



FINAL REPORT

Back to Work: Re-employment, Earnings and Skill Use after Job Displacement

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Helping Displaced Workers Back into Jobs
by Maintaining and Upgrading their Skills

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FOREWORD

This report provides new and more extensive evidence about the incidence of job displacement and its consequences for 14 countries. Job displacement is defined as involuntary job loss due to economic factors such as economic downturns or structural change and particular efforts are made to improve data comparability across the 14 countries included in the analysis. Displacement rates as well as re-employment rates one or/and two years after displacement are presented in the chapter. The report also looks at the effect of displacement on subsequent earnings, as well as some additional aspects of job quality, and explores changes in skill requirements resulting from occupational mobility following displacement. Finally, the groups of workers most affected by displacement – both in terms of its incidence and consequences – are identified. The OECD gratefully acknowledges financial support by the European Commission both for the production of the report and for the organisation of the conference at which it was discussed.

This report was prepared by Glenda Quintini and Danielle Venn. Statistical assistance was provided by Sylvie Cimper, Paulina Granados Zambrano and Vahé Nafilyan. A preliminary version of this report was presented to an expert audience at a conference held in Paris on 16-17 May 2013 and this final version incorporates the feedback collected at the event. The analysis carried out in the report serves as background to a series of country-specific studies that the OECD will carry out over the next two years. Participating countries include: Australia, Canada, Denmark, Finland, Japan, Korea, New Zealand, Sweden and the United States.

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ACRONYMS AND ABBREVIATIONS

ISCO International Standard Classification of Occupations

O*NET Occupational Information Network (United States)

BACK TO WORK: RE-EMPLOYMENT, EARNINGS AND SKILL-USE AFTER JOB DISPLACEMENT

Executive summary

This report provides new and more extensive evidence of job displacement and its consequences for 14 countries. Job displacement, i.e. involuntary job loss due to economic factors such as economic downturns or structural change, is highly cyclical but has not exhibited any upwards trend over the past decade. Differences in available data sources and definitions make cross-country comparisons difficult, but it appears that displacement affects around 2-7% of employees every year in the countries for which data are available.

Some workers have a greater risk of job displacement and are more likely to experience poor post-displacement outcomes than others. In most of the countries examined, older workers and those with low education levels have a higher displacement risk, take longer to get back into work and suffer greater (and more persistent) earnings losses. While youth also have a higher risk of displacement than prime-aged workers, they fare better afterwards. Young workers generally find work relatively quickly after displacement, often in jobs with greater skill requirements than their previous jobs. Women are generally no more likely to be displaced than men, once other factors such as the type of contract they hold before displacement are taken into account. However, women are more likely than men to become disconnected from the labour market and experience longer spells of inactivity after displacement.

The extent of earnings losses after displacement varies substantially across countries. Earnings losses tend to be fairly low in the Nordic countries, but much larger in the other countries examined in the report. Most of the loss in annual earnings after displacement can be attributed to time spent out of work rather than to lower wage rates upon re-employment. In most of the countries examined, men suffered from bigger and more persistent earnings losses than women, despite women taking longer, on average, to return to work. Older workers and those who did not complete secondary school also tend to suffer greater-than-average earnings losses after displacement.

As well as lower earnings, re-employed displaced workers are more likely to work in part-time or non-permanent jobs than prior to displacement, and work shorter hours on average. Other measures of the quality of post-displacement jobs, such as the incidence of work at non-standard times, the availability of paid leave and whether workers have managerial responsibilities, also suggest a decline in job quality after displacement. Some of this effect may be due to the loss of seniority that displacement brings, as job quality tends to improve with longer tenure.

