

## CHAPTER 5

# Employment adjustment, workers and unemployment

### A. INTRODUCTION AND MAIN FINDINGS

#### 1. Introduction

The adaptability of labour markets to economic change has been a preoccupation of policy-makers for well over a decade. Analysis of the process of job creation and destruction has increasingly been seen as crucial to furthering our understanding of the ways in which employment adjusts in response to shocks.

The early work on job turnover focused on explaining its levels over time and across countries, uncovering cyclical and structural tendencies, and on measuring establishment birth and survival rates [OECD (1994a)]. More recently, analysts have sought to establish links between the patterns of employment dynamics at the firm level, the levels and composition of unemployment across countries and some of the policies which link them, *e.g.* employment protection legislation (EPL) and unemployment insurance (UI). The key questions taken up here are:

- How good an indicator is job turnover of adjustment in employment?
- What flows of workers are generated by job turnover differences across OECD countries and what, if any, implications does this have for understanding unemployment?
- What are the effects of policies on job turnover and labour turnover, and with what implications, if any, for unemployment?

To examine these issues, data on job and labour turnover, unemployment inflows and outflows and indices of EPL have been collected from a variety of sources covering a number of time periods. It is important to bear in mind that many issues remain unresolved with respect to data comparability (see Annex 5.A). While analysis of the existing data does yield insights into the functioning of labour markets in allocating workers to jobs, strong conclusions must be tempered by the fact that much further work is needed on developing comparable data sets. Difficul-

ties also arise because the theory of job creation and destruction is not fully developed, and extensions of the basic model greatly complicate the predicted impact of turnover.

Section B summarises evidence on job turnover and its usefulness as a measure of adjustment in employment. As job turnover generates flows of workers, Section C analyses how job turnover is related to labour turnover (see the Box for definitions of these terms) and considers the impact of both on unemployment. Section D considers the impact of EPL on job turnover and labour turnover and assesses the implications. A concluding section briefly outlines some policy issues and highlights areas where further data and research are needed.

#### 2. Main findings

Although there are cross-country differences, relatively high job turnover is a common characteristic of many OECD countries. The rate of job turnover has remained relatively stable in most OECD countries since the late 1970s, with a few exceptions [Canada, particularly among small firms, Norway (manufacturing) and in one United States data set].

The magnitude of turnover rates shows that there is considerably more churning and employment adjustment in OECD countries than might be expected when only considering net employment growth.

Job turnover is not associated with cross-country differences in either net employment growth or the unemployment rate.

In line with simple models, job turnover (in continuing establishments) is positively related with unemployment inflows and outflows, and negatively related with the incidence of long-term unemployment. However, the correlations are weak and it is not plausible that cross-country differences in job turnover can explain much of the marked differences in the composition of unemployment.

The analysis linking job to labour turnover shows:

- i) labour turnover is lower in Europe and Japan than in North America;
- ii) the *difference* between annual rates of *new* job creation and a proxy measure of *all* new hires is much smaller in some European countries (France, Germany and Italy) compared with North America. This implies that individuals in Europe depend much more on new job creation to get into employment;
- iii) consequently, the share of jobs in which individuals can be hired to replace one another (ongoing jobs) appears relatively low in these countries;
- iv) by inference from the data presented, in France, Germany and Italy there is also high rotation of workers in ongoing jobs which do become vacant;
- v) measured inflows into unemployment are lower in Europe than in North America and, in some countries, are lower than job destruction rates; and these factors imply that
- vi) although there is almost no direct empirical work, an important feature of labour turnover in Europe is that many workers, when they lose or leave jobs, do not pass through a measured spell of unemployment. Perhaps they go “directly” to another job in another firm when their old job is destroyed.

Theory suggests that job turnover is partly determined by labour market policies such as EPL and UI. This chapter investigates the links between the former, proxied by measures of its strictness. More strict regulations on hiring temporary workers are associated with somewhat lower job turnover.

The fact that long-term unemployment is higher in Europe than in North America or Japan has often been cited as evidence of more inflexible labour markets and EPL has been suggested as one of the possible reasons for this. However, any association may reflect a different causal chain. Although there are many data problems and more exploration is necessary, the analysis suggests that the high incidence of long-term unemployment may stem less from a lack of adjustment in employment than from the way that adjustment takes place. Employment adjustment in some European countries seems to take place through a combination of internal adjustment within firms, resulting in relatively few vacancies in ongoing jobs and, when job losses take place, by worker flows apparently bypassing measured unemployment.

## B. JOB TURNOVER AS A MEASURE OF EMPLOYMENT ADJUSTMENT

Job turnover is the sum of over-the-year changes in employment levels across all establishments and is one indicator of the extent of change in the external labour market (see the Box). It is a reasonably comprehensive measure of employment adjustment in that it incorporates both the reallocation of employment *across* industries as well as the reallocation of employment across productive units (be they firms or establishments) *within* industries. While job turnover only measures net changes in the level of employment in individual establishments or jobs filled, it is still an important tool for analyses because the attention of policymakers has often been focused on barriers to filling jobs (hiring), as well as the converse (firing).

Job turnover rates and its components are presented in Table 5.1. The data show relatively high job turnover rates in most countries, ranging from a high of 35 per cent in New Zealand to 15 per cent in Belgium, the Netherlands and the United Kingdom.

As measured by job turnover, the pace of employment adjustment has remained relatively stable. It does not show any pronounced upward trend in most countries since the late 1970s<sup>1</sup> with few exceptions (Chart 5.1): Canada, particularly among small firms, Norway (manufacturing) and in one United States data set.<sup>2</sup> It is sometimes thought that relatively constant job turnover rates at the aggregate level may hide increasingly unstable employment in small establishments which counterbalances increasing stability in large ones. A comparison of trends in job turnover for different size classes of establishments in Canada, Denmark, Norway and the United States (not shown here) does not support this hypothesis.

However, the pattern of job turnover may vary over the business cycle. In the United States, job turnover increases in cyclical downturns because of a relatively sharp rise in job losses. In other countries, especially Europe, job turnover rates appear to show little cyclical movement. There is still considerable debate over why these different patterns seem to exist. Reasons put forward range from the role of labour market regulations, which result in job losses taking place over a longer time period, to data incomparability [Boeri (1995a)]. However, during the most recent downturn, which began in the early 1990s, job turnover has risen in more countries (Finland, Norway and Sweden). If labour market institutions or policies are at the root of the apparent dissimilarities in cyclical movements, recent increases in job turnover in

Table 5.1. **Job gains and job losses**<sup>a</sup>  
Average annual rates as a per cent of total employment

	Australia (manufac- turing)	Austria <sup>b</sup>	Belgium <sup>b</sup>	Canada <sup>b</sup>	Denmark	Finland	France <sup>b</sup>	Germany	Ireland (manufac- turing)	Italy <sup>b</sup>	Japan	Nether- lands <sup>b</sup> (manufac- turing)	New Zealand	Norway (manufac- turing)	Sweden	United Kingdom <sup>b,c</sup>	United States <sup>c</sup>	United States (manufac- turing)
	1984-85	1991-93	1983-85	1983-91	1983-89	1986-91	1984-91	1983-90	1984-85	1987-92	1985-92	1984-91	1987-92	1985-92	1985-92	1985-91	1984-91	1984-88
<b>Gross job gains</b>	<b>16.1</b>	..	<b>7.7</b>	<b>14.5</b>	<b>16.0</b>	<b>10.4</b>	<b>12.7</b>	<b>9.0</b>	<b>8.8</b>	<b>11.0</b>	..	<b>8.2</b>	<b>15.7</b>	<b>8.1</b>	<b>14.5</b>	<b>8.7</b>	<b>13.0</b>	<b>8.2</b>
Openings	9.0	..	..	3.2	6.1	3.9	6.1	2.5	2.7	3.8	..	..	7.4	2.1	6.5	2.7	8.4	1.4
Expansions	7.1	5.7	..	11.2	9.9	6.5	6.6	6.5	6.1	7.3	8.6	..	8.3	6.0	8.0	6.0	4.6	6.7
<b>Gross job losses</b>	<b>13.2</b>	..	<b>7.5</b>	<b>11.9</b>	<b>13.8</b>	<b>12.0</b>	<b>11.8</b>	<b>7.5</b>	<b>12.7</b>	<b>10.0</b>	..	<b>7.2</b>	<b>19.8</b>	<b>10.6</b>	<b>14.6</b>	<b>6.6</b>	<b>10.4</b>	<b>10.4</b>
Closures	8.7	..	..	3.1	5.0	3.4	5.5	1.9	4.6	3.8	..	..	8.5	3.1	5.0	3.9	7.3	2.7
Contractions	4.6	6.2	..	8.8	8.8	8.7	6.3	5.6	8.1	6.2	5.3	..	11.3	7.5	9.6	2.7	3.1	7.7
<b>Net employment change</b>	<b>2.9</b>	..	<b>0.2</b>	<b>2.6</b>	<b>2.2</b>	<b>-1.6</b>	<b>0.9</b>	<b>1.5</b>	<b>-3.9</b>	<b>1.0</b>	..	<b>1.0</b>	<b>-4.1</b>	<b>-2.5</b>	<b>-0.1</b>	<b>2.1</b>	<b>2.6</b>	<b>-2.2</b>
<b>Job turnover</b>	<b>29.3</b>	..	<b>15.2</b>	<b>26.3</b>	<b>29.8</b>	<b>22.4</b>	<b>24.4</b>	<b>16.5</b>	<b>21.4</b>	<b>21.0</b>	..	<b>15.4</b>	<b>35.5</b>	<b>18.7</b>	<b>29.1</b>	<b>15.3</b>	<b>23.4</b>	<b>18.6</b>
Continuing establishments only	11.7	11.9	..	20.0	18.7	15.2	12.9	12.1	14.1	13.5	13.9	..	19.7	13.5	17.6	8.7	7.7	14.4

.. Data not available.

a) Sampling months/periods vary across countries. Periods are as follows: Australia, June; Austria, annual average of monthly year-over-year changes; Belgium, annual averages; Canada, annual averages; Denmark, November; Finland, annual averages; France, annual averages; Germany, June; Ireland, September; Italy, December; Japan, January-June; Netherlands, September; New Zealand, February; Norway, annual averages; Sweden, November; United Kingdom, December; United States, private sector, December (biannual) (June in 1989 and 1991), manufacturing, March.

b) Data refer to firms.

c) These data are compiled by the Dun and Bradstreet Corporation. Results based on them should be treated with considerable caution for reasons explained in OECD (1994a).

