on relative prices and the allocation of labour. A regressor based on PPPs may be especially likely to pick up any such effects from trade. Despite these potential difficulties, relative PPPs typically have been used in prior econometric studies using international data [*e.g.* Summers (1985)].

## Table 3.10. Panel regressions to explain the employment share of the service subsectors [a]

| | Producer services | | Distributive services | | Personal services | | Social services | |
|---|---|---|---|---|---|---|---|---|
| | Restricted model | Full model | Restricted model | Full model | Restricted model | Full model | Restricted model | Full model |
| GDP per capita in PPP | 0.3 *(31.2)*** | 0.2 *(12.3)*** | 0.0 *(1.1)* | 0.0 *(2.4)*** | 0.1 *(13.0)*** | 0.1 *(6.0)*** | 0.3 *(15.4)*** | 0.1 *(3.3)*** |
| Relative price of services [b] | 4.4 *(2.6)*** | 3.3 *(1.5)* | 1.0 *(0.5)* | 1.1 *(0.4)* | –3.0 *(1.2)* | 0.2 *(0.1)* | 6.0 *(1.5)* | 3.1 *(0.7)* |
| Average tax wedge | | –0.1 *(1.5)* | | –0.1 *(1.7)** | | –0.1 *(2.3)*** | | 0.3 *(3.6)*** |
| EPL | | –0.5 *(2.6)*** | | –0.2 *(1.1)* | | –0.1 *(0.6)* | | –0.1 *(0.3)* |
| Product market regulation | | –0.2 *(0.3)* | | –0.3 *(0.3)* | | 0.0 *(0.0)* | | –2.4 *(1.6)* |
| Earnings compression | | –2.3 *(1.4)* | | 3.1 *(2.3)*** | | –0.1 *(0.1)* | | 1.7 *(0.8)* |
| Female participation rate | | 0.0 *(2.1)*** | | –0.1 *(5.3)**** | | 0.0 *(1.7)** | | 0.2 *(7.5)**** |
| Size of the welfare state | | 0.2 *(2.1)*** | | 0.0 *(0.5)* | | –0.1 *(1.0)* | | 0.5 *(5.1)**** |
| Number of countries | 24 | 14 | 25 | 15 | 24 | 14 | 24 | 14 |
| R-squared | 0.73 | 0.86 | 0.00 | 0.31 | 0.00 | 0.28 | 0.33 | 0.66 |
| Wald test [c] | 1 009*** | 604*** | 1 | 41*** | 168*** | 150*** | 245*** | 371*** |
| Breusch and Pagan test [d] | 948*** | 181*** | 1 238*** | 691*** | 978*** | 333*** | 1 000*** | 347*** |
| Hausman test [e] | 0.1 | 6.9 | 0.4 | 70.2*** | 0.0 | 19.8*** | 0.0 | 8.6 |

*, ** and *** mean statistically significant at the 10%, 5% and 1% levels respectively.

*a)* Generalised Least Squares (GLS) estimates for the random-effects (unbalanced) panel model over fifteen years (1984-1998). Absolute values of *t*-statistics in parenthesis. Regressions also contain a constant term.

*b)* PPP for services divided by PPP for goods.

*c)* Wald test for joint significance of regressors (Chi-square statistic).

*d)* Breusch and Pagan Lagrangian multiplier test for presence of country effects (Chi-square statistic).

*e)* Hausman test for misspecification of the random-effects model (Chi-square statistic).

*Sources and definitions:* See Annex 3.A for the dependent variables and see Annex 3.B for the explanatory variables.

## Table 3.11. Panel regressions to explain the employment share of selected service activities [a]

| | Business and professional services | | Retail trade | | Hotels and restaurants | | Health services | |
|---|---|---|---|---|---|---|---|---|
| | Full model | Modified full model | Full model | Modified full model | Full model | Modified full model | Full model | Modified full model |
| GDP per capita in PPP | 0.2 *(11.7)*** | 0.2 *(8.7)*** | 0.1 *(3.9)*** | 0.1 *(3.8)*** | 0.1 *(6.3)*** | 0.1 *(6.6)*** | 0.0 *(1.2)* | 0.0 *(2.4)*** |
| Relative prices of services [b] | –0.1 *(0.0)* | –1.9 *(1.1)* | 1.4 *(0.6)* | 1.6 *(0.6)* | 0.8 *(0.8)* | 0.9 *(1.1)* | 1.6 *(0.7)* | 2.1 *(0.9)* |
| Average tax wedge | 0.0 *(0.6)* | 0.0 *(0.9)* | 0.0 *(0.7)* | 0.0 *(0.7)* | –0.1 *(2.7)*** | –0.1 *(3.9)*** | 0.1 *(2.6)*** | 0.1 *(1.8)** |
| EPL | –0.3 *(2.1)*** | –0.4 *(2.3)*** | –0.2 *(1.9)** | –0.2 *(2.0)*** | –0.1 *(0.8)* | 0.0 *(0.4)* | 0.2 *(1.4)* | 0.2 *(1.4)* |
| Product market regulation | –0.3 *(0.5)* | 0.3 *(0.5)* | –0.7 *(0.8)* | –0.5 *(0.5)* | 0.0 *(0.0)* | –0.1 *(0.2)* | –0.2 *(0.2)* | 0.1 *(0.1)* |
| Earnings compression | –2.5 *(1.9)** | –2.7 *(1.9)*** | 2.0 *(2.0)** | 2.1 *(2.0)*** | –2.1 *(2.4)*** | –3.0 *(3.3)*** | 0.5 *(0.4)* | 0.4 *(0.4)* |
| Female participation rate | 0.0 *(2.1)*** | 0.0 *(2.5)*** | –0.1 *(4.7)*** | –0.1 *(4.6)*** | 0.0 *(1.1)* | 0.0 *(2.6)*** | 0.0 *(2.6)*** | 0.0 *(1.6)* |
| Size of the welfare state | 0.1 *(2.1)*** | 0.1 *(1.8)** | –0.1 *(2.0)** | –0.1 *(1.9)** | 0.0 *(0.7)* | 0.0 *(0.1)* | 0.2 *(3.3)*** | 0.2 *(3.3)*** |
| Investment in software and hardware | | 0.3 *(1.5)* | | | | | | |
| Relative tax wedge (Version 2) [c] | | | | –1.4 *(0.6)* | | 2.0 *(1.4)* | | |
| Ageing population | | | | | | | | 0.2 *(3.7)*** |
| Number of countries | 14 | 13 | 15 | 15 | 14 | 14 | 15 | 15 |
| R-squared | 0.79 | 0.82 | 0.49 | 0.44 | 0.55 | 0.71 | 0.49 | 0.54 |
| Wald test [d] | 538*** | 524*** | 37*** | 36*** | 121*** | 139*** | 39*** | 56*** |
| Breusch and Pagan test [e] | 153*** | 99*** | 698*** | 593*** | 316*** | 201*** | 536*** | 425*** |
| Hausman test [f] | 2.4 | 6.8 | 7.1 | 8.8 | 13.6** | 111.1*** | 14.6** | 7.8 |

*, ** and *** mean statistically significant at the 10%, 5% and 1% levels respectively.

*a)* Generalised Least Squares (GLS) estimates for the random-effects (unbalanced) panel model over fifteen years (1984-1998). Absolute values of *t*-statistics in parenthesis. Regressions also contain a constant term.

*b)* PPP for services divided by PPP for goods.

*c)* Ratio of the tax wedge of a single person whose earnings are one third of the average earnings, divided by the tax wedge of a single person whose earnings are one third above the average earnings. See Annex 3.B for more details.

*d)* Wald test for joint significance of regressors (Chi-square statistic).

*e)* Breusch and Pagan Lagrangian multiplier test for presence of country effects (Chi-square statistic).

*f)* Hausman test for misspecification of the random-effects model (Chi-square statistic).

*Sources and definitions:* See Annex 3.A for the dependent variables and Annex 3.B for the explanatory variables.

services are predominantly public, the latter finding may reflect reverse causality, namely, that the expansion of collective social services is associated with higher tax levels.

- Stricter regulation relating to employment protection reduces the employment share of producer services, suggesting that flexible forms of employment may be particularly important for this subsector.
- Greater earnings compression is associated with a higher employment share in distributive and social services, but is insignificant elsewhere. However, the earnings compression coefficient becomes insignificant if wage compression is measured instead over the bottom half of the earnings distribution (*i.e.* by the ratio of the 10th percentile to median earnings). A positive effect is not what would be expected if wage compression is an impediment to job creation in low-skilled services.
- The positive associations between the overall employment share of services and female participation and the size of the welfare state are disproportionately due to changes in the share for the social services. The producer-services share is also positively related to these variables, but this finding is puzzling since it is not evident why either should shift the composition of demand toward producer services.

### D. Determinants of the employment shares of four disaggregated service activities

This subsection presents regression models for the employment shares of more narrowly defined service activities. One disaggregated activity has been selected from each subsector: business and professional services; retail trade; hotels and restaurants; and health services. In each case, coefficients are presented for the *full model* as well as for an extended version of that model that incorporates an additional variable of particular salience for that activity (Table 3.11). In the case of business and professional services, the *modified full model* includes investment in computer software and hardware (as a percentage of GDP) as an additional regressor. In the case of both retail trade, and hotels and restaurants, the *modified full model* includes a relative tax wedge variable that is intended to measure the differential tax impact on low-earning workers. Finally, in the case of health services the *modified full model* includes the relative size of the aged population that is intended to capture the positive relationship between advanced age and the consumption of health care.

- The results for *business and professional services* show that stricter EPL and wage compression lower the employment share,[16] while female participation and welfare-state size have positive effects.
- The results for *retail trade* differ considerably from those obtained for overall distributive services, consistent with this being a particularly heterogenous subsector. The employment share is now significantly negatively related to EPL, consistent with an extensive retail sector being characterised by irregular work schedules and high turnover. The size of the welfare state now has a negative (and significant) impact on retail employment shares, which is difficult to interpret.
- The regression coefficients for the employment share in *hotels and restaurants* are similar to those for personal services, except that the effect of earnings compression is now strongly and significantly negative. This finding is consistent with high labour costs for low-skilled workers being an impediment to hiring in this sector [Piketty (1998)]. However, the relative tax variable that was added to capture another aspect of the relative cost of low-paid workers has a positive sign, which is inconsistent with this interpretation. Female participation has a positive coefficient that is sometimes statistically significant, consistent with increased paid employment among women leading to increased demand for dining out.
- The regression coefficients for the employment share in *health services* largely conform to those found for total social services, except that the impact of female participation and of welfare state size on the employment share is smaller. These differences probably reflect the smaller role for home production and the greater role of market purchases in health care as compared with other social services. The effect of population ageing is positive as expected and highly significant.

## V. Does underdevelopment of service employment explain low employment rates?

The relationship between the service share of employment and overall employment is analysed in this section. Although motivated by policy concerns to increase employment rates in many OECD countries, this analysis is largely restricted to assessing the importance of lower service employment for explaining poorer employment performance in an *accounting* sense. Even where such an analysis attributes a disproportionate role to services, a full *causal* analysis would be required to assess whether sectorally-targeted policies should play an important role in raising employment rates that are depressed by low service employment.