Displaced workers tend to use fewer mathematics, cognitive, interpersonal and verbal skills and more craft and physical skills in their pre-displacement jobs than the average employee. This suggests that they may be ill-equipped to take advantage of job opportunities in expanding sectors after displacement. Nevertheless, most displaced workers who are re-employed find jobs that use similar skills to their pre-displacement jobs, even if they move to a new occupation or industry. Even among those who experience a significant change in skill use following displacement, many move to jobs with higher skill requirements than their former jobs. However, a small sub-set of workers experience “professional downgrading”, where their new jobs use far fewer skills than their previous jobs. Those who suffer

professional downgrading experience significant losses in math, verbal, cognitive and interpersonal skills, modest gains in the use of craft skills and significant increases in the use of physical skills.

Changes in skill use after displacement explain some, but not all, of the earnings losses experienced by displaced workers. Changes in industry also appear to matter, suggesting that the loss of job-specific skills plays a role alongside changes in the use of generic skills.

These findings help identify a number of policy issues to be explored in future work. *First*, are policies that require large firms to provide re-employment services to displaced workers justified? On the one hand, this report shows that workers in smaller firms have a much higher risk of displacement than those in larger firm, suggesting that general active labour market programmes are needed. On the other hand, while displacement is more likely in smaller firms, the number of displaced workers is generally larger in larger firms, possibly justifying existing obligations applying to the latter. *Second*, what type of re-employment assistance and training is best suited to help displaced workers find work? findings in this report suggest that not all displaced workers may need retraining to find a new, high-quality job as not all changes in industry or occupation after displacement lead to a significant change in the skills used at work. However, a small group of displaced workers moves to job with significantly lower skill requirements, leading to professional downgrading and more sizeable earnings losses, pointing to the need both for skills assessment at unemployment entry and either retraining or job-search support to improve the match between skills and job requirements. *Third*, should helping people return to work quickly, especially for women, older workers and the low skilled, be a priority to limit earnings losses and skill depreciation after displacement? The finding, in this report, that earnings losses are almost entirely due to periods of non-employment rather than lower wages appears to support this view, expect perhaps for the minority of workers requiring retraining. *Finally*, does knowing in advance about displacement make a difference in outcomes relative to not knowing? This issue is not explored in this report but should be the object of future analysis, notably by looking at countries – such as the United States, with its WARN Act (Worker Adjustment and Retraining Notification Act) – which require advance notification to workers affected by economic dismissals.

Introduction

As documented in recent editions of the *OECD Employment Outlook*, the so-called Great Recession resulted in the destruction of millions of jobs across OECD countries, as firms closed or downsized. Workers “displaced” involuntarily from these jobs have often faced long periods of unemployment, during which time their skills could have depreciated. Even when they find a new job, it may have lower pay or inferior working arrangements to their pre-displacement job. As such, the costs of job displacement may be substantial and long-lasting. While job displacement is more prevalent during a downturn, it remains significant even in good times as firms continuously adjust to structural and technological changes.

Therefore, it is important to have a better understanding of the incidence and impact of job displacement in order to guide policy for helping affected workers. While the issue of job displacement, and particularly its impact on wages and earnings, is well-documented in the academic literature, differences in the definitions, methods and data sources used make it difficult to compare results across countries and individual studies. As well, a number of key areas of research have been largely neglected in the existing literature, including the impact of displacement on skill use and working arrangements such as hours, job security and job benefits.

This report summarises the results of a cross-country study of job displacement over the past decade, covering Australia, Canada, Denmark, Finland, France, Germany, Japan, Korea, New Zealand,

Portugal, the Russian Federation, Sweden, the United Kingdom and the United States. It attempts to fill some of the gaps in the existing literature by using a comparable methodology to examine job displacement and its consequences in these countries.¹ The report is organised as follows. Section 1 discusses the definitions and data sources used in the report, as well as their limitations. Section 2 presents estimates of the incidence of job displacement as well as identifies the types of workers most likely to be affected. Section 3 discusses the re-employment prospects of displaced workers. Section 4 examines the impact of job displacement on earnings, hours and working arrangements. Section 5 presents a detailed examination of skill-use by displaced workers before and after displacement, and the links between skills and post-displacement wage losses. The implications of the findings for policy makers are discussed in the conclusions of the report.