Sources: See Annex 5.A for data on: Denmark, Finland, Italy, Japan and the United States [manufacturing from the Longitudinal Research Database (LRD)]. See also the *Employment Outlook*, 1994, Annex 3.A for data on: Canada [Longitudinal Employment Analysis Program (LEAP)], Germany, New Zealand, Sweden, the United Kingdom (Dun and Bradstreet) and the United States (Dun and Bradstreet). Data for Australia are from Borland and Home (1994). Data for Austria are from Hofer and Pichelmann (1995). Data for Belgium are from Leonard and Van Audenrode (1995). Data for France are from Nocke (1994). Data for Ireland are from Keating and Keane (1988/1989). Data for Japan are from Genda (1995). Data for the Netherlands are from Broersma and Gautier (1994). Data for Norway are from Salvanes (1996).

Chart 5.1.

**Trends in job turnover rates<sup>a</sup>**  
Changes as a per cent of total employment



a) Sampling periods vary across countries. See note a to Table 5.1, except for France (December).

b) Data are from the Longitudinal Employment Analysis Program (LEAP).

c) Data refer to firms.

d) Manufacturing.

e) Data are from the Census for Manufactures.

f) Break in series between 1984 and 1985.

g) Data are from the Dun and Bradstreet Corporation.

h) Data are from the Longitudinal Research Database (LRD), US Bureau of the Census.

Sources: See Table 5.1.

### Job turnover and labour turnover

A number of concepts are used in the analysis of job creation and job destruction. *Job turnover*, at the level of an individual establishment or firm, is simply the *net* change in employment between two points in time – the total number of jobs created less the number of jobs which have disappeared. It does not include job vacancies which remain unfilled and jobs that begin and end over the interval of observation, which is most often one year. The economy-wide job turnover rate is simply the absolute sum of net employment changes across all establishments or firms, expressed as a proportion of total employment.

Comparing employment levels at two points in time permits establishments or firms to be classified into four groups: *i)* “opening”, *i.e.* those with no employment at the beginning and employment at the end; *ii)* “closing”, *i.e.* those with employment recorded at the beginning and none at the end; *iii)* “expanding”, *i.e.* those with employment in both periods, but at a higher level at the end; and *iv)* “contracting”, *i.e.* those with employment in both periods, but at a lower level at the end. Summing net employment changes over opening and expanding establishments gives *job gains*, while the sum of employment declines from closing and contracting establishments gives *job losses*. The balance of job gains and job losses is then job turnover.

By contrast, *labour turnover* is concerned with movements of *individuals* into jobs (hirings) and out of jobs (separations) over a particular period. The difference between job and labour turnover can be illustrated as follows. Suppose a given establishment has 100 people employed at time  $t$  and 110 at  $t+1$ . During this period, 10 people have been hired to fill newly created posts. The job turnover rate, *i.e.* the net change in employment, is 10 per cent. But, suppose that, during the same period, 10 individuals left the establishment and 10 were hired to replace them. Labour turnover, which concerns the movement of workers into and out of jobs, is 30 per cent [the sum of all hirings (20) and separations (10) divided by initial employment (100)].

Labour turnover is the sum of job turnover, which relates to the expansion and contraction of establishments or firms, and the movement of workers into and out of *ongoing jobs* in establishments or firms. Workers leave firms and firms hire other workers to replace them, regardless of whether the firm itself is growing or declining. In the example above, job turnover of 10 per cent reflects the expansion of the establishment and is part of the overall labour turnover of 30 per cent; the remaining 20 per cent, or two-thirds of the labour turnover, represents changes in ongoing jobs.

these countries suggest that they may only be able to smooth the process of job destruction to a limited extent.

## C. JOB TURNOVER, LABOUR TURNOVER AND UNEMPLOYMENT

### 1. Introduction

The theoretical framework used to analyse job turnover is based largely on a modelling of job creation and job destruction where it is assumed that the productivity levels of individual jobs vary. This dispersion in productivities, as well as shocks specific to individual firms, leads to high rates of job creation and loss in line with the observed patterns. Productivity is also assumed to vary over the cycle, leading to increases in job creation and decreases in job destruction in upswings as the output value of jobs rises and the reverse patterns in downturns when the output value of jobs declines. Fluctuations in job turnover translate directly to inflows to and outflows

from unemployment [Mortensen and Pissarides (1994); Millard and Mortensen (1994)].

If the rate of job turnover is high in most OECD countries, why are there such sharp cross-country differences in unemployment? This question cannot be considered without also examining labour turnover (see the Box for definitions). It is only through the actual movement of workers that establishment employment levels change, or job turnover is recorded. Job turnover is only one facet of labour turnover: a worker can also change jobs by replacing someone in another establishment (worker flows among ongoing jobs). Unfortunately, labour turnover is not fully considered in existing models of job turnover [Burgess (1994)]. However, it is important to understand the role of labour turnover as information on the way ongoing jobs are filled may provide a more comprehensive picture of cross-country differences in the way labour markets accommodate change. The relation between labour turnover and unemployment has already spawned considerable debate and analysis [see Alogoskoufis *et al.* (1995)]. This section aims to shed some light on the relation.

## 2. Job turnover and labour turnover

Labour turnover measures changes in individuals among jobs, regardless of whether the jobs themselves are newly created, ongoing (and subsequently filled by others) or whether the jobs themselves disappear. It includes worker separations (either quits or layoffs) which are ultimately replaced, or movements of workers into and out of ongoing jobs. Labour turnover is clearly affected by job turnover. Job creation, being a net addition to employment in an establishment, necessarily implies that at least an equivalent number of additional workers have been hired. Similarly, job destruction implies at least an equivalent number of separations have occurred. Considerably greater labour turnover, compared with job turnover, may be generated through a chain of vacancies stemming from a newly-created job which is filled by an employed individual changing firms, leading to a suc-

cession of separations and hirings [Akerlof *et al.* (1988); Contini and Revelli (1990)].

Though good, comparable, data on labour turnover are not readily available, preliminary estimates (Table 5.2) indicate that there are differences across countries: labour turnover tends to be higher in North America than in Europe or Japan.<sup>3</sup> However, it is not negligible in some European countries. Thus, as measured by both job and labour turnover, labour markets which have traditionally been considered very different seem to show a considerable degree of adjustment.

It is worthwhile, therefore, considering aspects of labour turnover in more depth. Taking the share of job turnover in labour turnover provides an indication of the importance of the former in explaining the latter. Differences between them give an indication of labour turnover in ongoing jobs. As presented in

Table 5.2. **Job turnover and labour turnover<sup>a</sup>**

	Unit of observation for job turnover	Period for job turnover and labour turnover <sup>b</sup>	Annual rates as per cent of total employment				Share of job turnover in labour turnover Per cent (1)/(2)
			Job turnover <sup>c</sup> (1)	Labour turnover <sup>c</sup> (2)	Hirings	Separations	
Canada	firms	1987-1988 <sup>d</sup>	22.1 <sup>d</sup>	92.6 (109.6) <sup>d</sup>	48.2	44.4	23.8 <sup>d</sup>
Denmark	manufacturing establishments	1984-1991	23.2 <sup>e</sup>	57.9 <sup>e</sup>	29.0	29.0	40.1 <sup>e</sup>
Finland	establishments	1986-1988 <sup>f</sup>	19.5 <sup>f</sup>	77.0 <sup>f</sup>	40.0	37.0	25.3 <sup>f</sup>
France	continuing establishments	1990-1991	7.2 <sup>g</sup>	58.0 <sup>g</sup>	..	..	12.4 <sup>g</sup>
Germany	establishments	1985-1990	16.0 <sup>h</sup>	62.0 <sup>h</sup>	31.6	30.4	25.9 <sup>h</sup>
Italy	firms	1985-1991 <sup>i</sup>	22.8 <sup>i</sup>	68.1 <sup>i</sup>	34.5	33.6	33.5 <sup>i</sup>
Japan	continuing establishments	1988-1992	8.2 <sup>j</sup>	39.1 <sup>j</sup>	20.2	18.9	21.0 <sup>j</sup>
Netherlands	continuing firms	1988-1990	7.0 <sup>k</sup>	22.0	11.9	10.1	31.8 <sup>k</sup>
United States	establishments	1979-1983	53.6 <sup>l</sup>	126.4 (174.4) <sup>l</sup>	64.6	61.8	42.5 <sup>l</sup>
Unweighted average (including the United States)			20.0	67.0	35.0	33.2	28.5
Unweighted average (excluding the United States)			15.8	59.6	30.8	29.1	26.7

.. Data not available.

a) Sampling months/periods vary across countries. Periods are as follows: Canada, annual averages; Denmark, November; Finland, annual averages; France, annual averages; Germany, June; Italy, December; Japan, January-June; Netherlands, all movements during the year; and the United States, quarterly.

b) Labour turnover is for a similar period except where noted in footnotes.

c) Job turnover in this table often differs from that reported in Table 5.1. As far as possible, the samples for job turnover in Table 5.2 match those for labour turnover. Consequently, the coverage of establishments varies (often limited to just continuing establishments), and so data are less comparable across countries than in Table 5.1.

d) Job turnover is an average of 1987-1988 and 1988-1989 and refers to the whole economy. Data on hirings, separations and employment refer to the whole economy for 1988 and are from Lemaitre, Picot and Murray (1992). Labour turnover figure in brackets includes temporary hirings and separations.

e) Data which refer to manufacturing only for 1984-1985 to 1990-1991 and are from Albaek and Sørensen (1995).

f) Job turnover is for 1986-1988. Labour turnover for 1984 is from OECD (1986). Share based on job turnover 1986-1988 and labour turnover 1984.

g) Data which refer to 1990-1991 for continuing establishments with at least 50 employees are from Lagarde, Maurin and Torelli (1995).

h) Job turnover is for the period 1984-1990, while labour turnover refers to 1985-1990. Labour turnover is from Mavromaras and Rudolph (1995). Job and labour turnover both derived from Bundesanstalt für Arbeit (BA) data with the same coverage of all employees except civil servants.

i) Job turnover is an average of 1985-1991. Labour turnover for 1985-1991 is from Contini *et al.* (1995).

j) Job turnover is from Genda (1995). Data are for continuing establishments only for 1988-1992.

k) Data for 1990 are from Hamermesh, Hassink, and Van Ours (1994).

l) Data for 1979-1983 are from Anderson and Meyer (1994). They are all based on quarterly estimates which have been roughly annualised by multiplying by 4. Quarterly estimation of job turnover leads to a significantly higher rate, as the shorter the time period, the more job turnover approaches labour turnover. Labour turnover in brackets includes temporary hirings and separations.