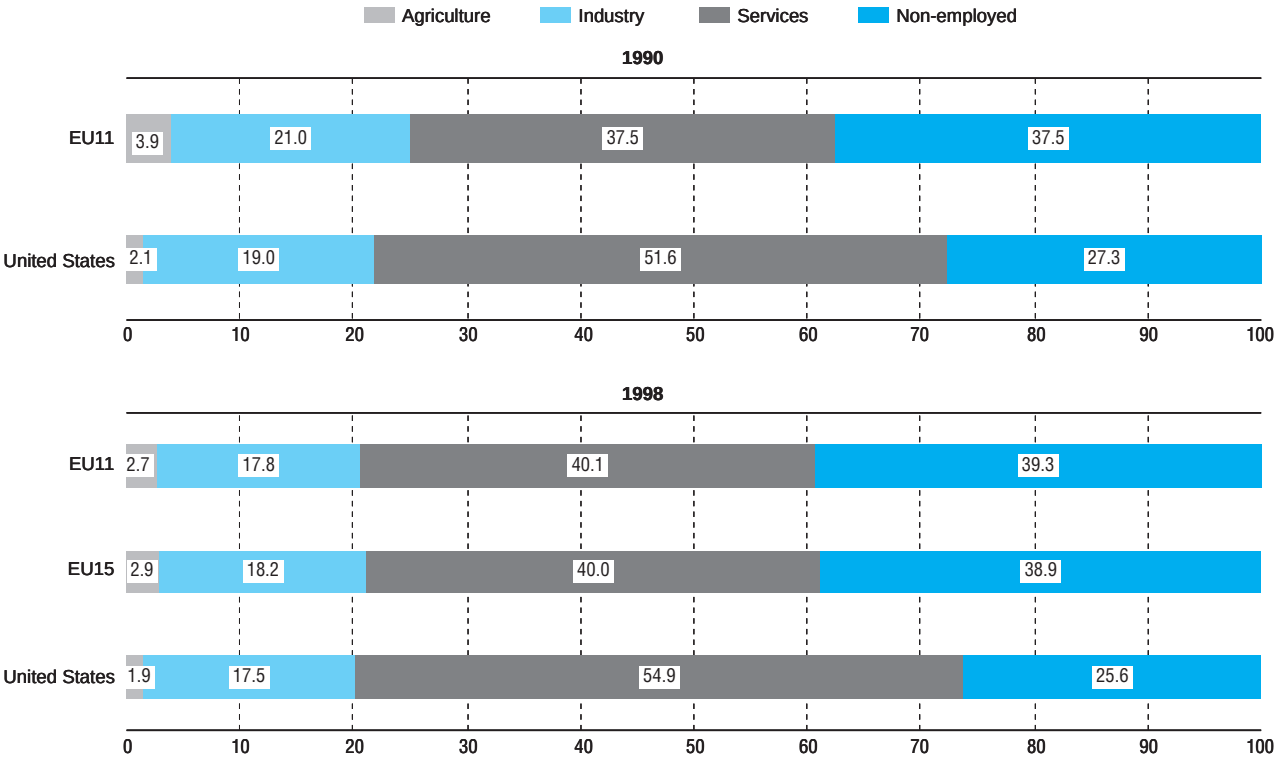
## A. The level of employment in 1998

The European Commission (1998) has recently emphasised that the gap between the EU and the United States in the share of the working-age population that is employed is due to lower service employment. The bottom two bars of Chart 3.7, Panel A present the data underlying this observation. In 1998, 55 per cent of the American working-age population were employed in the service sector, as compared with an average of 40 per cent in the EU area. This gap is slightly larger than the 13 percentage-point gap in overall employment rates. Expanding the comparison to 27 OECD countries confirms that service employment accounts for a disproportionate share of international differences in the overall employment rate (Chart 3.7, Panel B).[17] Expressed differently, countries with above-average service-sector shares of employment also tend to have above-average ratios of employment to the working-age population, with the 1998 correlation coefficient between the service employment share and the overall employment rate being 0.54 (statistically significant at the 1 per cent level).

More detailed analysis (not shown here) indicates that the association between a lower concentration of employment in the service sector and overall employment is largely due to international differences in the size of the producer and social services subsectors (correlations of 0.63 and 0.40 with the overall employment rate). In fact, the correlation is negative (albeit statistically insignificant) between the overall employment rate and the employment shares for distributive and personal services. Among the sixteen disaggregated service activities, specialisations in business and professional services, real estate, health services and other social services are most strongly associated with higher overall employment. By contrast, above-average concentrations of employment in retail trade, hotels and restaurants, and domestic services tend to be associated with below-average employment rates.[18] Clearly, it is critical to differentiate among disaggregated

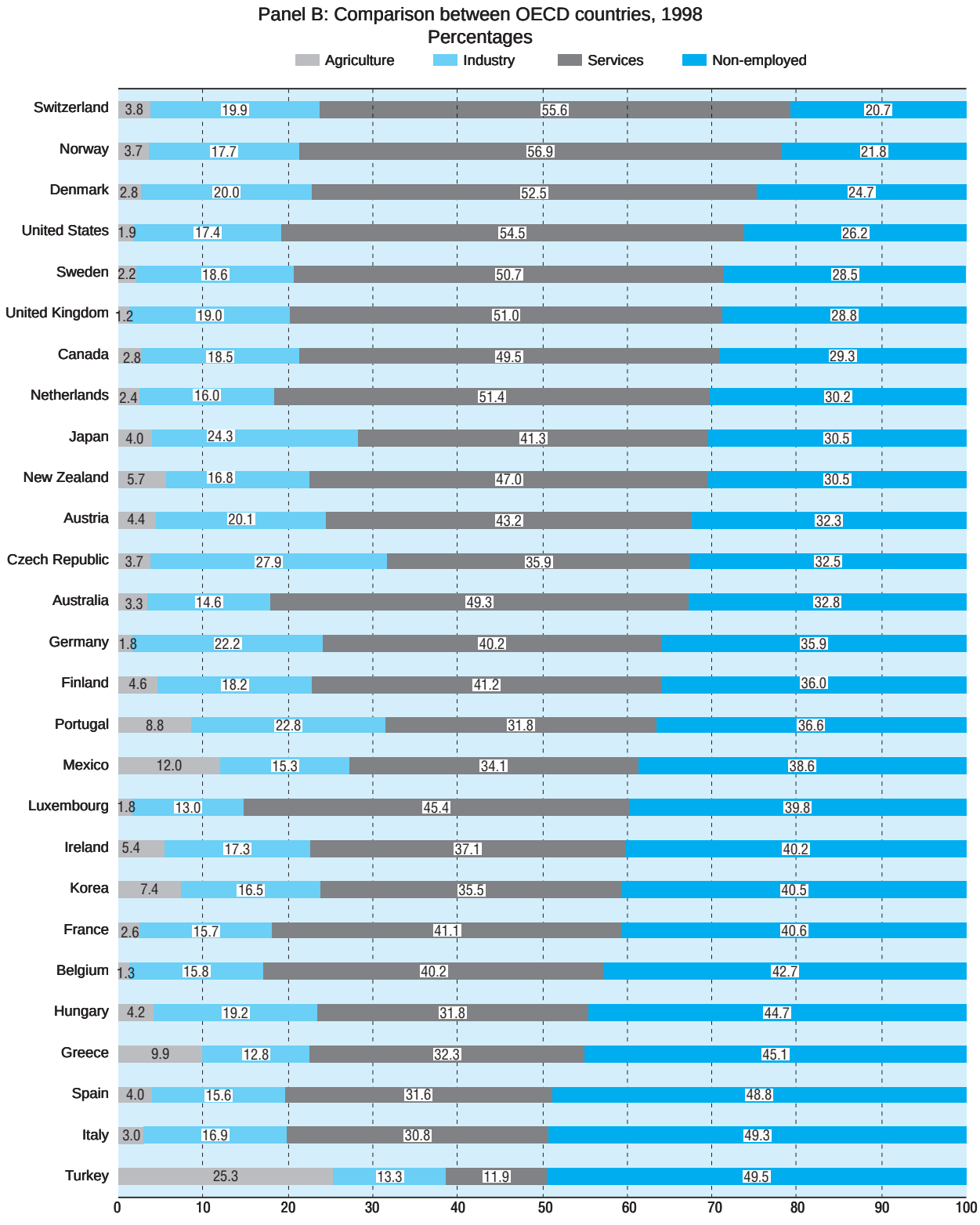
Chart 3.7. **Employment to working-age population ratios by sector**

Panel A: Comparisons between the European Union and the United States, 1990 and 1998[a]
Percentages




*a)* EU11: includes the EU12 countries except Italy.
*Source:* See Annex 3.A.

Chart 3.7. **Employment to working-age population ratios by sector** *(cont.)*




*Source:* See Annex 3.A.

service activities in analysing possible links between greater specialisation in service production and better overall employment performance.

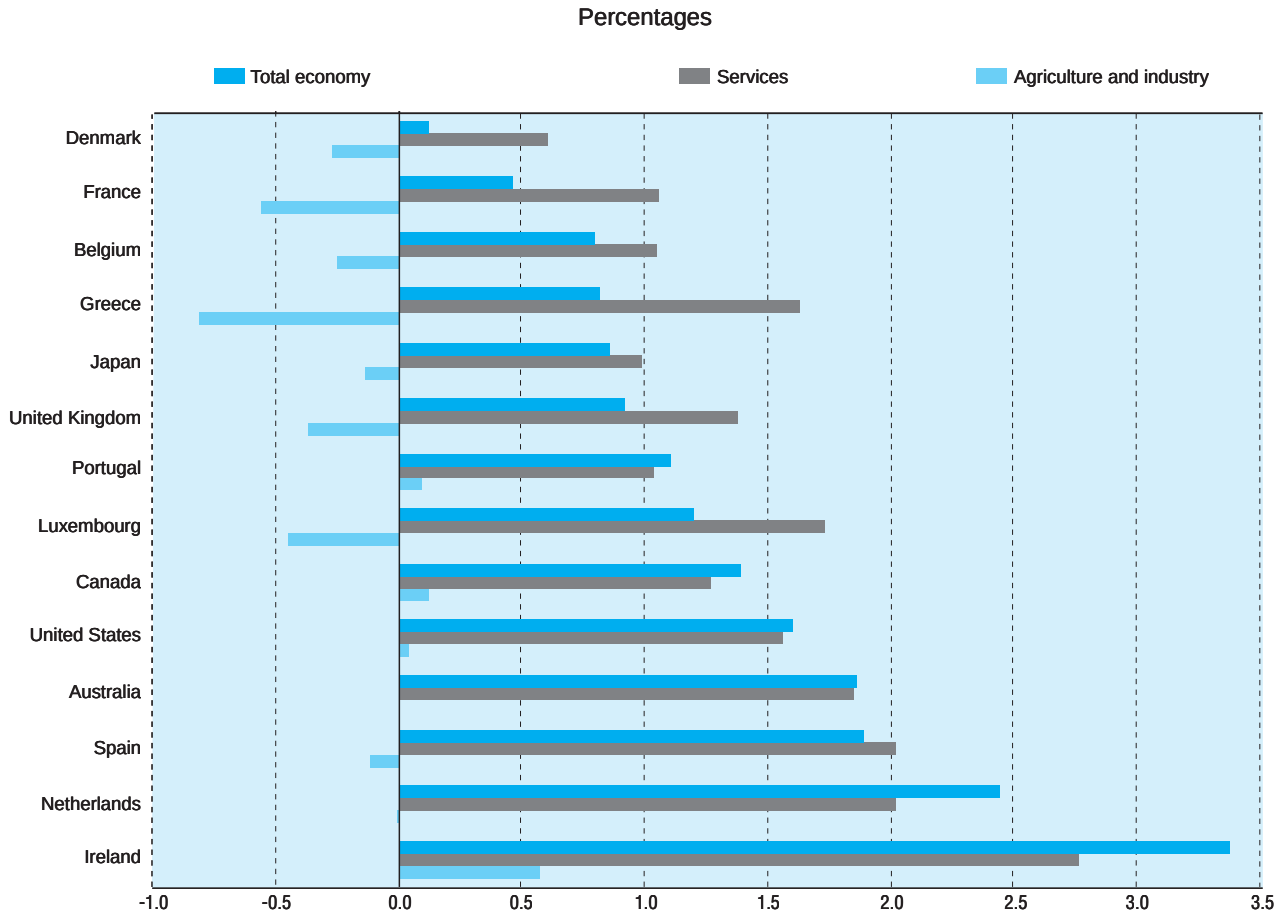
The relative importance of the disaggregated service activities for explaining overall employment changes somewhat when attention is restricted to the comparison of EU countries with the United States [Storrie (2000)]. The US employment advantage compared with the EU average is largely due to higher employment shares for producer services and hotels and restaurants (among the personal services). More generally, the identity of the "critical" industries changes as the group of countries being compared changes. This variability is consistent with the regression results in Section IV, which showed that the employment shares of disaggregated services are affected differently by the underlying economic and demographic environments. It should not be expected that there will be a uniform relationship between the employment shares of the disaggregated service activities and the overall employment rate across countries where these underlying factors vary in complex ways.