1. Defining and measuring job displacement

In this report, the term “job displacement” refers to involuntary job separations due to economic or technological reasons or as a result of structural change. Ideally, the exact reason for each job separation would be observed so that job displacements could be distinguished from other forms of job separation such as voluntary quits. However, in practice, it is often very difficult to know or accurately measure the true reason for job separations. In this report, two main types of data source and definitions are used:

Firm-identified displacement: job displacements are defined as job separations from firms² that, from one year to the next, experience an absolute reduction in employment of five employees or more and a relative reduction in employment of 30% or more (*mass dismissal*) or that ceased to operate (*firm closure*).³ Mass dismissals and firm closures are typically identified using linked employer-employee longitudinal data, usually from administrative sources such as tax or social security records.

Self-defined displacement: job displacements are defined as job separations where the reason given for leaving the previous job is economic reasons (e.g. redundancy, layoff, business slowdown, lack of work, firm closure, mass dismissal, etc.) or dismissal for cause (e.g. the worker was not able to do the job, employment terminated during the probation period, poor performance or behaviour of the worker, etc.).⁴ Self-defined dismissal is typically measured using household panel data or cross-sectional data with retrospective questions about job displacement. In both cases, workers who separate from their jobs are asked about the reason that they left their job, allowing job displacements to be distinguished from other types of separations.

Each definition and data source has its advantages and disadvantages. Firm-identified displacement is commonly used in the literature examining the impact of job displacement on wages and earnings because a mass dismissal or firm closure can be thought of as exogenous to the skills or earning capacity of the workers involved and the large sample sizes usually involved allow for accurate estimation of post-displacement effects. However, individual or small-scale job displacements cannot be easily identified and are excluded from the analysis, even though they may have important consequences for the individuals concerned. Administrative data sources tend to yield more accurate measures of post-displacement wages and earnings than household surveys and contain more information about firm characteristics. However, administrative data sources typically have limited information on worker characteristics and can only distinguish between employment and non-employment after displacement, rather than identifying periods of job-search, education/training or inactivity.

By contrast, household surveys usually have a rich array of information about the characteristics of workers and their situation after displacement, but have a smaller sample size than administrative sources. Perhaps the biggest limitation of survey data is in the identification of displacement, which relies on the accuracy of respondents’ answers to questions about why they left their previous job. Their

answers may be influenced by their experiences after displacement. For example, if they quickly found a new job, they may say that the reason they left their previous job was to move to a better job, in which case the separation would not be identified as a displacement. This would also tend to bias the results towards poorer post-displacement outcomes, as those who report being displaced are likely to be those that stay unemployed longer or experience greater earnings losses. The categorisation of reasons for displacement also varies considerably across the countries examined, making cross-country comparisons more difficult. For example, the treatment of separations from temporary contracts is not the same in each country. In some countries, the “end of a temporary contract” is one possible reason for leaving the previous job, and workers who leave a temporary contract voluntarily cannot be distinguished from those who do not have their contract renewed for economic reasons. In many countries, workers on temporary contracts often answer that the reason they left their previous job was due to economic reasons, rather than because their temporary contract ended. However in several countries, notably France, a majority of separations of temporary workers are attributed to the end of the contract, rather than economic reasons. For simplicity, the end of a temporary contract is not considered as job displacement in the remainder of this report because it is difficult to accurately identify voluntary and involuntary separations in a way that is consistent across countries.⁵