Sources and notes: For data on job turnover, see Annex 5.A for Finland. The *Employment Outlook*, 1994, Annex 3A contains information on job turnover for Canada and Germany. Additional sources are listed in the notes above.

Table 5.2, which brings together many detailed studies, job turnover accounts, on average, for almost 30 per cent of labour turnover [Anderson and Meyer (1994); Burgess *et al.* (1994); Schettkat (1994); Revelli (1996); Hamermesh *et al.* (1994)]. The case of France is unusual in that job turnover explains only 12-15 per cent of measured labour turnover; however, the share is understated by considering continuing establishments only [Lagarde *et al.* (1995); Chambin and Mihoubi (1995)]. Much labour turnover, therefore, takes place in ongoing jobs.

Labour turnover is the sum of the number of positions in which there is a hiring or a separation, *and* the number of hirings and separations in each of these positions over the period of, usually, a year. There is a direct relationship between the share of positions in which there has been at least one hiring and annual labour turnover. One measure of the share of positions in which there has been hiring is provided by data on the tenure of workers. The share of workers in an establishment/firm with less than one year of tenure represents the proportion of positions in which at least one new hire has been made during the past year. Consistent with differences in labour turnover rates, as shown in Table 5.3, Canada and the United States had a higher proportion (23.5 and 28.8 per cent, respectively) of workers having tenure of less than one year compared, for example, with France (16.8 per cent), Germany (12.8 per cent) and Japan (9.8 per cent for continuing firms only).

Assuming no measurement error, the share of all employees with tenure of less than one year is made up of three components: jobs which have been newly created and filled over the past year; ongoing jobs in which one worker replaces another on a temporary basis, with workers frequently moving in and out of them; and ongoing jobs which have been vacated and for which new hires will ultimately become long-term employees. These latter two components cannot be separated in available data. Annual data on new job creation rates are used here as a proxy for the first component.

The *difference* between the share of short-tenure workers in total employment and annual new job creation rates represents a very rough estimate of the proportion of ongoing jobs in which there has been labour turnover.<sup>4</sup> The last two columns of Table 5.3 suggest that the differences among countries are quite marked. This is a consequence of greater variation in the proportion of short-tenure workers across countries than in the rate of job creation.<sup>5</sup> Austria, France, Germany, Japan and Norway, for example, have a relatively small proportion of ongoing jobs available to be filled by individuals, while in the United States, Canada, Denmark and the Netherlands, the share is 10 per cent or more. These

differences are apparent in Chart 5.2, which indicates that there is only a slight positive correlation between job turnover and the proportion of workers with less than one year of tenure. The considerable variability observed across countries reflects differences in labour turnover in ongoing positions.

The data in Table 5.2 and Table 5.3, taken together, show that labour turnover can be rather high without a high proportion of ongoing positions necessarily becoming vacant. Relatively high hiring and separation rates compared with the share of workers with tenure less than one year implies the rotation of some individuals in and out of jobs for very short periods. For example, in both France and Germany, the share of workers with tenure less than one year is relatively low, while labour turnover is estimated at roughly 60 per cent annually. Japan is different in that both measures are comparatively low. Canada and the United States are relatively high on both. Concerning France and Germany, the data suggest that a relatively small proportion of the labour force is moving in and out of jobs of very short spells, while most of the employed are in long employment spells, a fact consistent with estimates of enterprise tenure and retention rates [OECD (1993)]. In Japan, it also seems that job matches are quickly established and durable for a large majority of workers. In Canada and the United States, a sizeable fraction continually move in and out of jobs. Therefore, to gain work experience or to find the right job, individuals in some European countries depend more on job turnover or on short work spells in comparatively fewer ongoing jobs. This may reflect the operation of internal labour markets in these countries with lower inter-firm mobility of workers and limited ports of entry into the firm.

Some of the potential implications for understanding labour markets are as follows. Often, European labour markets have been considered less flexible because flows into and out of unemployment, as measured by labour force surveys, are relatively low by comparison with North America [OECD (1995)]. However, both job turnover and labour turnover rates seem to indicate considerable employment adjustment. In spite of this, an issue is why movements into and out of unemployment seem relatively low in many European countries and what is the relationship, if any, between job and labour turnover and unemployment?

### 3. Job and labour turnover and unemployment

The expected relationship between job and labour turnover and unemployment is not at all clear, and becomes especially blurred if job search by the employed is modelled [Burgess (1994)]. Job turnover

Table 5.3. Job turnover and enterprise tenure

Unit of observation for job turnover		Job creation <sup>a</sup>		Job destruction		Enterprise tenure <sup>b</sup> < 1 year		Estimates of ongoing positions open to labour turnover (Enterprise tenure < 1 year – Job creation) Per cent of total employment	
		Annual rates as a per cent of total employment				Per cent of total employment			
		1985	1991	1985	1991	1985	1991	1985	1991
Australia	manufacturing establishments	16.1 <sup>c</sup>	..	13.2	..	20.2 <sup>c</sup>	16.0 <sup>c</sup>	4.1 <sup>c</sup>	..
Austria	continuing firms	..	7.6 <sup>d</sup>	..	5.1	..	13.8 <sup>d</sup>	..	< 6.2 <sup>d</sup>
Canada	firms	11.6 <sup>e</sup>	11.6	8.0	13.1	26.7 <sup>e</sup>	23.5	15.1	11.9
Denmark	establishments	16.3 <sup>f</sup>	13.9	13.7	14.6	26.8 <sup>f</sup>	..	10.5 <sup>f</sup>	..
Finland	establishments	10.2 <sup>g</sup>	8.2	9.3	17.1	18.1 <sup>g</sup>	11.9	7.9	3.7
France	firms	13.0 <sup>h</sup>	12.3	10.8	13.3	13.4	16.8	0.4	4.5
Germany	establishments	7.9 <sup>i</sup>	9.6	8.2	6.5	8.5 <sup>i</sup>	12.8 <sup>i</sup>	0.6	3.2
Italy	firms	12.8 <sup>j</sup>	9.6	10.0	10.5	..	15.6 <sup>j</sup>	..	6.0
Japan	continuing establishments	4.2 <sup>k</sup>	4.7	3.7	3.8	9.4 <sup>k</sup>	9.8	1.2 <sup>k</sup>	1.8
Netherlands	based on labour flows	10.5 <sup>l</sup>	14.0	8.8	10.7	11.7	24.0 <sup>l</sup>	1.2	10.0
Norway	manufacturing establishments	8.4 <sup>m</sup>	..	7.0	..	10.0 <sup>m</sup>	..	1.6 <sup>m</sup>	..
United Kingdom	firms	9.2 <sup>n</sup>	8.0	8.3	6.4	15.4 <sup>n</sup>	18.6	6.2	10.6
United States	establishments	10.4 <sup>o</sup>	12.0	9.3	11.3	28.9 <sup>o</sup>	28.8	18.5	16.8
Unweighted average		10.9	10.1	9.2	10.2	17.2	17.4	6.1	7.5

.. Data not available.

a) Sampling months/periods vary across countries and are adjusted to correspond to the period for tenure and so do not always correspond to estimates for 1985 or 1991. Periods are as follows: Australia, June; Austria, annual average of monthly year-over-year changes; Canada, annual averages; Denmark, November; Finland, annual averages; France, annual averages; Germany, June; Italy, December; Japan, January-June; Netherlands, annual average; Norway, annual averages; the United Kingdom, December (biannual); the United States, December (biannual) (June in 1989 and 1991).

b) OECD (1993).

c) For manufacturing only. Job turnover for 1984-1985 is from Borland and Home (1994).

d) Job turnover for 1988-1989 is from Hofer and Pichelmann (1995) for continuing firms only. Tenure refers to 1988. The share of continuing positions open to new hires is a ceiling as only job creation in continuing firms is subtracted from the share of employment with tenure of less than one year.

e) Job turnover refers to the private and public sectors and is an average of 1984-1985 and 1985-1986; 1989-1990 and 1990-1991. Tenure also refers to the private and public sectors for 1986.

f) Job turnover is an average of 1985-1986 and 1986-1987; and 1989-1990. Tenure data for 1987 are from Leth-Sørensen (1993).

g) Job turnover refers to 1986-1988. Tenure refers to 1986. Both cover the private sector only.

h) Job turnover for the private sector is an average of 1984-1985 and 1985-1986; 1989-1990 and 1990-1991 from Nocke (1994). Tenure refers to 1986 for the private sector.

i) Job turnover is a weighted average of [0.5(1982-1983) + 1983-1984 + 0.5(1984-1985)]; and [0.5(1988-1989) + (1989-1990)]. Tenure refers to 1984 and 1990. Job turnover refers only to the private sector, while tenure refers to both the private and public sectors.

j) Job turnover is an average of 1990-1991 and 1991-1992. Enterprise tenure for 1992 is from unpublished tabulations provided by Eurostat on the basis of the European Labour Force Survey. Both refer only to the private sector. Note that job turnover for 1985 includes extraordinary changes, while these are excluded in 1991. See Annex 5.A for details.

k) Job turnover in an average of 1984-1985 and 1989-1990 from Genda (1995). Tenure refers to 1985 and 1990. Both refer only to the private sector. To calculate column (7) for continuing establishments only, the share of short-tenure workers (9.4%) is adjusted to reflect continuing establishments only, by excluding employment in new establishments 1985-1986 (4.3%) from the 1986 Establishment Census of Japan annualised to take account of the census date. The adjustment is [(9.4 - 4.3) / (100 - 4.3)]. A similar adjustment is made using employment in new establishments (3.5% in 1990-1991) from the 1991 Establishment Census.

l) Job turnover for 1990 was constructed from labour market flows by Broersma and Den Butter (1995). Tenure refers to 1990. Both refer to both the public and private sectors.

m) Job turnover is an average of 1984-1985 and 1985-1986, for manufacturing only. Tenure < 21 months in manufacturing refers to 1986.

n) Job turnover for 1985-1987 and 1989-1991 for the private sector are from Gallagher, Daly and Thomason (1991) and Brace, Robson and Gallagher (1993), respectively. Tenure for the public and private sectors refers to 1983.

o) Data on job turnover for the private sector is from the Dun and Bradstreet Corporation for an average of 1980-1982 and 1982-1984; and 1989-1991. Tenure for the public and private sectors refers to 1983.