The EU employment gap relative to the United States grew by over 3 percentage points during 1990-1998 and 80 per cent of this was due to a more rapid contraction in EU goods-production employment, rather than to stronger US gains in service employment (Chart 3.7, Panel A). This simple calculation suggests that an analysis of the link between service employment shares and employment *growth* is an important complement to the analysis of the link to the *level* of employment.

### B. Employment growth, 1986-98

Chart 3.8 decomposes net employment growth during 1986-1998 between the contributions made by the

Chart 3.8. **Sectoral contribution to annualised employment growth, 1986-1998**[a]




*a)* For Australia, Canada and the Netherlands, total employment growth is calculated over the period 1987 to 1998.
*Source:* See Annex 3.A.

goods-producing and service sectors for fourteen OECD countries (see Box 2 for an explanation of the calculations used to quantify sectoral contributions to employment growth). Virtually all net employment growth is due to increased service employment. Indeed, job losses in agriculture and industry partially offset job gains in services in one-half of the countries. This simple analysis suggests that policy makers probably should look to services as the dominant source of further employment gains, but also demonstrates that below-average employment

### *Box 2.* Measures used in the sectoral analysis of net employment growth

**Definition of terms:**

- Annualised net employment growth (EG) in country i:

$$EG_i = \sum_{j=1}^{21} (N_{ijT} - N_{ij0}) / (T * \sum_{j=1}^{21} N_{ij0}),$$

where $N_{ijt}$ denotes employment in country i, sector j and year t.

- Sectoral contribution (SC) to annualised employment growth of sector j in country i:

$$SC_{ji} = EG_{ij} * W_{ij0},$$

where $EG_{ij}$ is employment growth in country i and sector j:

$$EG_{ij} = (N_{ijT} - N_{ij0}) / (T * N_{ij0}),$$

and $W_{ij0,}$ is the share of sector j in total employment at the initial date:

$$W_{ij0} = N_{ij0} / \sum_{j=1}^{21} N_{ij0}.$$

- Growth in country i assuming a common initial distribution (CID):

$$CID_i = \sum_{j=1}^{21} (EG_{ij}) * \overline{W_{j0}},$$

where $\overline{W_{j0}}$ is the employment share of sector j in the overall sample at the initial date:

$$\overline{W_{j0}} = \sum_{i=1}^{n} N_{ij0} / \sum_{i=1}^{n} \sum_{j=1}^{21} N_{ij0}.$$

- Growth in country i assuming common sectoral growth rates (CSG):

$$CSG_i = \sum_{j=1}^{21} \overline{EG_j} * W_{ij0},$$

where $\overline{EG_j}$ is the annualised employment growth of sector j in the overall sample:

$$\overline{EG_j} = \left( \sum_{i=1}^{n} N_{ijT} - \sum_{i=1}^{n} N_{ij0} \right) / \sum_{i=1}^{n} N_{ij0}.$$

**Shift-share decomposition:**

- Relative annualised employment growth (REG) in country i: $REG_i = EG_i - \overline{EG}$, where $\overline{EG}$ is the annualised employment growth in the overall sample.
- Competitive effect (CE) in country i: $CE_i = CID_i - \overline{EG}$
- Sectoral-mix effect (SE) in country i: $SE_i = CSG_i - \overline{EG}$
- Residual (R) in country i: $R_i = REG_i - CE_i - SE_i$.

performance is often a result of large losses of goods-producing jobs in addition to small gains in service jobs.[19]

Shift-share analysis provides a more comprehensive assessment of the links between the sectoral mix of employment and international differences in employment growth [Ray and Harvey (1995)]. The difference in overall growth performance between a given country and average growth for all countries is decomposed into three (additive) terms: the *competitive effect*, which measures the importance of differences between the sector-specific growth rates in that country and the sector-specific rates averaged over all countries; the *sectoral-mix effect*, which measures the impact of differences between the initial sectoral mix of employment in that country and the average mix for all countries; and a *residual* term which measures whether the employment performance of that country tends to be better – relative to all countries – in the sectors in which it is specialised (see Box 2).

Table 3.12 presents the shift-share decomposition of relative growth performance. Countries are listed in descending order of their 1986-1998 employment growth rates (column 1). The columns to the right then decompose these into the three shift-share terms. This decomposition is performed for three levels of sectoral detail so as to provide a test of robustness.[20] The results are very similar in all three cases, with the exception of a small number of countries for which the most detailed version is heavily influenced by growth rates in a single detailed service sector. For this reason, the decomposition for an intermediate, nine-sector case is used when specific results are cited below.

The main findings are:

- The competitive effect explains the largest part of cross-country variation in employment growth. The correlation between actual employment growth and the competitive effect, which represents a "simulation" of how well a country would have fared if it had begun with the average sectoral mix but maintained its sector-specific growth rates, is 0.80. The implication is that countries in which employment grew fastest tended to have above-average gains across all sectors.[21] This suggests either that economy-wide factors have been the dominant determinants of international differences in employment growth or that the presence of one or a few especially dynamic sectors generates "spillover" effects that raise growth rates in the rest of the economy.
- The sectoral-mix effect is relatively small for almost all countries and is uncorrelated with overall performance. In other words, differences in the sectoral mix of employment in 1986 accounted for very little of the international differences in employment growth over the succeeding 12 years. The one exception to this assessment is that the four countries in the sample with the largest concentrations of employment in agriculture (Greece, Ireland, Portugal and Spain) have negative sectoral-mix effects that are large in magnitude, reflective of their relative specialisation in a declining sector.
- The residual effect also tends to be small and is weakly negatively correlated with overall growth performance. The negative correlation reflects the tendency towards convergence in sectoral mix that was analysed in Section II, since a negative residual term implies a tendency for countries to perform relatively better (worse) in the sectors in which they begin with a below-average (above-average) employment share.[22] The residual takes a large negative value for the four countries with the highest agricultural shares of employment, indicative of the rapid rate at which employment is shifting out of agriculture in these countries.
- In evaluating possible links between the sectoral mix of employment and growth rates within individual sectors, it is crucial to differentiate countries where agriculture is still shedding large numbers of worker from those where the major job losses in this sector have already occurred. While the overall correlation between the competitive and sectoral-mix effects is negative (–0.58), these two effects are positively related within the high- and low-agriculture-share countries (Chart 3.9). The positive association within the two semi-homogenous subgroups may reflect positive spillover effects from being specialised in sectors with the strongest growth prospects. It is unclear why the four high-agricultural-share countries enjoyed above-average growth rates within most individual sectors during 1986-1998 and it should not be concluded that specialisation in a declining sector is generally good for growth.

## Conclusions

Service employment continues to grow as a share of total employment in OECD countries, approaching three-quarters of all jobs in several countries by the end of the 1990s. While the increasing numerical dominance of service jobs is a universal trend, the implications for employment opportunities and labour-market policy-making are not straightforward. One complication is the great diversity of service employment as demonstrated by the comparisons among the four service subsectors and their sixteen constituent activities. Another complication is that international

## Table 3.12. Shift-share analysis of employment growth, 1986-1998 [a]

| | Relative annualised growth [b] | Competitive effect [c] | | | Sectoral-mix effect [d] | | | Residual [e] | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 3 sectors | 9 sectors | 21 activities | 3 sectors | 9 sectors | 21 activities | 3 sectors | 9 sectors | 21 activities |
| Ireland | 1.99 | 2.77 | 2.93 | 4.43 | –0.44 | –0.45 | –0.41 | –0.34 | –0.48 | –2.02 |
| Netherlands | 1.07 | 0.70 | 0.67 | 1.02 | 0.03 | 0.05 | 0.03 | 0.34 | 0.35 | 0.02 |
| Spain | 0.51 | 1.37 | 2.04 | 4.60 | –0.48 | –0.60 | –0.70 | –0.38 | –0.94 | –3.39 |
| Australia | 0.48 | 0.41 | 0.46 | 0.55 | 0.07 | 0.04 | 0.10 | 0.00 | –0.02 | –0.17 |
| United States | 0.22 | 0.14 | 0.12 | 0.13 | 0.15 | 0.19 | 0.20 | –0.07 | –0.09 | –0.12 |
| Canada | 0.01 | –0.01 | –0.05 | –0.07 | 0.06 | 0.05 | 0.15 | –0.03 | 0.01 | –0.07 |
| Luxembourg | –0.18 | –0.12 | 0.16 | 4.31 | 0.01 | 0.05 | –0.19 | –0.08 | –0.39 | –4.29 |
| Portugal | –0.27 | 0.49 | 0.93 | 2.08 | –0.72 | –0.81 | –0.97 | –0.04 | –0.38 | –1.38 |
| United Kingdom | –0.47 | –0.32 | –0.22 | –0.10 | –0.02 | –0.04 | –0.06 | –0.12 | –0.20 | –0.30 |
| Japan | –0.51 | –0.23 | –0.47 | .. | –0.31 | –0.22 | .. | 0.02 | 0.18 | .. |
| Greece | –0.56 | 0.75 | 1.13 | 1.16 | –0.82 | –0.93 | –0.93 | –0.48 | –0.76 | –0.80 |
| Belgium | –0.58 | –0.61 | –0.31 | 0.78 | 0.03 | –0.06 | –0.19 | 0.00 | –0.21 | –1.17 |
| France | –0.92 | –0.72 | –0.64 | –0.53 | –0.14 | –0.15 | –0.21 | –0.06 | –0.13 | –0.18 |
| Denmark | –1.25 | –1.03 | –0.89 | –0.52 | –0.09 | –0.01 | –0.16 | –0.13 | –0.36 | –0.57 |
| **Average** | **–0.03** | **0.26** | **0.42** | **1.37** | **–0.19** | **–0.21** | **–0.26** | **–0.10** | **–0.24** | **–1.11** |
| **Standard deviation** | **0.84** | **0.97** | **1.06** | **1.89** | **0.31** | **0.35** | **0.39** | **0.20** | **0.35** | **1.37** |

.. Data not available.

*a)* Countries listed by descending order of the rate of employment growth. For Australia, Canada and the Netherlands the annualised employment change has been calculated for the period 1987-1998.

*b)* Difference between the annualised employment growth in each country and that for the overall sample.

*c)* Difference between the annualised employment growth in each country, assuming a common initial distribution, and actual growth for the overall sample.

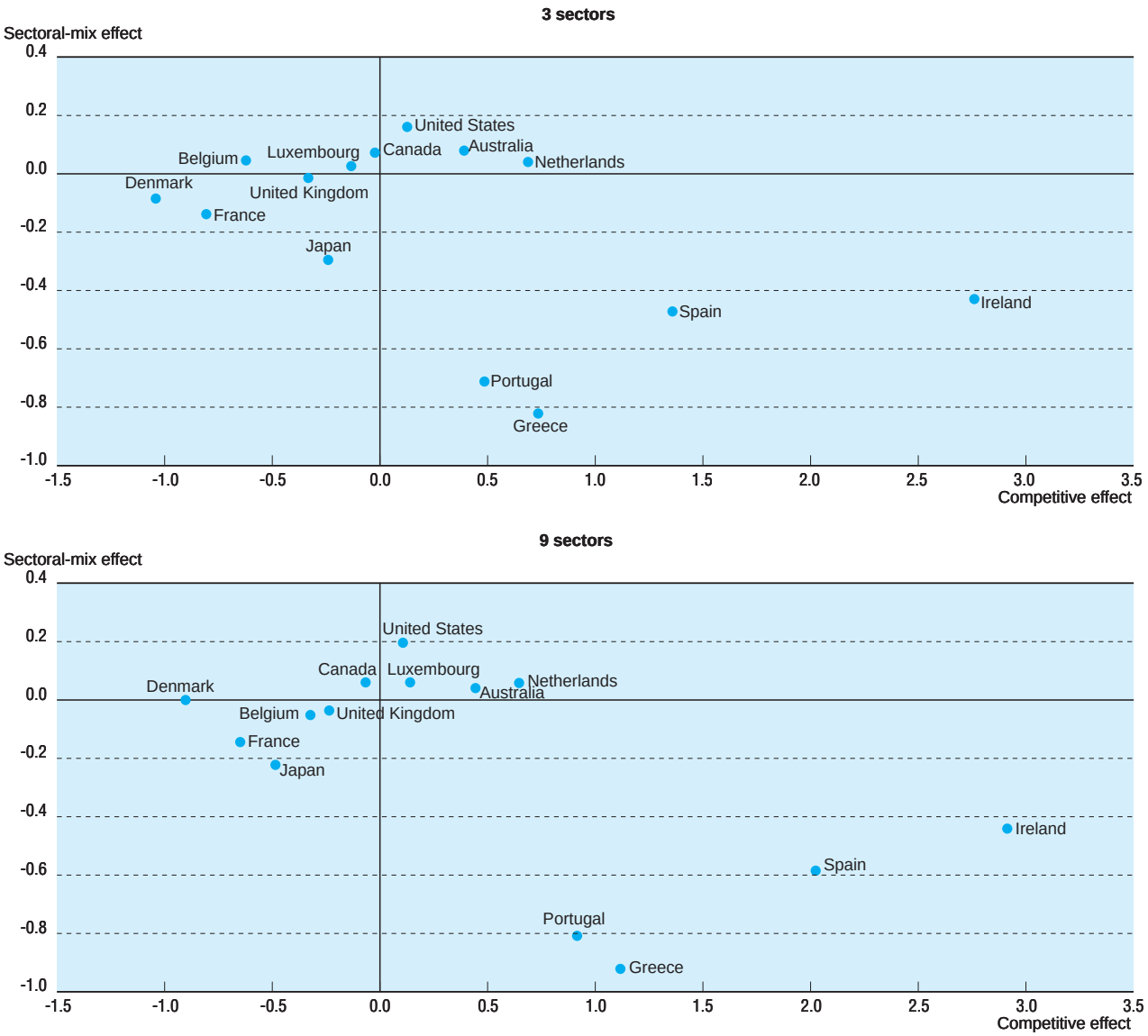
*d)* Difference between the annualised employment growth in each country, assuming common sectoral growth rates, and actual growth for the overall sample.

*e)* Residual = Total relative growth in each country minus the competitive and sectoral-mix effects.

*Source:* See Annex 3.A.

Chart 3.9. **Shift-share analysis of employment growth, 1986-1998**

Competitive and sectoral-mix effects (in percentage points)




*Source:* See Annex 3.A.

differences in the composition of service employment appear to persist, even at similar income levels, due to a myriad of factors such as differences in the participation rate of married women in paid employment, the size of the welfare state, regulatory policy and trade specialisation. International differences are also apparent in the extent to which specific workforce groups are concentrated in particular service activities. It follows that jobs in the service economy will be very diverse and that the job mix is likely to differ substantially between different countries.

How is the rising numerical dominance of service employment affecting the overall availability of jobs? The analysis in this chapter confirms that services account for virtually all net employment growth in OECD countries. However, it also shows that there is little link between the

sectoral mix of employment and overall employment growth. Countries in which employment has grown fastest have tended to enjoy above-average gains across all sectors. This suggests either that economy-wide factors have been at play or that the presence of especially dynamic sectors generates "spillover" effects that raise growth in the rest of the economy.

The sustained increase in the service employment share also raises the question of whether important mismatches are developing between the evolving job structure and the qualifications and career aspirations of the workforce. The analysis of educational qualifications and occupational mix indicates that the shift of employment toward services increases the premium on formal schooling and cannot be broadly characterised as a trend toward "bad" jobs. Thus, improving workforce education levels is one element of a programme to minimise mismatch. Nonetheless, even the most advanced service economies continue to generate a considerable number of jobs in low-skilled occupations, as well as an increase in the share of part-time and temporary jobs. Whether that constitutes a problem to be addressed by policy depends on the skills, family income needs and labour supply preferences of the workers who hold these jobs. It is intended that a sequel chapter will be published in the 2001 issue of the *Employment Outlook* that will analyse job quality in the service sector more closely, as well as any possible trade-offs between the quality and quantity of service jobs.

## NOTES

1. The service sector corresponds to ISIC Rev 3 major divisions G to Q. Annex 3.A provides additional technical details related to the measurement of service sector employment, including the adjustments made for countries not using ISIC Rev 3.
2. As Gershuny (1978) has emphasised, there is also considerable substitutability between personal and social services (*e.g.* restaurant meals and institutional child care) and self-servicing by households (*e.g.* home-cooked meals and familial child care). This chapter only presents data on service activities involving paid-employment.
3. This does not imply that the distinction between service activities performed in-house and those outsourced is without economic significance. For example, specialised service firms can frequently achieve higher levels of efficiency, in which case increased outsourcing represents a further development of the division of labour.
4. Elfring's taxonomy is closely related to those used by earlier researchers [Gershuny (1978); Hill (1977); Singelmann (1978)], which he adapted to facilitate international comparisons.
5. A potential weaknesses of Elfring's taxonomy is that it is not especially well suited to highlight the role of information and communications technology (ICT) in reshaping employment. To some extent, "new economy" workers can be isolated in the "business and professional" and "communications" service activities, but these activities are split between the producer and distributive services subsectors, within which they are grouped with activities that are less ICT intensive. A second limitation is that the distributive services subsector groups retail trade – which is widely perceived to generate many low-paid, low-skill jobs – with activities that appear to offer very different employment conditions and to be technologically more progressive (*e.g.* communications and transportation).
6. Turkey, where an initially low service share declined modestly during 1989-1998, is an exception. The primary reallocation of labour remains that from agriculture to industry.
7. The dissimilarity index for countries 1 and 2 is calculated as $D_{1,2}=\Sigma_i |S_{i,1}-S_{i,2}|$, where $S_{i,j}$ is defined as the employment share of sector i in country j.
8. The United States was chosen as a point of reference because it has often been viewed as being the "pace-setting" country in the evolution of the service economy. This choice is not intended to imply that it is desirable for other countries to have the same industrial structure as the US.
9. A high tax wedge or a compressed wage distribution will tend to increase the relative cost of low-skilled workers and may discourage employment in sectors such as retail trade or hotels and restaurants [Piketty (1998); Davis and Henrekson (2000); Freeman and Schettkat (2000)]. Similarly, strict product market regulation may act as a tax on entrepreneurialism, which may disproportionately affect certain producer and personal services [Krueger and Pischke (1997)].
10. One consequence of increasing female participation is that households have less time to devote to household "service" tasks (*e.g.* laundering, cooking, cleaning, taking care of children, elder, or ill family members, washing the car). Hence, the increasing share of dual-earner households is linked to a greater demand for market services, in particular social and personal services.
11. Since service industries disproportionately employ women, an exogenous increase in the size of the service sector could encourage more women to enter the labour market.
12. Valletta (1997) shows that average wages are lower and earnings dispersion higher in the service sector than in the goods sector in the United States, such that an increase in the service-sector share increases the overall level of earnings inequality.
13. The Hausman test does not indicate a misspecification problem due to the choice of a random-effects model, but the Breusch and Pagan test does indicates that significant country differences in the service employment share remain after controlling for the two core variables. The full model adds additional regressors that are intended to account for some of this remaining variation.
14. One difficulty in estimating the full model is that the limited availability of some of the regressors causes 10 of the original 25 countries to drop from the sample.
15. The relative price of services variable is typically insignificant in the subsector regressions, probably due to it being a services-wide measure rather than a relative productivity measure specific to each subsector.
16. Davis and Henrekson (2000) also find that overall wage compression reduces employment shares for industries characterised by relatively high wage dispersion.
17. Cross-country comparisons also demonstrate that employment rates differ significantly *within* the EU. For example, Denmark has an equivalent level of service employment as the United States and a higher overall employment rate.

18. The results for retail trade, and hotels and restaurants suggest that Piketty's (1998) finding, that higher employment in these activities accounts for much of the US employment advantage over France, does not generalise to comparisons among OECD countries generally.

19. Another implication is that some countries with below-average employment growth must nonetheless manage rapid shifts of employment from the goods- to service-employing sectors [European Commission (2000)].

20. The three and twenty-one-sector versions are the same as used to calculate dissimilarity indices in Table 3.3, while the nine-sector version differentiates among the five goods-producing and four service subsectors.

21. Garibaldi and Mauro (1999) reach the same conclusion using similar techniques but somewhat different years and countries.

22. The residual term is sometimes interpreted as a measure of the extent to which a country is specialised in those sectors in which it enjoys a competitive advantage [Ray and Harvey (1995)]. But, this adopts a static notion of comparative advantage that implies that the industrial mix of countries should tend to diverge in order to fully exploit gains from specialisation.

# Annex 3.A

## Definition of Service-sector Employment and its Constituent Components

### Definition of industrial groupings

The empirical analysis in this chapter adopts the definition of services that was established by the United Nations in Revision 3 of the International Standard Industrial Classification of all Economic Activity (ISIC Rev. 3). Total service-sector employment is divided into 4 subsectors and 16 activities proposed by Elfring (1989), which differ somewhat from the subcategories used in the ISIC. The major difference between Elfring's groupings and those used in the ISIC is in the way in which he reaggregates the detailed ISIC service industries to form four service subsectors (producer, distributive, personal and social services). The mapping between the 292 4-digit industry classes in ISIC Rev. 3 and the industrial groupings introduced by Elfring and used here is provided in Table 3.A.1. An analogous mapping is provided for the 503 4-digit industry classes used in Revision 1 of the General Industrial Classification of Economic Activities within the European Communities (NACE Rev. 1), which is used by EU Countries and is closely related to the ISIC Rev. 3.