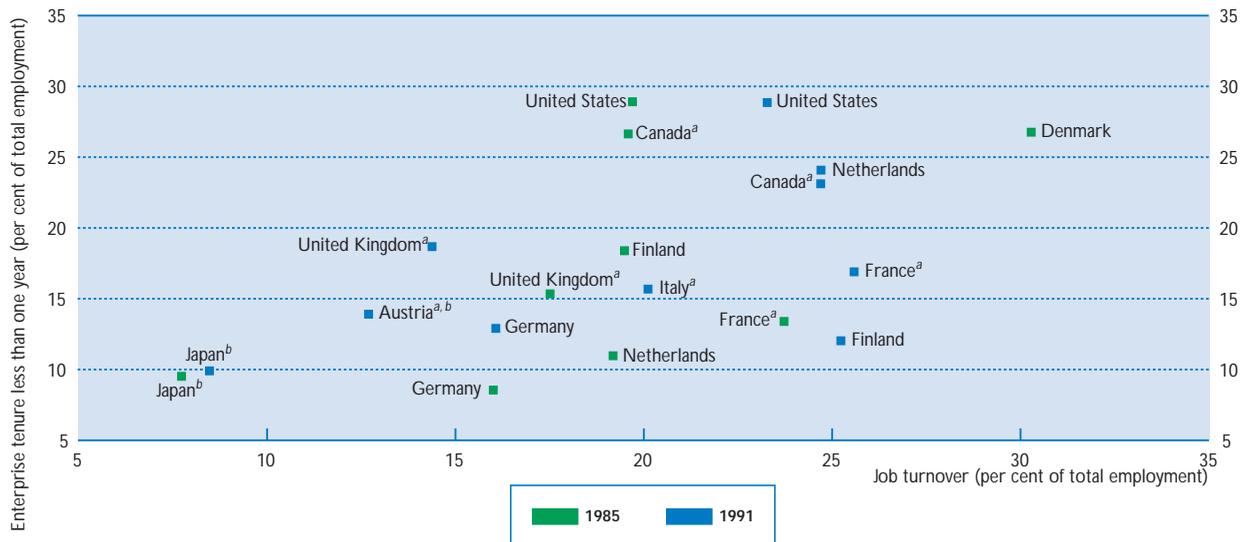
Sources and notes: For data on job turnover, see Annex 5.A for Denmark, Finland and Italy. The *Employment Outlook*, 1994, Annex 3A, contains information on job turnover for Canada, Germany, Norway, and for both the United Kingdom and the United States using data from the Dun and Bradstreet Corporation. Additional sources are listed in the notes above.

is a component of labour turnover, measured from the perspective of the type of employment change that led to a hiring or separation. Flows into unemployment from employment and the converse are also components of labour turnover. However, new job creation, or the filling of a job vacancy, need not lead

to one-to-one changes in either the stock of unemployed persons or to an increase in outflows from unemployment. This is due to at least three factors. First, new jobs may be taken by those already in work who change jobs. Second, some new jobs may be taken by people who had been outside the measured

Chart 5.2.

## Job turnover and enterprise tenure



a) Data refer to firms.

b) Continuing firms (Austria) and establishments (Japan) only.

Sources: See sources and notes to Table 5.3.

labour force. Finally, individuals can leave unemployment, not by finding jobs, but by dropping out of the labour force [OECD (1995)]. Similar caveats apply to the relationship between job loss rates and unemployment. Nonetheless, exploring the relationships is useful.

While the sample sizes are small and there may be outliers, Table 5.4 shows that the rank correlation between *job turnover* and the unemployment rate is essentially zero.<sup>6</sup> This is consistent with the lack of correlation between job turnover and net employment growth also shown in the table. Higher job turnover implies both increased job losses and job gains, such that, while there are vacancies which could be taken by the stock of unemployed persons, there is also a larger outflow of workers from jobs, many of whom are also seeking work.

There is a positive, though rarely statistically significant, correlation across countries between job turnover (as well as job creation and job loss rates considered independently) and inflows to, or outflows from, unemployment, in line with the theory outlined earlier. When considering only continuing establishments, there is a statistically significant positive cor-

relation between job turnover rates and inflows into unemployment. Note that for continuing establishments, there is a positive correlation of around 0.5 for outflows, as well. However, it is not clear why including job losses, for example, from closing establishments results in no significant relation. While job turnover does influence inflows and outflows from unemployment, its impact is just not very important relative to other factors. Time-series analyses for the United States, using quarterly data, tend to show a positive correlation between job creation and outflows from unemployment as well as between job losses and inflows to unemployment [Davis and Haltiwanger (1995); Davis *et al.* (1995)]. However, examination of annual time-series data for Canada and Denmark (not shown here) did not give very strong results.

The incidence of long-term unemployment has tended to rise and is much higher in a number of European countries compared with North America, Japan and, until very recently, Scandinavia. Moreover, these differences are not satisfactorily explained by dissimilarities in rates of unemployment. As shown in Table 5.4, higher job turnover rates are associated

Table 5.4. **Correlations between job turnover and unemployment<sup>a</sup>**

	Job turnover (private sector)		Job creation (private sector)		Job losses (private sector)	
	All establishments	Continuing establishments	All establishments	Continuing establishments	All establishments	Continuing establishments
Unemployment rate	-0.32	0.00	-0.29	0.05	-0.31	-0.06
Inflows into unemployment	0.22	0.61*	0.23	0.53	0.19	0.61*
Outflows from unemployment	0.30	0.47	0.31	0.38	0.26	0.50
Incidence of long-term unemployment (per cent of unemployed)	-0.62*	-0.56	-0.64*	-0.51	-0.54	-0.53
Net employment change <sup>b</sup>	-0.40	-	-0.06	-	-0.63*	-
Sample size (number of countries) <sup>c</sup>	11	11	11	11	11	11

- Not applicable.

\* indicates significance at the 5 per cent level using a two-tailed *t* test.

\*\* indicates significance at the 1 per cent level using a two-tailed *t* test.

a) Countries included in the correlations are Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan (continuing establishments only), the Netherlands ("All establishments" only), New Zealand, Sweden, the United Kingdom (continuing establishments only), the United States ("All establishments" only). Sampling months/periods vary across countries: see note a to Table 5.1.

b) Similar results were obtained using official estimates of net employment change from OECD sources.

c) There is some variation in the countries, according to the variables being correlated.

Sources: For data on job turnover for Denmark, Finland, France, Italy and Japan, see Annex 5.A. The *Employment Outlook*, 1994, Annex 3.A contains information on job turnover for the following countries: Canada (LEAP), Germany, New Zealand, Sweden and the United States (Dun and Bradstreet).

Additional sources are: Belgium (continuing firms only) [Mulkay and Van Audenrode (1993)], (all firms) [Leonard and Van Audenrode (1995)]; France [Nocke (1994)]; Japan [Genda (1995)]; the Netherlands (all firms) [Broersma and Den Butter (1995)]; the United Kingdom [Blanchflower and Burgess(1994)]; and the United States [Anderson and Meyer (1994)]. Data on various measures of unemployment are from OECD sources.

with a lower incidence of long-term unemployment. However, differences in job turnover only explain part of its increase.<sup>7</sup>

Further exploration of the relationship between job and labour turnover and unemployment flows is desirable. As was outlined earlier in this section, the share of short-tenure workers is the most important aspect of labour turnover. An issue is whether this component of labour turnover is related to unemployment. While the correlations between the share of

workers with tenure less than one year and unemployment flows have the expected, positive, signs, they are generally not significant at conventional levels (Table 5.5). The share of short-tenure workers is negatively related to the incidence of long-term unemployment, but not significantly so (Table 5.5). These relatively weak results are not unexpected. It is unlikely that correlations of labour turnover with unemployment would be stronger than those with job turnover. Labour turnover is higher than job turnover perhaps because of job-to-job flows (the vacancy

Table 5.5. **Correlations between enterprise tenure and unemployment<sup>a</sup>**

	Enterprise tenure (per cent of workers with tenure of less than one year)	
	Tenure (1985)	Tenure (1991)
Unemployment rate (1985 or 1991)	0.08	0.50
Inflows into unemployment (1985 or 1991)	0.71*	0.62
Outflows from unemployment (1985 or 1991)	0.52	0.21
Incidence of long-term unemployment (per cent of unemployed) (1985 or 1991)	-0.49	-0.24
Sample size (number of countries) <sup>b</sup>	11	10

\* indicates significance at the 5 per cent level using a two-tailed *t* test.

\*\* indicates significance at the 1 per cent level using a two-tailed *t* test.

a) Countries included in the correlations are Australia (1985, 1991), Canada (1985, 1991), Denmark (1987), Finland (1985), France (1985, 1991), Germany (1985, 1991), Italy (1992), Japan (1985, 1991), Netherlands (1985, 1991), Norway (1991), Spain (1985, 1991), the United Kingdom (1985) and the United States (1985, 1991).

b) The observation for Finland for 1991 is excluded because of a pronounced decline in short-tenure employment.

Sources: Data on employer tenure are from OECD (1993) and various measures of unemployment are from OECD sources.

chain), which imply that the unemployed are competing with those already working and are easily excluded from firms' selection processes.

The inference to draw is that, while low unemployment flows and a high incidence of long-term unemployment in Europe reflect somewhat lower job turnover and a lower share of positions in which there is labour turnover, neither of the relations is very strong. This suggests that either other factors influence the availability of job opportunities and/or differences across countries in the competition for jobs influences unemployment flows and duration.

It may be the case that relatively high job turnover does not truly reflect available job opportunities, at least in so far as the unemployed are concerned. External worker flows which "bypass" measured unemployment may play an important role [Boeri (1995*b*)]. Some, though limited, evidence indicates that such flows are important. In Germany, 32 per cent of separations resulted in re-employment within one week based on estimates for 1976-1981 [Schettkat (1992)]. In Italy, 25 per cent of separations over 1985-1991 resulted in re-employment within one month [Contini *et al.* (1995)]. In the United Kingdom, hiring from other jobs accounted for 48 per cent of all hiring in 1988 [Smith (1988)]. By comparison, in Canada, 53 per cent of workers permanently laid off from full-time jobs in 1988, found another job in no more than three weeks [Picot and Pyper (1993)]. This means that, at any given rate of net job growth, in spite of relatively high labour and job turnover, worker flows which bypass unemployment can limit available job opportunities for those in the pool of unemployed.

#### D. LABOUR MARKET POLICIES, JOB AND LABOUR TURNOVER

##### 1. Introduction

This section considers the possible effects of employment protection legislation (EPL) and Unemployment Insurance (UI), on job turnover, labour turnover and unemployment. The reasons for the focus on EPL and UI are: *i*) the links between EPL, job turnover and unemployment have received much attention in the literature, as has the impact of UI on employment; and *ii*) various proxy measures of EPL and the generosity of UI benefits are available for a large number of countries.

EPL includes legislation and rules governing unfair dismissal, the individual and collective layoff of regular workers for economic reasons, severance payments, notice periods, administrative authorisation for dismissal and prior discussion with union repre-

sentatives. Regulations governing temporary work contracts, such as their maximum duration or number of renewals, can also be included [(OECD (1994*b*)]. As such legislation can affect both firms' decisions to hire and fire workers in response to changing economic circumstances, as well as workers' decisions to leave jobs, it may also influence job and labour turnover.

##### 2. Theoretical arguments

Theorising about the impact of EPL on employment prior to the advent of models of job turnover led to a line of argument that, by increasing the costs of laying off workers, EPL encouraged firms to adjust their employment more slowly in downturns and to hire less during upswings, with ambiguous effects on average employment and unemployment levels over the cycle [for a summary see Buechtemann (1993)]. Bertola (1990) has also emphasised the importance of firms' expectations in the presence of EPL. If they are pessimistic about future demand, they may be more wary of hiring, the greater the costs of firing workers.

A similar logic applies when EPL is considered in theoretical models of job creation and destruction by Mortensen and Pissarides (1994) and Millard and Mortensen (1994). As employment protection may affect the costs of hiring and firing workers, it adds to the costs of job creation and destruction which are, consequently, expected to both be lower. EPL could also affect the cyclical sensitivity of job turnover. Job creation may be smoother than job losses because matching workers to new positions is costly and time-consuming [Mortensen and Pissarides (1994)]. Job losses might tend to increase less dramatically during cyclical downturns in countries where EPL is more strict [Garibaldi (1995)].

There have been few empirical tests of the impact of EPL on job turnover. A simulation for the United Kingdom, by Millard (1995), found that when the strictness of EPL was reduced, consistent with the prediction of increased job creation and job destruction, the incidence of unemployment increased, but the average duration of unemployment declined more, so that the unemployment rate was lower than otherwise. Although not shown here, the correlation of job turnover with net employment change suggests that, in countries where employment protection is less strict (Canada, New Zealand, the United Kingdom and the United States), job turnover is more cyclical, while countries with stricter provisions (France, Germany, Italy and Sweden) tend to show no cyclical pattern [Garibaldi (1995)].<sup>8</sup> On the other hand, there is little evidence that the responsiveness of job turnover to GDP growth varies significantly across countries grouped according to strictness of EPL [Boeri (1995*a*)].

The impact of UI on employment has received considerable attention, and theories have recently been developed and tested in the context of job turnover models [Garibaldi *et al.* (1995); Millard and Mortensen (1994); Millard (1995)]. By lowering the cost of unemployment, more generous UI benefits are assumed to lead to higher reservation wages. In the theoretical framework developed by Mortensen and Pissarides (1994), increases in the generosity of UI benefits will lead to an increase in job destruction, as the threshold level of productivity for a job to continue is increased, while it will also reduce the creation of jobs whose productivity now lies below the higher threshold level. A cross-country empirical test revealed that the relation between job turnover and the level of benefit was positive while the duration of benefits was negatively correlated [Garibaldi *et al.* (1995)]. In another test, changes in the incidence and duration of unemployment were consistent with the prediction of increased job destruction and reduced

job creation stemming from an increase in UI benefits [Millard and Mortensen (1994); Millard (1995)].

In sum, there is some expectation on the basis of theory that job turnover should be lower and that it should fluctuate less, the more strict is EPL, and that job destruction should be higher and job creation lower the higher are UI benefits.

### 3. Empirical evidence

Table 5.6 presents cross-country correlations between various indices of country rankings on EPL and job turnover.<sup>9</sup> Lack of data comparability must again be stressed, as well as difficulties in developing an accurate and up-to-date index to reflect strictness of employment protection.<sup>10</sup> The indicators of "strictness" of EPL include those covering regular and contract employees.<sup>11</sup> For regular employees, there are also country rankings based on the maximum weeks

Table 5.6. **Correlations between various cross-country rankings of measures of employment protection legislation and job turnover<sup>a</sup>**

Indices of employment protection legislation	Job turnover (private sector)					Job turnover (manufacturing)	
	All establishments	Continuing establishments	Establishments, size ≥ 100	Continuing establishments, size ≥ 100	Establishments < 100 / Establishments ≥ 100	All establishments	Continuing establishments
1. Regulations governing regular employees only	-0.44	-0.34	-0.67	-0.83**	0.62	-0.23	-0.47
2. Regulations governing temporary employees only	-0.79*	-0.63*	-0.77*	-0.68	0.63	-0.41	-0.64**
3. Maximum pay and notice period for dismissal of regular employees	-0.54	-0.34	-0.85**	-0.98*	0.73*	-0.38	-0.30
4. International Organisation of Employers (IOE)	-0.65	-0.33	-0.60	-0.66	0.63	-0.52	-0.54*
5. Ranking by Bertola (1990)	-0.58	-0.48	-0.79*	-0.90**	0.74*	-0.26	-0.52*
Sample size (number of countries)	11	11-12	8	8	8	12-13	15-17

\* indicates significance at the 5 per cent level using a two-tailed *t* test.

\*\* indicates significance at the 1 per cent level using a two-tailed *t* test.

a) Sampling months/periods also vary across countries: see note to Table 5.1.

Sources: For data on job turnover for Denmark, Finland, France, Italy and Japan, see Annex 5.A. The *Employment Outlook*, 1994, Annex 3.A contains information on job turnover for the following countries: Canada (LEAP), Germany, New Zealand, Norway, Sweden, the United Kingdom (Dun and Bradstreet) and the United States (Dun and Bradstreet). Additional sources are as follows: Australia [Borland and Home (1994)]; Austria [Hofer and Pichelmann (1995)]; Belgium, continuing firms only [Mulkey and Van Audenrode (1993)]; continuing manufacturing [Leonard and Van Audenrode (1993)]; all firms [Leonard and Van Audenrode (1995)]; Canada, manufacturing [Baldwin, Dunne and Haltiwanger (1994)]; France [Nocke (1994)]; Ireland [Keating and Keane (1988/1989) and Barry, Strobl and Walsh (1996)]; Japan [Genda (1995)]; the Netherlands, manufacturing [Broersma and Gautier (1994)]; all firms [Broersma and Den Butter (1995)]; Norway [Salvanes (1996)]; the United Kingdom, continuing establishments only [Blanchflower and Burgess (1994)]; and the United States [Anderson and Meyer (1994)].

1. and 2. Source: Grubb and Wells (1993) updated in OECD (1994b, Tables 6.5 and 6.6).

3. Source: OECD (1993) updated in OECD (1994b, Table 6.7).

4. Source: IOE (1985) in Emerson (1988) updated in OECD (1994b, Table 6.7).

5. Source: Bertola (1990) updated in OECD (1994b, Table 6.7).

of notice and severance payments for workers with 20 years of tenure.

The indicators used here are based on a simple ranking of countries from least to most “protective”, and they generally refer to the situation as of the late 1980s or early 1990s. This does not always match well with the turnover data, which further complicates the analysis. Moreover, the actual application of EPL usually varies greatly by type of worker, by tenure and, often, by size of establishment. Ideally, it would be desirable to measure the actual costs that EPL imposes on firms, rather than using qualitative indices, but these data are not available and one must settle for proxies.

The first result from Table 5.6 is that there is invariably a negative correlation between the various indices of EPL and job turnover, in line with theory. The correlations are, however, often insignificant at conventional test levels. It is noticeable that when the indices of EPL governing permanent and temporary workers are considered separately, the former correlations are not statistically significant while the latter are larger in an absolute sense and are often statistically significant. Results for other indices of EPL are mixed, though the signs are as expected. Charts 5.3a and 5.3b plot observations of job turnover in continuing establishments/firms in manufacturing (where the sample of countries is the largest) against the indices of EPL for permanent and temporary workers.<sup>12</sup>

Why should EPL appear to have a stronger negative effect on job turnover for temporary workers compared with permanent workers? In principle, EPL governing permanent workers smoothes job losses directly by making them more time-consuming. Further, if it is the case that EPL affects firms’ hiring, job gains would be reduced. However, the lack of a statistically significant correlation for permanent workers suggests that firms are able to reduce their employment and that new job creation for permanent employees is not necessarily constrained by the legislation.

There are several reasons for the statistically significant negative relationship between job turnover and the regulation of temporary contracts. The need for a temporary worker to meet short-term needs is likely to be more pressing than a longer-term decision to hire an additional permanent worker. Restrictions on temporary contracts relate more to the hiring decisions of firms, rather than their firing decisions as the firm knows that the contract will ultimately end and the worker will be laid off. Regulations governing regular employees affect the firing decision more directly than the hiring decision. This is consistent with the argument that the costs of firing regular workers are heavily discounted because they are expected to occur a long time in the future [Bentolila and Bertola (1990)]. Labour turnover may also reduce

the need to fire regular workers. This makes EPL for permanent workers less burdensome, a situation which does not apply to temporary contracts. These two reasons may explain the significant correlation between EPL governing temporary workers and job turnover, but the lack of one with regulations governing permanent workers.

One argument which has been raised is that job turnover may still be high in all countries because less strict rules governing temporary contracts relative to permanent workers leads to a substitution of temporary for permanent jobs. Such substitution could occur though attrition of permanent workers. Some part of such conversion of positions would be recorded as job turnover in that the attrition of permanent employees who are not replaced in their posts would show up as job losses, while the subsequent hiring of temporary workers to replace them would appear as job creation. The empirical evidence in support of this is rather weak. For a substitution of temporary for permanent jobs to have accounted for a significant share of job turnover, which is often in the range of 20 per cent annually, there would have to have been a substantial rise in the share of temporary workers in total employment, and that has generally not been observed. It would seem that only in Spain has the “conversion” of permanent to temporary jobs been sufficient to potentially have an important influence on job turnover rates [OECD (1993)].<sup>13</sup>

Job turnover in continuing or large establishments should be more influenced by EPL than turnover in small establishments as there are often minimum size thresholds for restrictions governing dismissal. Size thresholds vary across countries, but generally, firms with at least 20 employees are subject to the legislation. Unfortunately, data limitations do not allow this size threshold to be applied across all countries in the sample and, instead, a size cut-off of greater than 100 employees is used. As openings and closings occur largely among small firms, this is another reason to expect employment protection legislation to have a greater effect on job turnover in large establishments [Garibaldi *et al.* (1995)]. In the event, the correlations between the various measures of EPL are essentially unchanged for large establishments compared with those for all establishments.