Table 3.A.1. **Definition of sectors used in the empirical analysis**

| Sector | ISIC Rev. 3 code [a] | NACE Rev. 1 code [b] |
|---|---|---|
| **Agriculture, hunting and forestry** | 0112-0500 | 01.11-05.02 |
| **Mining and quarrying** | 1010-1429 | 10.10-14.50 |
| **Manufacturing** | 1511-3720 | 15.11-37.20 |
| **Electricity, gas and water supply** | 4010-4100 | 40.10-41.00 |
| **Construction** | 4510-4550 | 45.11-45.50 |
| **Producer services** | | |
| Business and professional services | 7111-7129 and 7210-7499 | 71.10-71.34 and 72.10-74.84 |
| Financial services | 6511-6599 and 6711-6719 | 65.11-65.23 and 67.11-67.13 |
| Insurance | 6601-6603 and 6720 | 66.01-66.03 and 67.20 |
| Real estate | 7010-7020 | 70.11-70.32 |
| **Distributive services** | | |
| Retail trade | 5010, 5030-5050 and 5211-5259 | 5010, 50.30-50.50 and 52.11-52.63 |
| Wholesale trade | 5110-5190 | 51.11-51.70 |
| Transportation | 6010-6309 | 60.10-63.40 |
| Communication | 6411-6420 | 64.11-64.20 |
| **Personal services** | | |
| Hotels and restaurants | 5510-5520 | 55.11-55.52 |
| Recreational and cultural services | 9211-9249 | 92.11-92.72 |
| Domestic services | 9500 | 95.00 |
| Other personal services | 5020, 5260-5260, 7130 and 9301-9309 | 50.20, 52.71-52.74, 71.40 and 93.01-93.05 |
| **Social services** | | |
| Government proper | 7511-7530 and 9900 | 75.11-75.30 and 99.00 |
| Health services | 8511-8520 | 85.11-85.20 |
| Educational services | 8010-8090 | 80.10-80.42 |
| Miscellaneous social services | 8531-9199 | 85.31-91.33 |

*a)* The United Nations' International Standard Industrial Classification of All Economic Activities [United Nations (1990)].
*b)* The European Union's General Industrial Classification of Economic Activities within the European Communities [EUROSTAT (1996)].

Three difficulties arise in implementing Elfring's industry classification that reduce international and intertemporal comparability. First, some countries use neither the ISIC nor the NACE. For example, Canada and the United States use the North American Industry Classification System (NAICS). These countries are handled on a case-by-case basis, working from the most detailed level of industrial sectors available. In all cases, these are detailed enough to allow industrial groupings to be specified in a manner that is largely consistent with ISIC-based definitions.

The periodic revision of industry classifications complicates the making of intertemporal comparisons. The ISIC Rev. 3 and the NACE Rev. 1 were developed in parallel in the late 1980s and phased in during the early 1990s in countries using these classifications. Thus, the data for most of the countries studied have a historical discontinuity sometime during the study period, with the exact date differing between countries (and between data sources within some countries). Approximate "crosswalks" are available for converting between successive version of these classifications, but they are not exact.

A final problem is that some of the survey data used in the chapter are only available at a more aggregated (*i.e.* "2-digit") level. This is the case for European Labour Force Survey data provided by EUROSTAT. When using these sources, it is not possible to separate out repair and real estate services that constitute final household consumption and, hence, some employment that ideally would be allocated to personal services is instead assigned to producer services. The less accurate mapping used is these cases is presented in Table 3.A.2.

## Data sources

Table 3.A.3 identifies the sources of the data on employment by sector that are analysed in this chapter. With one exception, these data were provided to the OECD by national statistical offices and EUROSTAT. In the case of the United States, the OECD Secretariat did all calculations using microdata. The original industrial classification, which was used to group the data into these twenty-one sectors, is also indicated in Table 3.A.3.

Table 3.A.2. **Approximate mapping using 2-digit sectors for the European Union**

| Sector description | NACE Rev. 1 codes | NACE 1970 codes |
|---|---|---|
| **Agriculture, hunting and forestry** | 01, 02 and 05 | 01, 02 and 03 |
| **Mining and quarrying** | 10 to 14 | 11 to 15, 21 and 23 |
| **Manufacturing** | 15 to 37 | 22, 24 to 49 |
| **Electricity, gas and water supply** | 40 to 41 | 16, 17 |
| **Construction** | 45 | 50 |
| **Producer services** | | |
| Business and professional services | 71 to 74 | 83, 84 and 94 |
| Financial services | 65 and 67 | 81 |
| Insurance | 66 | 82 |
| Real estate | 70 | 85 |
| **Distributive services** | | |
| Retail trade | 50 and 52 | 64, 65 and 67 |
| Wholesale trade | 51 | 61 to 63 |
| Transportation | 60 to 63 | 71 to 77 |
| Communication | 64 | 79 |
| **Personal services** | | |
| Hotels and restaurants | 55 | 66 |
| Recreational and cultural services | 92 | 97 |
| Domestic services | 95 | 9A |
| Other personal services | 93 | 98 |
| **Social services** | | |
| Government proper | 75 and 99 | 91 and 9B |
| Health services | 85 | 95 |
| Education services | 80 | 93 |
| Miscellaneous social services | 90 to 91 | 92 and 96 |

*Source:* EUROSTAT (1996).

## Table 3.A.3. Overview of data on employment by sector

| Country | Data source | Identification of 21 economic sectors |
|---|---|---|
| **Australia** | Labour Force Survey. | All 21 sectors are identified using detailed Australian and New Zealand Standard Industrial Classification (ANZSIC) industries. |
| **Canada** | Labour Force Survey. | All 21 sectors are identified using detailed North American International Classification Standard (NAICS) industries. |
| **Czech Republic** | Employment and Household Survey. | All 21 sectors are identified using NACE Rev. 1. |
| **Austria, Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom** | European Labour Force Survey, EUROSTAT. | All 21 sectors are identified using NACE 2-digit industries, with Rev. 1 being phased in at different times during the 1990s. |
| **Italy** | Labour Force Survey. | All 21 sectors are identified using NACE Rev. 1 2-digit industries. |
| **Hungary** | Labour Force Time Series 1993-1996. | All 21 sectors are identified using NACE Rev. 1 2-digit industries. |
| **Japan** | Labour Force Survey. | The 5 goods subsectors, along with total services and several of its components, are identified using groupings from the Standard Industrial Classification for Japan. |
| **Korea** | The Economically Active Population Survey. | The 5 goods subsectors, along with total services and several of its components, are identified using the ISIC Alphabetic codes (Rev. 3 introduced in 1992). |
| **Mexico** | National Employment Survey. | All 21 sectors are identified using ISIC Rev. 3. |
| **New Zealand** | Household Labour Force Survey (HLFS). | All 21 sectors are identified using detailed Australian and New Zealand Standard Industrial Classification (ANZSIC) industries. |
| **Norway** | Labour Force Survey. | All 21 sectors are identified using NACE Rev. 1. |
| **Switzerland** | Labour Force Survey (ESPA). | All 21 sectors are identified using NACE Rev. 1. |
| **Turkey** | Labour Force Survey. | The 5 goods subsectors, along with total services and several of its components, are identified using the ISIC Rev. 1. |
| **United States** | Current Population Survey (OECD calculations from outgoing rotation group, microdata file). | All 21 sectors are identified using detailed (three-digit) industry codes from the census of the population. |

# *Annex 3.B*

## Definitions and Data Sources of the Explanatory Variables Used in Section IV

### Institutional and policy variables

#### *Earnings compression*

*Definition*: This variable is measured as the ratio of the 10th to the 90th percentiles of the earnings distribution. Generally, these are gross earnings ratios, except for France. Earnings are either annual (*i.e.* Canada, Finland, France, the Netherlands, Spain, Sweden and Switzerland), monthly (*i.e.* Austria, the Czech Republic, Germany, Hungary, Italy, Japan, Korea and Poland), weekly (*i.e.* Australia, Belgium, Ireland, New Zealand, Portugal, the United Kingdom and the United States) or hourly (*i.e.* Norway). Normally the data refer to full-time full-year earnings, except for Austria, Denmark and Norway, which include all employees.

In principle, all years from 1984 to 1998 have been used. However, in a large number of cases only a subset of these years were available: Australia, from 1985 to 1995 and from 1997 to 1998; Austria: 1996; Belgium and Germany: from 1984 to 1995; Canada: from 1984 to 1994; the Czech Republic: 1996 and 1997; Denmark: from 1984 to 1990; Finland, France, Sweden: from 1984 to 1996; Hungary: from 1986 to 1998; Ireland: 1994; Italy: from 1986 to 1996; Japan, New Zealand, Poland: from 1984 to 1997; Korea: from 1984 to 1996; the Netherlands: 1984 to 1995; Norway: from 1984 to 1991; Portugal: from 1985 to 1993; Spain: 1995; Switzerland: from 1991 to 1998; the United Kingdom and the United States: from 1984 to 1998.

*Source*: OECD DEELSA Earnings Structure Database.

#### *Size of the welfare state*

*Definition*: This variable is defined as the sum of government expenditures on social services and education as a percentage of GDP, which therefore excludes cash transfers. Among the social services included are services for elderly and disabled people, family services, ALMPs, health and education. In general, these data are available from 1984 to 1995.

*Sources*: Except for educational expenditure, government consumption expenditures have been obtained from the OECD, Social Expenditure Database. The following years of data are available: Australia and Austria: 1985 and 1990 to 1995; Belgium: from 1984 to 1990; the Czech Republic: from 1990 to 1995; Denmark, Finland, Portugal, Spain, the United Kingdom and the United States: from 1984 to 1995; France and Mexico: from 1985 to 1995; Germany: from 1985 to 1993; Ireland: 1994 and 1995; Italy and Luxembourg: from 1987 to 1995; Japan and Korea: 1990 to 1995; the Netherlands: 1985 and 1988 to 1995; New Zealand: from 1986 to 1996; Norway: 1985 and from 1988 to 1995.

Educational expenditure was obtained from OECD (1999*d*, 2000*b*), Table B1.1*a*, first and eighth columns entitled "Direct public expenditure for educational institutions", which is only available for the years 1990, 1995 and 1997. Data for Belgium includes only the Flemish community.

#### *Tax wedge*

*Definition*: The tax wedge is measured as the sum of employees' and employers' social security contributions and personal income tax less transfer payments as a percentage of gross labour costs (gross wage earnings plus employers' social security contributions). Data are available for 1995 and 1997, and for all countries except Korea. Three different variables have been constructed using these data:

- *Average tax wedge*: The chosen family type is a two-earner married couple with two children whose combined earnings are one-third above the average production worker's (APW) earnings.
- *Relative tax wedge (version 1)*: Ratio of the tax wedge of a married couple with two children, whose combined earnings are 67 per cent above the APW's earnings divided by the tax wedge of a married couple with two children where one partner receives no earnings from work and the other partner receives the equivalent to the APW's earnings.
- *Relative tax wedge (version 2)*: Ratio of the tax wedge of a single person with no children whose earnings are equivalent to 67 per cent of the APW's earnings divided by the tax wedge of a single person with no children whose earnings are 67 per cent above the APW's earnings.

*Sources*: OECD Analytical Database (Economics Department), as published in OECD (1997*b*), Table 5, page 384, and OECD (1998*b*), Table 7, page 37.

### *EPL*

*Definition*: This variable is a summary index of EPL strictness that ranges from 0 to 6 and is available for 27 OECD countries in the late 1980s and in the late 1990s. As described in OECD (1999*e*), Chapter 2, this summary index weights provisions for regular and temporary employment equally, but legislation concerning collective dismissals is not included.

*Source*: OECD (1999*e*), Chapter 2, Table 2.5 (version 1).

### *Product market regulation*

*Definition*: This is a summary indicator which has been obtained by means of factor analysis. The taxonomy of regulations included in this indicator can be divided in four groups: state control; barriers to entrepreneurship; explicit barriers to trade and investment; and other regulatory barriers. This variable is available for all OECD countries except Iceland and Luxembourg.

*Source*: Nicoletti *et al.* (2000), Table A3.7, p. 80.