There may also be a displacement effect where EPL is associated with a “transfer” of job turnover to smaller firms. In other words, in countries where employment protection legislation is more strict, small firms may absorb relatively more of any employment shocks. If that is the case, one should expect to observe a positive correlation between EPL and job turnover rates in small establishments relative to large establishments. The positive, sometimes statistically significant, correlation between employment protection legislation and job turnover in small

Chart 5.3a.

## Employment protection legislation governing permanent workers and job turnover

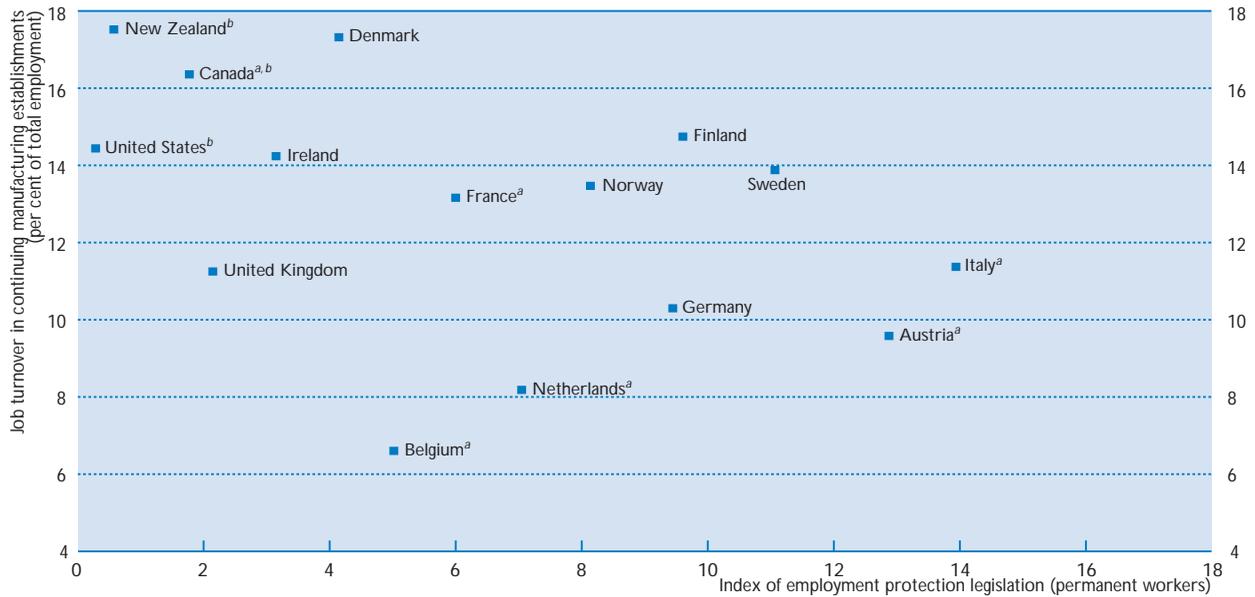
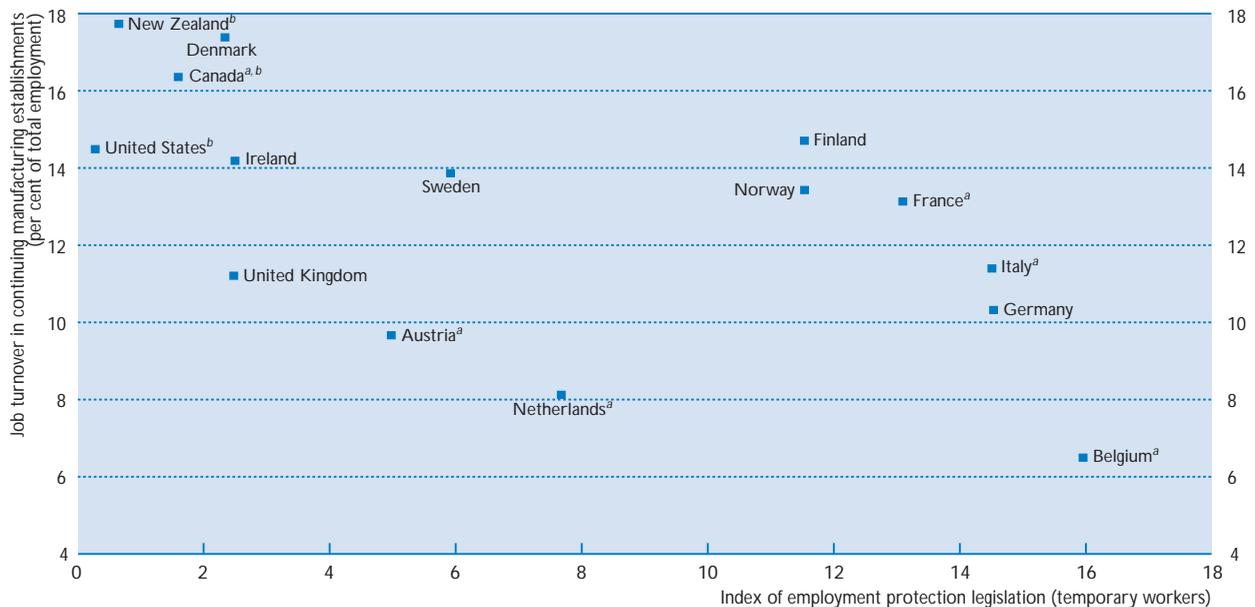


Chart 5.3b.

## Employment protection legislation governing temporary workers and job turnover



a) Turnover refers to firms.

b) Values for combined index of employment protection legislation for both permanent and temporary workers imputed in OECD (1994b).

Sources: For information on job turnover and on the index of employment protection, see sources to Table 5.6.

relative to large establishments (column 5 of Table 5.6), as well as the statistically significant negative correlation for job turnover in large establishments (column 3), provide a bit of support in favour of this displacement hypothesis.

One should also expect changes in EPL to be associated with changes in the level of job turnover over time within countries. In France, turnover in continuing establishments appears to have been unaffected when legislative changes in 1986 liberalised regulations governing fixed-term contracts and abolished prior administrative authorisation for collective dismissals [see OECD (1994*b*) and Chart 5.1 for job turnover]. Further, a strengthening of legislation on collective dismissals in 1989 was not associated with a decline in job turnover, nor does a limitation on fixed-term contracts introduced in 1990 appear to have had much impact. Liberalisation of regulations governing fixed-term contracts in Germany in 1985 was also not associated with an increase in job turnover. While hardly conclusive, these episodes do not provide strong support for the idea that changes in EPL influence job turnover.<sup>14</sup>

EPL may exert a stronger influence on labour turnover. Table 5.7 indicates that the index of strictness of EPL governing temporary workers is negatively and significantly correlated with the share of short-tenure workers in employment.<sup>15</sup> Again, the results for other indices are mixed. This means that the share of positions in which labour turnover occurs is lower, though not necessarily the amount of rotation in these positions. This may be a result of a

lower creation and destruction of temporary jobs or less rotation in ongoing positions because employers may not be able to “free” such positions because of restrictions on firing. There is currently little evidence one way or the other.

More strict EPL has been associated with a higher incidence of long-term unemployment [OECD (1993)]. The results of this chapter indicate that this is apparently only in small part a result of more “frozen” labour markets, whether measured through job turnover or labour turnover. The fact that these measures of the availability of jobs are only weakly associated with the incidence of long-term unemployment suggests that other factors, at least associated with stricter EPL, influence the availability of jobs as far as the unemployed are concerned.

Labour turnover differs across countries in ways that might influence unemployment. In countries where there is more strict EPL, there appear to be fewer ongoing jobs open to new hires. Measured inflows into unemployment are also lower in these countries. In a number of them, unemployment inflows are not sufficient to match measured job loss rates [Boeri (1995*b*)]. Taken together, these suggest the following hypothesis: Employment adjustment in some European countries seems to take place more through a combination of internal adjustment within firms or, when job losses invariably occur, worker flows bypassing unemployment. Those who do become unemployed apparently have difficulty reintegrating in jobs and become at risk of drifting into long-term unemployment. However, much more

Table 5.7. **Correlations between various cross-country rankings of measures of employment protection legislation and employer tenure<sup>a</sup>**

Indices of employment protection legislation	Enterprise tenure (per cent of workers with tenure of less than one year)		
	Tenure 1985	Tenure 1991	Tenure in European countries (1992)
1. Regulations governing regular employees only	-0.66	-0.45	0.17
2. Regulations governing temporary employees only	-0.82**	-0.63*	-0.69*
3. Maximum pay and notice period for dismissal of regular employees	-0.21	-0.20	0.38
4. International Organisation of Employers (IOE)	-0.68*	-0.26	-0.33
5. Ranking by Bertola (1990)	-0.69*	-0.53	-0.05
Sample size (number of countries) <sup>b</sup>	9-11	11-13	11

\* indicates significance at the 5 per cent level using a two-tailed *t* test.

\*\* indicates significance at the 1 per cent level using a two-tailed *t* test.

a) Countries included in the correlations are: Australia (1985, 1991), Austria (1991), Belgium (1992), Canada (1985, 1991), Denmark (1987, 1992), Finland (1985), France (1985, 1991, 1992), Germany (1985, 1991, 1992), Greece (1992), Ireland (1992), Italy (1992), Japan (1985, 1991), Netherlands (1985, 1991, 1992), Norway (1991), Portugal (1992), Spain (1985, 1991, 1992), Switzerland (1991), the United Kingdom (1985, 1991, 1992) and the United States (1985, 1991). The observation for 1992 for Italy is also used for 1991.

b) The observation for Finland for 1991 is excluded because of a pronounced decline in short-tenure employment.

Sources: See Table 5.6 for sources of indices 1. to 5. Tenure data come from OECD (1993) and unpublished data for 1992, provided by Eurostat on the basis of the European Labour Force Survey.

empirical work is necessary to confirm or refute this hypothesis.

## E. CONCLUSIONS

This chapter set out to consider whether certain indicators of labour market adjustment – job and labour turnover – vary across OECD countries. While both do differ across countries, the amount of employment adjustment suggested by these measures is considerable everywhere. However, job turnover is not associated with either cross-country differences in net employment growth or the unemployment rate. This raises a number of policy-relevant questions. In particular, is weak net employment growth in some countries really a result of a lack of structural change? And what can be anticipated by policies which try to encourage more turnover?

In line with theory, job turnover is positively correlated with unemployment inflows and outflows and negatively correlated with the incidence of long-term unemployment. However, the correlations are not very strong, and differences in job turnover do not explain much of the marked differences in unemployment flows or duration.

From a policy perspective, the high incidence of long-term unemployment in a number of OECD countries presents a major challenge. Should governments try to raise job turnover or should they work to increase rotation in existing jobs (labour turnover) or both? Policies of deregulation and encouraging business start-ups could increase job turnover. Relaxing EPL may also increase job turnover, as well as open up more ongoing jobs to hiring. The merits of these policies depends on the importance that is placed on having greater rotation in the pool of unemployment. They might tend to reduce long-term unemployment, but raise the inflow into unemployment, without necessarily changing the overall unemployment rate

greatly. Liberalising labour legislation has also to be weighed against the possible negative effects on firms' and workers' incentives to invest in human capital and, when job loss is inevitable, the role that certain minimum standards might play in giving workers time to find a new job and, perhaps, minimise earnings losses.

Moreover, it is not obvious that increasing vacancies will necessarily improve the situation for the long-term unemployed because of weak net employment growth. As there is already considerable labour turnover in ongoing jobs, the long-term unemployed are less likely to find or keep a job than other job seekers. Policies which increase job turnover would provide additional opportunities through new job creation. However, as the number of these new jobs is close to the number of individuals displaced through job destruction, it is not clear that the opportunities to reintegrate the long-term unemployed are expanded, at least not without additional and more focused labour market policies.

In sum, the results of ongoing research on the process of job creation and job destruction point to a pressing need to understand and measure the impact of institutional differences among countries on the way labour markets adjust.

The development of more comparable data sources on job creation and destruction, together with longer time-series is crucial. Without this, there will continue to be considerable disagreement over the appropriate policy course to follow. This applies not only to data on job creation and destruction alone, where the emphasis needs to be placed primarily on developing comparable criteria for defining an establishment and for measuring establishment openings and closings. But, understanding how adjustment takes place and the implications for unemployment requires the development of compatible data on labour turnover, in particular, accurate measures of flows into and out of unemployment, and flows from one job to another.

## Notes

1. This conclusion is based on applying the procedure developed by Hodrick and Prescott (1980) to fit a smooth curve through a data series, in this case job turnover. A sensitivity analysis was conducted using different values of an exogenous parameter which smoothes the estimated trend line.
2. This is data for the entire private sector, compiled by the Dun and Bradstreet Corporation. Results based on it should be treated with considerable caution for reasons explained in OECD (1994a).
3. The estimate for the United States is not fully comparable as it is based on quarterly data which has been annualised and refers to only several States. An analysis of various estimates suggests that labour turnover may be in the range of 130 per cent annually in the United States [Davis and Haltiwanger (1995)].
4. There are several difficulties with this comparison. First, employer tenure and job turnover data come from entirely different sources and estimates of employment can consequently be quite different. This is partly mitigated by comparing percentages, as it is differences in the distribution which are more important than differences in levels. Second, job creation is often measured at the establishment level, while tenure is measured at the firm. To be consistent with enterprise tenure, inter-establishment shifts in multi-establishment firms should be excluded. The relatively few estimates comparing enterprise and establishment mobility reveal that the share of employed individuals with tenure in a particular establishment of less than one year would be between 3.5 (Australia), 3.7 (France) and 5 percentage points (Denmark) higher than that using enterprise data. However, enterprise and establishment tenure can be quite different in that legal changes affecting enterprise tenure may leave establishment tenure unchanged. Third, time periods differ in that job turnover includes the entire year while the comparable category in tenure data is less than one year.
5. The coefficient of variation for job creation, taken across all countries for which there are data for the whole private sector, is 24.2 per cent, while for short-tenure workers, it was 44.9 per cent in 1985 and 34.9 per cent in 1991.
6. Estimates for job turnover used in the correlations in Table 5.4 and Table 5.6 differ slightly from those in Table 5.1 in that, where possible, current year averages were used. This involved changes in the estimates from base year averages for Canada, Denmark, Finland, Germany, Ireland [manufacturing from Keating and Keene (1988-1989)], Italy, New Zealand, Sweden, the United Kingdom (Dun and Bradstreet) and the United States (Dun and Bradstreet). See Davis *et al.* (1995).
7. These results are broadly consistent with those obtained from a simple regression analysis which makes use of all observations across countries and over time (not shown here). The incidence of long-term unemployment was regressed on job turnover as well as dummy variables which control for differences across countries and over time. The coefficients for job turnover were statistically significant. It is possible to derive an estimate of the variance in the incidence of long-term unemployment which is explained by the variance in job turnover. The results of this test (not shown here) show that the variance in job turnover explains only a small share of the variance in the incidence of long-term unemployment. The results were even weaker when the relation between job turnover and unemployment inflows and outflows was examined. These are consistent with the results observed in the simple correlation analysis.
8. Employment protection legislation governing notice and compensation relating to the dismissal of regular employees is based on that presented in OECD (1993).
9. Countries included in the correlations are: Australia (manufacturing only), Austria (continuing firms only), Belgium (in manufacturing, continuing ones only), Canada, Denmark, Finland, France, Germany, Ireland (manufacturing only), Italy, Japan (continuing establishments only), the Netherlands ("all establishments" only, manufacturing), New Zealand, Norway (manufacturing only), Sweden, the United Kingdom (continuing establishments only) and the United States ("all establishments" only, manufacturing). For establishments where size  $\geq 100$ , the countries included are: Austria (continuing ones only), Canada, Denmark, Finland, Italy, New Zealand, Sweden, the United Kingdom and the United States ("all establishments" only).
10. Firm-based job turnover data would be preferable to the mostly establishment data used here in analysing the effect of EPL as transfers of jobs among establishments owned by the same firm, which are counted as job turnover at the establishment level, should not be affected by employment protection.
11. The index used is based on that developed by Grubb and Wells (1993), updated to include Austria, Finland, Norway, Sweden and Switzerland, Canada, the United States, Japan, Australia and New Zealand [OECD (1994b)]. Indices of employment protection for temporary and permanent employees from OECD (1994b) are not available for Australia, Canada, Japan, New Zealand and the United States. Imputed values for the combined index were used as proxy values for the indices governing temporary and permanent workers in the cases of Canada, New Zealand and the United States. Missing values for Australia and Japan explain why the

- sample size varies for a particular category of job turnover.
12. Results for the correlations between indices which provide varying measures of the generosity of UI and job turnover were largely positive, never statistically significant and are not reported. Indices of the generosity of unemployment benefits reflecting varying family situations, varying durations of unemployment and different combinations of types of benefits were tested. The procedure described in note 7 was applied to pooled time-series data across countries and it was found that the variation in the index of UI generosity explained very little of the variance in job turnover. One reason may be that these indices compare gross benefits before taxes with pre-tax wages, while reservation wages of workers may be more influenced by the net replacement rate of unemployment benefits after taxes. Unfortunately, data on net replacement rates are not available for a time period which corresponds with that of the job turnover data.
  13. Though the share of temporary workers in employment has risen significantly in Australia and France, this could have only accounted for a small share of total job turnover (see Chapter 1 for data on temporary employment). If the entire increase of the share of temporary workers in France was a result of substitution, and if there was a delay of at least one year between all substitutions, this would have generated job turnover of 16 per cent over the ten-year period, or 1.6 per cent annually. However, this would only account for 8 per cent of annual job turnover of 20 per cent.
  14. In both France and Germany, job turnover was regressed on a time trend and dummy variables meant to identify years in which there were changes in EPL. Legislative changes did not have any statistically significant impact on job turnover.
  15. Variation in the sample size for a particular year reflects missing values for the indices of EPL governing temporary and permanent workers for Australia and Japan, as described in note 11.

## ANNEX 5.A

**Sources, definitions and methods of data collection on job gains and job losses**

The data used in this chapter are drawn from national, primarily administrative, sources that differ not only in their methods of collection, but also in their employment coverage and sectoral classification. The analysis involves cross-section comparisons of employment stocks which are longitudinally linked at the level of establishment/firm. It is important to note that most administrative sources do not distinguish between job slots and the individuals filling those slots.

Because coverage differs across data sources, an attempt was made to "standardize" as much as possible. Thus, the analysis is limited to dependent employees in the private sector, excluding public administration and establishments providing non-market services. Self-employed individuals and domestic workers are also excluded. In addition, the primary sector, except for mining and quarrying, was excluded. The exclusion of non-market services presented difficulties. Public sector institutions in ISIC (International Standard Industrial Classification) 931 (education services), ISIC 333 (medical, dental and other health and veterinary services) and ISIC 934 (welfare institutions) were not included in Denmark, France, Italy, Japan, the United Kingdom (Dun and Bradstreet) and the United States (Dun and Bradstreet). Equivalents of these entire industry groups were excluded in Canada [Longitudinal Employment Analysis Program (LEAP)], Finland, Germany, New Zealand and Sweden because a distinction could not be made between public and private establishments. In data taken from published sources, the public sector can be excluded in the cases of France [Nocke (1994)] and the United Kingdom [Blanchflower and Burgess (1994)]. Data taken from some published sources include some public sector workers: Austria [Hofer and Pichelmann (1995)], Belgium [Leonard and Van Audenrode (1995)], the Netherlands [Broersma and Den Butter (1995)] and the United States [Anderson and Meyer (1994)]. There are minimum establishment or firm size cut-offs in a number of countries: France (data described in this annex),  $\geq 20$ ; Ireland, manufacturing, [Keating and Keane (1988/1989)],  $\geq 3$ ; Japan [data described in this annex and Genda (1995)],  $\geq 5$ ; the Netherlands, manufacturing, [Boersma and Gautier (1994)],  $\geq 10$ ; the United Kingdom [Blanchflower and Burgess (1994)],  $\geq 25$ ; and the United States, manufacturing, [Longitudinal Research Database (LRD)],  $\geq 5$ .

Comparisons of the status of each establishment between years  $t$  and  $t + 1$  result in the classification of each establishment and associated employment changes according to openings, closures and – among continuing establishments – expanding, contracting and those with

unchanged employment. An opening is recorded when the first dependent employee is hired, while a closing establishment is one that has laid off all its dependent employees. Transitions to and from self-employment are counted as openings and closings, respectively. Movements to and from industries included in the sample are also counted as openings and closures. Privatisations are counted as openings. For continuing establishments, gains and losses by establishment size group are distributed according to establishment size at time  $t$ . There are many other subtleties which influence opening and closing rates described in the country-specific definitions, below. Countries described in this annex are: Canada (Census of Manufactures), Denmark, Finland, France, Italy, Japan and the United States [Longitudinal Research Database (LRD)]. Data are also published in OECD (1994a), and readers should refer to Annex 3.A for descriptions of data used for the following countries: Canada (LEAP), France (Chart 5.1), Germany, New Zealand, Norway [see also Salvanes (1996)], Sweden, the United Kingdom (Dun and Bradstreet) and the United States (Dun and Bradstreet).