### *Co-ordination of collective bargaining*

*Definition*: This index variable ranges from 0 to 2.5, according to the degree of co-ordination in bargaining [see OECD (1997*a*), Chapter 3, for more details]. This measure reflects both union and employer co-ordination and is available for the years 1990 and 1994 for all OECD countries except the Czech Republic, Finland, Greece, Hungary, Ireland, Korea, Luxembourg, Mexico, Poland and Turkey.

*Sources*: OECD DEELSA database. Data have also been published in OECD (1997*a*), Chapter 3, Table 3.3.

### *Centralisation of collective bargaining*

*Definition*: This index ranges from 0 to 2.5, according to the prevailing bargaining level [see OECD (1997*a*), Chapter 3 for more details]. The measure reflects both union and employer centralisation and is available for the years 1990 and 1994 for all OECD countries except the Czech Republic, Finland, Greece, Hungary, Ireland, Korea, Luxembourg, Mexico, Poland and Turkey.

*Sources:* OECD DEELSA database. Data have also been published in OECD (1997*a*), Chapter 3, Table 3.3.

## Economic and demographic variables

### *Real GDP per capita in PPP*

*Definition*: Gross domestic product expressed in thousands of US dollars using PPPs divided by the population. This variable is available for all countries except Turkey.

*Source*: OECD Analytical Database (Economics Department).

### *Relative price of services*

*Definition*: PPP for all services divided by PPP for all goods. This variable is available for all countries except Korea.

*Sources*: OECD (1999*c*), Table 2, page 82.

### *Investment in hardware and software*

*Definition*: Physical investment in computer hardware and software as a percentage of gross domestic product. This variable is available for years 1985 and 1995 for all OECD countries except the Czech Republic, Hungary, Korea, Luxembourg and Poland.

*Sources:* OECD (1998*c*), Annex Table 2.5, page 251.

### *Female participation*

*Definition*: Female labour force participation rate for the age group 15-64. This variable is available for all years from 1984 to 1998 and for all OECD countries except Korea.

*Sources*: OECD Analytical Database (Economics Department).

### *Ageing population*

*Definition*: Share of persons older than 65 in the total population. This variable is available for all years from 1984 to 1998 and for all OECD countries.

*Sources:* OECD Analytical Database (Economics Department).

# *Annex 3.C*

## Employment Shares in Services: Detailed Tables

Table 3.C.1 provides detailed information on the evolution of the share of service employment during 1984-1998 and Table 3.C.2 provides estimates of sectoral contributions to employment growth during 1986-1998.

## Table 3.C.1. **Evolution of the share of service employment**[a]

Levels in 1998 (in percentages) and percentage-point changes between 1984, 1989, 1994 and 1998

**Panel A: Total**

| | All services | | | | Producer services | | | | Distributive services | | | | Personal services | | | | Social services | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Changes | | | Level | Changes | | | Level | Changes | | | Level | Changes | | | Level | Changes | | | Level |
| | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 |
| Australia | 0.3 | 3.2 | 1.9 | 73.3 | 0.6 | 0.7 | 1.8 | 14.7 | 0.2 | –0.3 | –0.2 | 24.6 | 0.4 | 1.2 | 0.5 | 11.8 | –0.9 | 1.6 | –0.1 | 22.2 |
| Austria | .. | .. | 3.4 | 63.8 | .. | .. | 1.4 | 10.5 | .. | .. | 0.2 | 22.4 | .. | .. | 0.8 | 9.2 | .. | .. | 1.1 | 21.7 |
| Belgium | 1.1 | 3.0 | 2.3 | 70.2 | 1.3 | 1.6 | 1.8 | 11.7 | –1.0 | –0.5 | –0.2 | 21.8 | –0.2 | 0.9 | 0.6 | 6.8 | 0.9 | 1.0 | 0.2 | 29.8 |
| Canada | 0.1 | 3.4 | –0.4 | 69.9 | 0.7 | 1.4 | 1.4 | 16.5 | –0.2 | –0.6 | –0.2 | 19.4 | 0.0 | 0.7 | 0.1 | 11.7 | –0.3 | 1.9 | –1.6 | 22.3 |
| Czech Republic | .. | .. | 2.8 | 53.1 | .. | .. | 0.6 | 7.2 | .. | .. | 1.5 | 19.7 | .. | .. | 0.7 | 7.9 | .. | .. | –0.1 | 18.2 |
| Denmark | 0.0 | 1.7 | 1.6 | 69.5 | 2.2 | 1.3 | 0.1 | 11.4 | –0.4 | –0.4 | 0.6 | 21.1 | –0.4 | 0.4 | 0.0 | 5.8 | –1.4 | 0.3 | 0.8 | 31.2 |
| Finland | .. | .. | –0.3 | 64.2 | .. | .. | 0.9 | 11.3 | .. | .. | 0.1 | 18.8 | .. | .. | 0.5 | 6.2 | .. | .. | –1.8 | 28.0 |
| France | 3.3 | 5.9 | 1.3 | 69.2 | 1.1 | 2.4 | 0.1 | 11.9 | –0.4 | 0.0 | –0.2 | 19.9 | 0.4 | 1.0 | 0.5 | 8.3 | 2.2 | 2.6 | 0.8 | 29.2 |
| Germany | 1.8 | .. | .. | 62.6 | 1.4 | 0.7 | 1.7 | 10.9 | –0.9 | .. | .. | 19.9 | –0.1 | .. | .. | 7.1 | 1.4 | .. | .. | 24.8 |
| Greece | 4.4 | 6.5 | 3.6 | 58.8 | 1.0 | 1.4 | 1.2 | 7.4 | 0.5 | 1.8 | 0.5 | 23.3 | 0.4 | 1.5 | 1.4 | 10.4 | 2.5 | 1.8 | 0.5 | 17.7 |
| Hungary | .. | .. | 0.1 | 57.6 | .. | .. | 1.4 | 6.7 | .. | .. | 0.0 | 21.3 | .. | .. | 0.1 | 7.3 | .. | .. | –1.4 | 22.3 |
| Ireland | 2.8 | 3.6 | 2.9 | 61.7 | 0.8 | 0.3 | 2.7 | 11.5 | 0.1 | –1.0 | 1.1 | 19.9 | 1.5 | 1.8 | 0.5 | 10.7 | 0.5 | 2.5 | –1.4 | 19.6 |
| Italy | .. | .. | 2.2 | 60.8 | .. | .. | 1.7 | 9.3 | .. | .. | 0.0 | 21.6 | .. | .. | 0.3 | 8.0 | .. | .. | 0.3 | 22.0 |
| Japan | 1.9 | 2.1 | 2.2 | 59.4 | 1.9 | 1.7 | 1.5 | 22.6 | 0.1 | –0.2 | 0.3 | 26.8 | .. | .. | .. | .. | .. | .. | .. | .. |
| Korea | 0.5 | 16.7 | 6.7 | 59.7 | 1.4 | 1.8 | 1.8 | 9.3 | –0.9 | –6.8 | 1.2 | 24.9 | .. | .. | .. | .. | .. | .. | .. | .. |
| Luxembourg | 4.8 | 2.5 | 5.7 | 75.1 | 3.1 | 2.4 | 2.8 | 17.8 | 0.5 | –1.8 | –0.8 | 19.7 | –0.7 | 2.3 | –1.4 | 8.4 | 1.9 | –0.4 | 5.1 | 29.3 |
| Mexico | .. | .. | –0.1 | 55.6 | .. | .. | 0.0 | 3.9 | .. | .. | 4.7 | 22.0 | .. | .. | 0.2 | 17.5 | .. | .. | –4.9 | 12.2 |
| Netherlands | 2.4 | 2.9 | –0.8 | 70.2 | 1.6 | 1.8 | 1.3 | 14.3 | 0.1 | 0.6 | –0.7 | 22.0 | 0.7 | 0.5 | –0.4 | 6.2 | 0.0 | 0.0 | –1.0 | 27.6 |
| New Zealand | .. | .. | 0.8 | 67.4 | .. | .. | 2.5 | 13.5 | .. | .. | –1.0 | 22.1 | .. | .. | 0.6 | 9.8 | .. | .. | –1.3 | 22.0 |
| Norway | .. | .. | 1.1 | 72.7 | .. | .. | 1.0 | 10.6 | .. | .. | 0.4 | 22.1 | .. | .. | –0.2 | 7.2 | .. | .. | –0.2 | 32.8 |
| Portugal | 1.6 | 9.5 | –5.3 | 50.2 | 0.2 | 3.5 | –1.4 | 5.5 | –0.1 | 1.4 | –2.0 | 17.7 | 0.4 | 1.7 | 0.8 | 10.7 | 1.0 | 3.0 | –2.7 | 16.2 |
| Spain | 2.5 | 6.1 | 1.7 | 61.7 | 0.9 | 2.3 | 1.3 | 9.0 | 0.5 | 0.5 | –0.5 | 22.4 | 0.8 | 0.3 | 0.1 | 11.8 | 0.2 | 3.0 | 0.9 | 18.5 |
| Sweden | .. | .. | –0.1 | 70.9 | .. | .. | 0.8 | 12.2 | .. | .. | 0.4 | 19.4 | .. | .. | 0.1 | 5.9 | .. | .. | –1.4 | 33.4 |
| Switzerland | .. | 2.4 | 3.1 | 69.2 | .. | 0.3 | 1.8 | 15.3 | .. | 0.6 | –0.1 | 19.6 | .. | –0.5 | –1.4 | 10.0 | .. | 2.1 | 2.8 | 24.3 |
| Turkey | .. | –2.6 | 1.1 | 23.5 | .. | –2.2 | –0.1 | 2.8 | .. | –0.4 | 1.2 | 20.8 | .. | .. | .. | .. | .. | .. | .. | .. |
| United Kingdom | 3.1 | 5.1 | 1.6 | 71.4 | 2.2 | 2.4 | 1.2 | 14.7 | 0.6 | –0.5 | –0.2 | 21.8 | –0.1 | –0.1 | 0.5 | 9.2 | 0.3 | 3.2 | 0.2 | 25.7 |
| United States | 2.4 | 2.5 | 0.7 | 73.8 | 1.7 | 0.2 | 0.9 | 15.8 | –0.2 | –0.1 | 0.0 | 21.2 | 0.0 | 0.5 | –0.1 | 12.1 | 0.8 | 1.8 | –0.1 | 24.8 |
| **OECD average** | **2.1** | **4.4** | **1.5** | **63.5** | **1.4** | **1.3** | **1.2** | **11.4** | **–0.1** | **–0.5** | **0.2** | **21.3** | **0.2** | **0.9** | **0.2** | **9.2** | **0.7** | **1.7** | **–0.2** | **24.0** |

## Table 3.C.1. **Evolution of the share of service employment**[a] *(cont.)*

Levels in 1998 (in percentages) and percentage-point changes between 1984, 1989, 1994 and 1998

**Panel B: Men**

| | All services | | | | Producer services | | | | Distributive services | | | | Personal services | | | | Social services | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Changes | | | Level | Changes | | | Level | Changes | | | Level | Changes | | | Level | Changes | | | Level |
| | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 |
| Australia | –0.2 | 3.5 | 1.8 | 63.5 | 0.4 | 0.9 | 2.1 | 13.9 | –0.2 | 0.2 | –0.1 | 25.0 | 0.5 | 1.3 | 0.7 | 10.9 | –0.9 | 1.1 | –0.9 | 13.8 |
| Austria | .. | .. | 2.4 | 52.3 | .. | .. | 1.4 | 9.2 | .. | .. | 0.3 | 22.1 | .. | .. | 0.8 | 6.3 | .. | .. | 0.0 | 14.8 |
| Belgium | –0.3 | 2.1 | 2.0 | 59.3 | 1.3 | 1.4 | 2.1 | 11.7 | –0.3 | 0.2 | –0.6 | 23.0 | 0.2 | 0.7 | 0.6 | 5.4 | –1.5 | –0.2 | –0.2 | 19.2 |
| Canada | –0.2 | 3.6 | –0.5 | 59.7 | 0.5 | 1.9 | 1.6 | 15.0 | –0.1 | –0.4 | –0.4 | 21.4 | 0.0 | 1.2 | –0.1 | 9.5 | –0.6 | 1.0 | –1.7 | 13.7 |
| Czech Republic | .. | .. | 2.0 | 42.3 | .. | .. | 0.5 | 6.3 | .. | .. | 2.0 | 18.0 | .. | .. | 0.3 | 7.0 | .. | .. | –0.8 | 10.9 |
| Denmark | 0.1 | 1.9 | 1.8 | 57.8 | 2.2 | 1.3 | 0.4 | 11.7 | –0.3 | –0.1 | 0.5 | 24.9 | –0.1 | 0.0 | 0.8 | 4.4 | –1.8 | 0.6 | 0.0 | 16.8 |
| Finland | .. | .. | –0.5 | 49.9 | .. | .. | 1.2 | 11.3 | .. | .. | 1.4 | 22.9 | .. | .. | 0.4 | 3.8 | .. | .. | –3.6 | 11.9 |
| France | 2.7 | 6.5 | 0.7 | 58.4 | 1.2 | 2.5 | 0.0 | 11.0 | –0.3 | 0.5 | –0.1 | 21.9 | 0.3 | 0.8 | 0.2 | 5.5 | 1.5 | 2.7 | 0.5 | 20.1 |
| Germany | 1.1 | .. | .. | 50.2 | 1.3 | 0.8 | 1.4 | 9.9 | –1.1 | .. | .. | 18.9 | 0.2 | .. | .. | 5.0 | 0.7 | .. | .. | 16.4 |
| Greece | 3.3 | 4.3 | 1.8 | 53.7 | 1.0 | 1.3 | 0.6 | 6.5 | 0.0 | 1.0 | 0.4 | 25.4 | 0.4 | 0.9 | 0.9 | 8.3 | 1.8 | 1.0 | –0.2 | 13.5 |
| Hungary | .. | .. | –0.7 | 47.0 | .. | .. | 1.7 | 5.9 | .. | .. | 0.2 | 22.0 | .. | .. | –0.4 | 6.2 | .. | .. | –2.2 | 12.9 |
| Ireland | 2.6 | 1.8 | 2.6 | 49.5 | 0.6 | 0.1 | 2.2 | 9.5 | 0.8 | –0.8 | 1.0 | 20.3 | 0.9 | 1.6 | 0.1 | 7.4 | 0.3 | 0.9 | –0.7 | 12.3 |
| Italy | .. | .. | 1.7 | 54.1 | .. | .. | 1.6 | 9.1 | .. | .. | 0.1 | 23.0 | .. | .. | 0.1 | 6.1 | .. | .. | –0.1 | 16.0 |
| Japan | 1.1 | 0.5 | 1.3 | 53.8 | 1.2 | 1.0 | 1.3 | 18.4 | 0.0 | –0.9 | –0.2 | 26.2 | .. | .. | .. | .. | .. | .. | .. | .. |
| Korea | 1.6 | 13.7 | 6.4 | 54.8 | 1.4 | 1.1 | 2.3 | 9.5 | 0.1 | –3.5 | 1.7 | 26.8 | .. | .. | .. | .. | .. | .. | .. | .. |
| Luxembourg | 4.8 | 2.4 | 7.3 | 65.4 | 2.5 | 2.1 | 3.9 | 16.4 | 0.8 | –1.5 | 0.0 | 20.0 | 0.1 | 1.4 | –0.5 | 5.3 | 1.4 | 0.4 | 3.9 | 23.7 |
| Mexico | .. | .. | 0.1 | 47.7 | .. | .. | –0.1 | 3.8 | .. | .. | 3.7 | 20.3 | .. | .. | 0.3 | 14.3 | .. | .. | –3.8 | 9.2 |
| Netherlands | 1.8 | 3.1 | 0.7 | 61.6 | 2.2 | 1.4 | 1.5 | 14.6 | 0.2 | 0.7 | –0.1 | 23.5 | 0.2 | 0.6 | –0.3 | 4.6 | –0.7 | 0.5 | –0.5 | 19.0 |
| New Zealand | .. | .. | 0.1 | 56.2 | .. | .. | 2.8 | 12.8 | .. | .. | –1.3 | 22.7 | .. | .. | 0.9 | 7.9 | .. | .. | –2.3 | 12.7 |
| Norway | .. | .. | 0.9 | 59.7 | .. | .. | 1.2 | 11.4 | .. | .. | 0.7 | 23.6 | .. | .. | 0.2 | 5.9 | .. | .. | –1.1 | 18.8 |
| Portugal | 0.8 | 7.7 | –6.9 | 42.3 | 0.2 | 3.7 | –2.2 | 5.6 | –0.1 | 1.9 | –2.8 | 20.6 | 0.3 | 1.2 | –0.2 | 5.5 | 0.4 | 0.8 | –1.7 | 10.7 |
| Spain | 1.8 | 5.2 | 0.4 | 51.3 | 0.7 | 1.2 | 1.1 | 8.0 | 0.5 | 0.3 | –0.6 | 22.3 | 0.7 | 0.9 | –0.2 | 8.0 | –0.1 | 2.8 | 0.1 | 13.0 |
| Sweden | .. | .. | 1.3 | 57.5 | .. | .. | 1.0 | 13.4 | .. | .. | 1.0 | 23.4 | .. | .. | –0.2 | 4.8 | .. | .. | –0.6 | 15.9 |
| Switzerland | .. | 2.5 | 1.3 | 59.1 | .. | 1.2 | 2.1 | 16.7 | .. | 0.4 | –0.1 | 18.7 | .. | –0.5 | –1.6 | 6.9 | .. | 1.4 | 1.0 | 16.8 |
| Turkey | .. | –5.2 | 0.0 | 29.7 | .. | –4.0 | –0.2 | 2.7 | .. | –1.2 | 0.2 | 26.9 | .. | .. | .. | .. | .. | .. | .. | .. |
| United Kingdom | 2.9 | 5.7 | 1.7 | 59.6 | 1.9 | 2.9 | 1.7 | 14.6 | 0.6 | 0.4 | –0.2 | 23.1 | 0.5 | 0.7 | 0.6 | 6.8 | –0.2 | 1.7 | –0.3 | 15.1 |
| United States | 2.2 | 2.9 | 0.4 | 63.4 | 1.3 | 0.9 | 1.0 | 14.8 | 0.1 | 0.2 | 0.0 | 23.1 | 0.5 | 1.3 | –0.1 | 10.6 | 0.3 | 0.5 | –0.5 | 14.9 |
| **OECD average** | **1.6** | **3.7** | **1.2** | **54.1** | **1.3** | **1.2** | **1.3** | **10.9** | **0.0** | **–0.1** | **0.3** | **22.6** | **0.3** | **0.9** | **0.2** | **6.9** | **0.0** | **1.1** | **–0.7** | **15.1** |

## Table 3.C.1. **Evolution of the share of service employment**[a] *(cont.)*

Levels in 1998 (in percentages) and percentage-point changes between 1984, 1989, 1994 and 1998

**Panel C: Women**

| | All services | | | | Producer services | | | | Distributive services | | | | Personal services | | | | Social services | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Changes | | | Level | Changes | | | Level | Changes | | | Level | Changes | | | Level | Changes | | | Level |
| | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 | 1984-1989 | 1989-1994 | 1994-1998 | 1998 |
| Australia | 0.4 | 1.9 | 1.5 | 86.0 | 0.8 | 0.3 | 1.3 | 15.7 | 0.7 | –1.0 | –0.4 | 24.2 | 0.2 | 1.0 | 0.1 | 13.0 | –1.3 | 1.6 | 0.5 | 33.2 |
| Austria | .. | .. | 4.2 | 78.5 | .. | .. | 1.3 | 12.2 | .. | .. | 0.1 | 22.8 | .. | .. | 0.5 | 12.9 | .. | .. | 2.3 | 30.5 |
| Belgium | 1.9 | 2.2 | 2.0 | 85.6 | 1.2 | 1.9 | 1.2 | 11.8 | –2.0 | –1.4 | 0.5 | 20.1 | –1.2 | 0.9 | 0.3 | 8.9 | 3.9 | 0.9 | –0.1 | 44.8 |
| Canada | 0.2 | 2.5 | –0.3 | 82.2 | 0.9 | 0.7 | 1.0 | 18.2 | –0.3 | –0.7 | 0.0 | 17.1 | –0.2 | 0.0 | 0.3 | 14.3 | –0.1 | 2.5 | –1.7 | 32.5 |
| Czech Republic | .. | .. | 4.2 | 67.0 | .. | .. | 0.7 | 8.3 | .. | .. | 1.0 | 21.9 | .. | .. | 1.4 | 9.1 | .. | .. | 1.1 | 27.6 |
| Denmark | –0.5 | 1.4 | 1.3 | 83.3 | 2.2 | 1.3 | –0.3 | 11.1 | –0.5 | –0.7 | 0.8 | 16.7 | –0.9 | 0.9 | –0.9 | 7.4 | –1.3 | –0.1 | 1.7 | 48.1 |
| Finland | .. | .. | 0.3 | 80.0 | .. | .. | 0.6 | 11.4 | .. | .. | –1.6 | 14.3 | .. | .. | 0.6 | 8.7 | .. | .. | 0.6 | 45.6 |
| France | 3.5 | 4.3 | 1.7 | 82.5 | 0.9 | 2.1 | 0.2 | 13.0 | –0.3 | –0.5 | –0.2 | 17.4 | 0.3 | 1.0 | 0.8 | 11.7 | 2.6 | 1.7 | 0.9 | 40.4 |
| Germany | 2.5 | .. | .. | 78.7 | 1.4 | 0.4 | 1.9 | 12.2 | –0.6 | .. | .. | 21.1 | –0.6 | .. | .. | 9.7 | 2.3 | .. | .. | 35.7 |
| Greece | 6.3 | 10.5 | 6.3 | 67.2 | 1.0 | 1.4 | 2.2 | 9.0 | 1.9 | 3.3 | 0.8 | 19.7 | 0.1 | 2.5 | 2.1 | 13.9 | 3.4 | 3.3 | 1.1 | 24.7 |
| Hungary | .. | .. | 1.5 | 70.3 | .. | .. | 1.1 | 7.7 | .. | .. | –0.3 | 20.4 | .. | .. | 0.7 | 8.6 | .. | .. | 0.0 | 33.6 |
| Ireland | 1.1 | 3.0 | 1.6 | 80.2 | 1.0 | 0.1 | 3.2 | 14.5 | –1.5 | –1.1 | 1.4 | 19.4 | 2.1 | 1.2 | 0.6 | 15.6 | –0.5 | 2.8 | –3.7 | 30.7 |
| Italy | .. | .. | 2.6 | 72.6 | .. | .. | 1.8 | 9.8 | .. | .. | –0.2 | 19.1 | .. | .. | 0.4 | 11.3 | .. | .. | 0.6 | 32.4 |
| Japan | 3.0 | 4.6 | 3.7 | 67.9 | 2.7 | 2.9 | 1.8 | 29.0 | 0.4 | 0.7 | 1.0 | 27.7 | .. | .. | .. | .. | .. | .. | .. | .. |
| Korea | –1.3 | 21.2 | 7.2 | 66.8 | 1.4 | 2.8 | 1.0 | 9.0 | –2.6 | –11.6 | 0.5 | 22.2 | .. | .. | .. | .. | .. | .. | .. | .. |
| Luxembourg | 3.5 | 0.7 | 2.5 | 91.2 | 4.1 | 2.6 | 0.9 | 20.1 | –0.3 | –2.5 | –2.3 | 19.1 | –2.7 | 3.2 | –3.0 | 13.5 | 2.3 | –2.7 | 6.9 | 38.5 |
| Mexico | .. | .. | –1.1 | 71.2 | .. | .. | 0.1 | 4.2 | .. | .. | 6.6 | 25.3 | .. | .. | –0.3 | 23.6 | .. | .. | –7.5 | 18.1 |
| Netherlands | 1.1 | 0.1 | –3.4 | 82.0 | 0.5 | 2.4 | 0.9 | 14.0 | 0.1 | 0.6 | –1.5 | 20.0 | 1.5 | 0.0 | –0.7 | 8.4 | –0.9 | –2.9 | –2.2 | 39.7 |
| New Zealand | .. | .. | 1.1 | 81.2 | .. | .. | 2.1 | 14.4 | .. | .. | –0.7 | 21.5 | .. | .. | 0.1 | 11.9 | .. | .. | –0.4 | 33.4 |
| Norway | .. | .. | 1.2 | 87.7 | .. | .. | 0.8 | 9.5 | .. | .. | 0.2 | 20.3 | .. | .. | –0.7 | 8.7 | .. | .. | 0.9 | 49.1 |
| Portugal | 2.3 | 11.0 | –3.3 | 59.8 | 0.4 | 3.2 | –0.5 | 5.5 | 0.3 | 1.2 | –0.9 | 14.2 | 0.1 | 1.7 | 2.1 | 17.1 | 1.5 | 4.9 | –4.0 | 22.9 |
| Spain | 2.6 | 6.0 | 2.9 | 80.7 | 1.4 | 4.4 | 1.4 | 10.9 | 0.6 | 0.9 | –0.5 | 22.6 | 0.4 | –1.8 | 0.1 | 18.6 | 0.2 | 2.4 | 1.9 | 28.5 |
| Sweden | .. | .. | –1.0 | 85.8 | .. | .. | 0.5 | 10.8 | .. | .. | –0.4 | 15.0 | .. | .. | 0.5 | 7.1 | .. | .. | –1.6 | 52.9 |
| Switzerland | .. | 2.2 | 4.8 | 81.9 | .. | –0.9 | 1.5 | 13.4 | .. | 0.9 | –0.1 | 20.8 | .. | –0.6 | –1.4 | 13.9 | .. | 2.8 | 4.8 | 33.8 |
| Turkey | .. | 3.1 | 1.5 | 8.6 | .. | 1.6 | 0.3 | 2.8 | .. | 1.4 | 1.2 | 5.8 | .. | .. | .. | .. | .. | .. | .. | .. |
| United Kingdom | 2.5 | 3.3 | 1.7 | 85.9 | 2.6 | 1.8 | 0.5 | 14.7 | 0.7 | –1.5 | –0.2 | 20.2 | –1.1 | –1.3 | 0.5 | 12.2 | 0.3 | 4.3 | 0.9 | 38.8 |
| United States | 1.8 | 1.7 | 0.9 | 86.0 | 2.1 | –0.6 | 0.7 | 17.1 | –0.4 | –0.3 | 0.0 | 18.9 | –0.9 | –0.4 | –0.1 | 13.8 | 0.9 | 3.0 | 0.2 | 36.2 |
| **OECD average** | **1.9** | **4.7** | **1.8** | **76.0** | **1.5** | **1.6** | **1.1** | **12.2** | **–0.2** | **–0.7** | **0.2** | **19.6** | **–0.2** | **0.6** | **0.2** | **12.3** | **0.9** | **1.8** | **0.1** | **35.5** |