**Canada**

Data are from the annual Census of Manufactures (CMA) of Statistics Canada and cover the period 1985-1992.

*Method:* The CMA contains linked data on both enterprises and establishments. An establishment is usually equivalent to a factory, plant or mill. As such it excludes head offices or similar activities if they are located separately from the establishment or if they serve more than one establishment. An enterprise is defined as all establishments in the manufacturing sector under common control and is distinct from the legal entity, or ownership unit. Each establishment is identified by a Record Serial Number (RSN) and each enterprise by a unique code (ENT). Matching establishments through the RSN over time allows both establishment and job dynamics to be examined.

*Openings/closures:* For establishments, they are based on receipt of a new or changed RSN. Apart from new or closed establishments, RSN codes for continuing establishments are reassigned if ownership, name and location all change. Tests adding the requirements that, when a new RSN is given, employment or shipments must also be positive (entry) or zero (exit) in the year prior to or equal to that when the RSN disappeared did not have much effect on the results.

## Denmark

Data are from the *Integreret Database for Arbejdsmarkedsforskning* (IDA) (Integrated Database for Labour Market Research) of Danmarks Statistik, based on various administrative sources. The core sources are the Salary Information Register, established by the tax authorities, and the Business Register of Danmarks Statistik. Additional sources include other tax registers, the Central Population Register, the Register for Unemployed Persons and the register-based workplace statistics. The information covers the period 1985-1990 and refers to the last week of the month of November. For this study, all public sector establishments are excluded and data by industry are only available at the one-digit ISIC (Rev. 2) level.

*Method:* This is a true longitudinal dataset for both individuals and establishments. Data on individuals are linked to establishments each November to determine their employment situation, using the Salary Information Register. Comparison is then made between each November to calculate the categories of job turnover analysed in this chapter. Some adjustments were made in the standard tabulations for Denmark to ensure greater consistency with other countries. This involved distributing all changes included in the category, "Other" (openings and closures within firms), among openings, closures, expansions and contractions and unchanged employment.

*Openings/closures:* Four criteria are used: ownership, workforce, industry and location. For an establishment to be considered the same from year to year, one of three conditions must be met: *i)* same owner and same industry; *ii)* same owner and same workforce; or *iii)* same workforce and location or industry. "Same workforce" is defined as a situation where at least 30 per cent of the employees are common to the establishment from year to year. This ensures that either workforce or ownership and one additional criterion must change for an establishment to be counted as new.

## Finland

The data come from the Business Register of *Tilastokeskus* (Statistics Finland), based on various administrative files from the registers of the tax authorities for enterprise data, supplemented by annual establishment surveys. Industries are classified according to the Finnish system, which is based on ISIC (Rev. 3).

*Method:* Tax registers contain enterprise data, but not information on establishments. Establishment data are based largely on enterprise surveys which collect information on employment, branch of economic activity, location and information on take-overs. Verification of information included in the tax register is also obtained. Surveys are sent to all new and existing enterprises covering: all multi-establishment enterprises; all single-establishment enterprises employing more than 20 persons; and a portion (on a rotating basis) of remaining enterprises. To be included, firms must operate for at least six months and have a turnover of at least Fmk 45 000 (1991). Employment estimates are annual averages, though in enterprises which are not surveyed, establishment employment is estimated by dividing the wage bill by average industry wages. Among

continuing establishments, there is not a separate category for those with unchanged employment.

*Measurement of openings/closures:* Openings and closures are based upon receipt and termination of, or changes in, an establishment identification number. Apart from newly formed establishments, this occurs if certain criteria are met. Where ownership changes, if either address or detailed industry group changes, this is counted as a new establishment.

## France

Data come from an enterprise panel called the "Échantillon Marché et Stratégies d'Entreprises" (MSE). This is based on two sources: "Bénéfices Industriels et Commerciaux" (BIC) and "Système Unifié de Statistiques d'Entreprises" (SUSE), both produced by INSEE. Data in SUSE are based on a combination of two sources: tax declarations from the Direction Générale des Impôts and data from the Enquête Annuelle d'Entreprises (EAE) for firms with more than 20 persons. Combining these sources is possible through use of the *Système Informatique pour le Répertoire des Entreprises et des Établissements* (SIRENE), developed by INSEE. This is the official register of enterprises and establishments. Data are merged with information on employment taken from the *Enquête sur la Structure des Emplois* (ESE). Data cover the period 1984-1991. Only establishments with at least 20 employees are included. The data cover most private and semi-public sectors, excluding agriculture and the public service. Public sector institutions in education services, health and medical services and social welfare services are excluded. Industries are classified using the *Nomenclature d'activités et de produits* (NAP) classification system converted into ISIC (one-digit groups).

*Method:* A sample is drawn from the BIC file in 1986 and data from the combination of BIC and SUSE provide the information on the demography of SIREN units (firms). In 1992, there were approximately 13 000 enterprises in the MSE sample. The ESE provides detailed annual information about employment and its characteristics [annual earnings, occupation (six broad groups) and gender in SIRET units (establishments) with 10 or more individuals which are aggregated to the SIREN (firm) level, though a SIREN code attached to each SIRET unit]. Employment includes part-time workers converted to full-time equivalents based on relative salary costs. Employment estimates are annual averages.

*Openings/closures:* The data available do not directly provide information on openings and closings. This information is reconstructed based on information on the existence of enterprises in the BIC data. Recording of SIREN units is based on commencement and cessation of activity in the underlying business register. Registration is required for social charges purposes, and data are thought to be fairly accurate. They are divided into "création pure", or new, enterprises and "création reprise" – changes in ownership, merger, incorporation and restructuring, including change in location of head office. In the first, a SIREN unit receives its first registration when its first establishment is opened. Many closures (those that are voluntary) are not always reported, though this is more the case if the firm has

no employees. Officially recorded closures may take two forms: cessation of operation, with the possibility of recommencement; and legal closure (faillite). However, the latter may lead to partial take-over after liquidation or continued operations under judicial control. Administrative data do not permit different types of closure to be distinguished. There are some time lags in recording commencements and cessations of activity.

### Italy

The data are from records of the *Istituto Nazionale Previdenza Sociale* (INPS) (National Institute for Social Security), which collects social security contributions from both firms and workers, and administers retirement benefits, various wage supplements and unemployment benefits. The information covers the period 1985-1991. All public sector firms are excluded. Industry data are based on the national classification system at the two-digit level and were converted to ISIC (Rev. 2) for this chapter.

*Method:* A standard comparison between consecutive annual employment observations on each firm is made to calculate job turnover. Firms temporarily operating without dependent workers are retained in the data file and counted as having no employees. This leads to a more accurate reflection of enterprise turnover than in some other countries.

*Openings/closures:* New registration of businesses with the INPS are counted as openings. However, legal changes resulting in the formation of new firms, hence the receipt of a new identification number, are also counted. It is not possible, therefore, to differentiate changes in ownership from the opening of a new business. A screening method can be applied in which extraordinary changes in employment, likely associated with purely legal transformations, can be excluded from estimates of job turnover. Such data were used in this chapter, unlike Chapter 3 in the 1994 *Employment Outlook*. Delays in data processing affect the count of business terminations, especially among small firms. To compensate for this, the INPS applies estimated closure probabilities to periods when reported data are absent.

### Japan

Data are from the Survey of Employment Trends, conducted by the Ministry of Labour. This survey of 14 000 private sector establishments is based on the Establishment Census of Japan and is conducted twice annually. Only establishments with five or more dependent regular workers are included. Industry data are available using the Standard Industrial Classification of Japan for 44 one- and two-digit groups, though coverage is not complete, with domestic services and education being excluded.

*Method:* The Survey of Employment Trends is conducted twice annually, in January and June, based on the same sample, which permits the calculation of job turnover through matching individual establishments in consecutive surveys. On the other hand, establishment openings and closures cannot be determined from this statistical source because the permanent nature of the sample – spanning

three years for establishments with a dependent workforce of 30 or more – restricts coverage to surviving establishments only. Supplementary data on establishment openings and closures can be obtained from the Establishment Census.

### United States

The Longitudinal Research Database (LRD) is a longitudinal one for establishments and enterprises, but not for workers, based on a combination of census and survey data. It is based on data from the quinquennial Census of Manufactures (CM) and the Annual Survey of Manufactures (ASM) of the US Department of Commerce, Bureau of the Census. This sample of the LRD covers the period 1984-1988. It covers only the manufacturing sector and only establishments with at least five employees. Only data on manufacturing establishments are available – data on head offices are excluded. Data are available using the US Standard Industrial Classification (SIC) at the two-digit level.

*Method:* Data on job creation and loss in the LRD is based on the ASM. This is a probability sample of one-seventh to one-fifth of establishments and approximately 75 per cent of employment from the CM, followed for five years. In census years, it is possible to identify the sample of establishments that would have been in the ASM were it conducted, which provides a continuous series from the ASM. Establishments are added to the ASM annually from the Company Organization Survey (multi-unit companies) and openings (single-unit companies) identified through Employer Identification numbers of the Social Security Administration. There have been two significant changes to the ASM affecting the definition of the sampling unit and sample weights. Establishment level longitudinal data can be generated as each establishment is given a permanent plant number (PPN) which it maintains during its life. Employment levels in each establishment can then be compared across consecutive surveys. Several adjustments are made to the raw data involving: a redefinition of annual employment; imputation of missing data; and adjustment for processing errors. Data are validated using administrative records. Rotation of establishments in the ASM leads to the need to impute employment in the year preceding entry into the sample as well as to distinguish the effects of rotation from actual employment changes. Aggregate data from the LRD do not correspond exactly to the official aggregate ASM/CM published data.

*Openings/closures:* A series of steps are followed to identify openings and closures. First, establishment identification numbers (PPN) are matched. These remain unchanged through the life of the establishment even if ownership changes. Employment levels in consecutive years are compared which provides preliminary estimates of openings and closures. Coverage Codes (CC) are then compared. The CC variable provides information on why an establishment did or did not appear in a year, *i.e.* whether and how establishment operations have changed. Total employment in previous periods is also compared. This may have an effect somewhat similar to screening establishment changes using continuity of the workforce.

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