.. Data not available.
*a)* See note *a)* to Chart 3.1.
*Source:* See Annex 3.A.

## Table 3.C.2. Sectoral contribution to annualised employment growth, 1986-1998[a]

| | Australia | Belgium | Canada | Denmark | France | Greece | Ireland | Japan | Luxembourg | Netherlands | Portugal | Spain | United Kingdom | United States | Total OECD[b] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Agriculture** | **0.01** | **–0.06** | **–0.03** | **–0.17** | **–0.25** | **–0.74** | **–0.29** | **–0.25** | **–0.03** | **–0.08** | **–0.49** | **–0.55** | **–0.02** | **0.00** | **–0.09** |
| **Industry** | **0.00** | **–0.18** | **0.16** | **–0.09** | **–0.31** | **–0.07** | **0.87** | **0.11** | **–0.41** | **0.07** | **0.58** | **0.43** | **–0.35** | **0.04** | **–0.01** |
| Mining and quarrying | –0.02 | –0.04 | –0.01 | –0.01 | –0.05 | –0.03 | –0.03 | –0.01 | 0.01 | –0.08 | –0.02 | –0.04 | –0.09 | –0.02 | –0.03 |
| Manufacturing | –0.06 | –0.26 | 0.13 | –0.08 | –0.21 | –0.15 | 0.61 | –0.11 | –0.58 | 0.14 | 0.25 | 0.09 | –0.27 | –0.04 | –0.06 |
| Electricity, gas and water supply | –0.08 | 0.00 | 0.00 | 0.01 | –0.01 | 0.00 | –0.02 | 0.01 | 0.01 | –0.01 | –0.01 | 0.00 | –0.04 | 0.00 | –0.01 |
| Construction | 0.15 | 0.12 | 0.03 | –0.01 | –0.04 | 0.11 | 0.32 | 0.22 | 0.15 | 0.02 | 0.35 | 0.38 | 0.06 | 0.10 | 0.10 |
| **Producer services** | **0.56** | **0.46** | **0.54** | **0.24** | **0.33** | **0.34** | **0.70** | **..** | **0.85** | **0.69** | **0.25** | **0.54** | **0.53** | **0.42** | **0.45** |
| Business and professional services | 0.52 | 0.33 | 0.49 | 0.20 | 0.22 | 0.26 | 0.48 | .. | 0.41 | 0.45 | 0.23 | 0.47 | 0.32 | 0.33 | 0.35 |
| Financial services | 0.01 | 0.07 | 0.04 | –0.01 | 0.03 | 0.05 | 0.14 | 0.06[c] | 0.36 | 0.10 | –0.01 | 0.01 | 0.19 | 0.04 | 0.05 |
| Insurance | –0.01 | 0.02 | 0.01 | 0.00 | 0.00 | 0.03 | 0.03 | .. | 0.05 | 0.05 | 0.01 | 0.03 | –0.05 | 0.03 | 0.01 |
| Real estate | 0.03 | 0.03 | 0.01 | 0.05 | 0.08 | – | 0.04 | .. | 0.03 | – | 0.02 | 0.04 | 0.08 | 0.02 | 0.04 |
| **Distributive services** | **0.42** | **0.05** | **0.17** | **0.22** | **0.09** | **0.47** | **0.70** | **0.25** | **–0.08** | **0.46** | **0.14** | **0.46** | **0.22** | **0.32** | **0.29** |
| Retail trade | 0.31 | 0.08 | 0.08 | 0.14 | 0.01 | 0.38 | 0.43 | 0.15 | –0.05 | 0.24 | 0.12 | 0.21 | 0.12 | 0.16 | 0.15 |
| Wholesale trade | 0.08 | –0.05 | 0.01 | –0.08 | 0.04 | 0.06 | 0.01 | 0.01 | –0.12 | 0.09 | 0.02 | 0.13 | 0.00 | 0.05 | 0.04 |
| Transportation | 0.03 | 0.00 | 0.04 | –0.03 | 0.06 | 0.00 | 0.16 | 0.09[d] | 0.04 | 0.10 | 0.00 | 0.08 | 0.09 | 0.10 | 0.08 |
| Communication | 0.01 | 0.03 | 0.05 | – | –0.02 | 0.01 | 0.10 | .. | 0.05 | 0.03 | –0.01 | 0.03 | 0.01 | 0.01 | 0.01 |
| **Personal services** | **0.41** | **0.11** | **0.23** | **0.07** | **0.17** | **0.34** | **0.65** | **..** | **0.12** | **0.16** | **0.36** | **0.33** | **0.15** | **0.22** | **0.22** |
| Hotels and restaurants | 0.19 | 0.07 | 0.14 | 0.05 | 0.03 | 0.23 | 0.42 | .. | 0.03 | 0.16 | 0.24 | 0.22 | 0.06 | 0.11 | 0.11 |
| Recreational and cultural services | 0.09 | 0.05 | 0.06 | 0.04 | 0.06 | 0.05 | 0.16 | .. | 0.03 | 0.02 | 0.05 | 0.09 | 0.08 | 0.11 | 0.09 |
| Domestic services | –0.01 | 0.00 | –0.01 | –0.03 | 0.09 | 0.06 | 0.03 | .. | 0.06 | –0.02 | 0.04 | –0.01 | –0.01 | –0.03 | –0.01 |
| Other personal services | 0.13 | –0.01 | 0.04 | 0.00 | –0.01 | 0.01 | 0.05 | .. | 0.00 | 0.00 | 0.03 | 0.03 | 0.02 | 0.04 | 0.03 |
| **Social services** | **0.47** | **0.42** | **0.32** | **0.09** | **0.46** | **0.48** | **0.72** | **..** | **0.84** | **0.71** | **0.29** | **0.70** | **0.48** | **0.60** | **0.53** |
| Government proper | 0.02 | 0.07 | 0.01 | –0.09 | 0.13 | 0.10 | 0.11 | .. | 0.42 | 0.23 | –0.05 | 0.26 | 0.11 | 0.06 | 0.08 |
| Health services | 0.13 | 0.58 | 0.11 | 0.92 | 0.40 | 0.19 | 0.40 | .. | 0.37 | 0.89 | 0.19 | 0.27 | 0.52 | 0.25 | 0.31 |
| Educational services | 0.15 | 0.12 | 0.08 | –0.15 | 0.12 | 0.22 | 0.25 | .. | 0.20 | 0.08 | 0.15 | 0.22 | 0.11 | 0.17 | 0.14 |
| Miscellaneous social services | 0.17 | –0.35 | 0.12 | –0.60 | –0.19 | –0.04 | –0.04 | .. | –0.14 | –0.49 | –0.01 | –0.05 | –0.25 | 0.12 | 0.00 |
| **Total services** | **1.86** | **1.05** | **1.27** | **0.61** | **1.06** | **1.63** | **2.77** | **1.01** | **1.73** | **2.03** | **1.04** | **2.02** | **1.38** | **1.56** | **1.48** |
| Non classified[e] | 0.00 | 0.00 | 0.00 | –0.22 | –0.03 | 0.00 | 0.03 | 0.00 | –0.08 | 0.43 | –0.01 | –0.01 | –0.10 | 0.00 | –0.01 |
| **TOTAL** | **1.86** | **0.80** | **1.39** | **0.13** | **0.46** | **0.82** | **3.37** | **0.87** | **1.20** | **2.45** | **1.11** | **1.89** | **0.91** | **1.60** | **1.38** |

.. Data not available.

*a)* For Australia, Canada and the Netherlands, the annualised employment growth has been calculated for the period 1987-1998.

*b)* "Total OECD" refers to the sectoral contribution to annualised employment growth in the 14 countries considered as a whole.

*c)* Includes the financial, insurance and the real estate services (FIRE).

*d)* Includes transport and communication services.

*e)* The "non classified" refers to employed people who could not be assigned to a specific sector.

*Source:* See Annex 3.A.

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