It is not clear, *a priori*, which of the data sources or definitions used yields the most accurate estimates of displacement. On the one hand, using administrative data excludes displacement in smaller businesses, whose workers are more likely to be displaced and who tend to have certain characteristics, as well as individual or small-scale displacements. On the other, while using survey data potentially covers a broader array of displacements, the results rely on subjective responses and involuntary displacements of temporary workers are not captured in a way that is comparable across countries. In a direct comparison of the two main types of data used in the literature, von Wachter et al. (2009a) use matched survey and administrative data for California for the period 1990-2000. They find that administrative data tend to overstate the incidence of displacement (by including many voluntary job separations) while survey data tend to understate the incidence of displacement because workers tend to ignore “less severe” job displacements (those which lead to only short spells of unemployment or small earnings losses) when asked about their recent experiences. These limitations should be kept in mind when comparing displacement incidence and outcomes across countries, particularly when comparing estimates for self-defined and firm-identified displacement. For this reason, these are shown separately in all the figures and tables in this report.

Regardless of the data source and definition used, the data are analysed in the form of annual observations. Workers are defined as displaced if they are employed in one year, and either employed in a different job or not employed in the following year and the reason for the separation is either firm-identified or self-defined displacement, as outlined above. The use of annual data will tend to underestimate the incidence of displacement because workers may be displaced several times over the course of a year.

Several additional restrictions are placed on the samples used in the analysis. Only employees are examined – *i.e.* employers, the self-employed or unpaid family workers are excluded from the sample. To avoid picking up job separations that happen soon after hiring (and may be the result of the firm and employee deciding that they were not well-matched, rather than for economic reasons), only workers with at least one year of tenure with the same employer are examined. Those who work in public administration, defence, for private households or international organisations are also excluded from the analysis, as are those who hold more than one job prior to displacement. For countries which use the firm-identified definition of displacement, the analysis only covers workers from firms with 10 or more employees in the year prior to displacement. Finally, the analysis examines only workers who were aged 20-64 years in the year prior to displacement. Young workers were excluded for the same reason as

short-tenure workers. Older workers were excluded because it may be difficult to differentiate between displacement and retirement for those aged 65 years and over. Unfortunately, due to data limitations, not all sample restrictions could be implemented for every country. These differences should also be kept in mind when comparing results across countries. A full description of the data sources, definitions and sample restrictions used for each country examined in this report is shown in Annex A1.

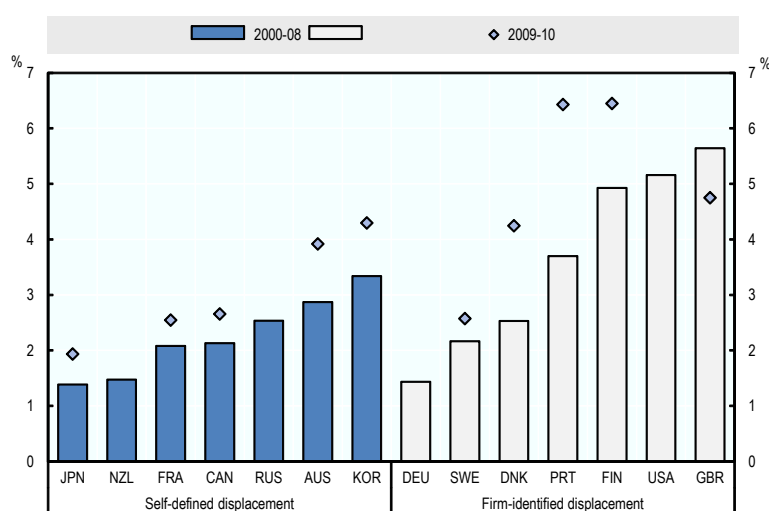
2. How large is the risk of job displacement and who is affected?

Incidence of job displacement

Figure 1 shows the risk of displacement in each country for the periods 2000-08 and 2009-10, where available. These periods were chosen to provide an indication of differences in displacement and its outcomes before and during the Great Recession.⁶ Displacement rates are expressed as the number of employees aged 20-64 who are displaced from one year to the next as a proportion of all employees aged 20-64. There are considerable differences in displacement rates across countries and between the pre- and post-crisis periods. The effect of the Great Recession is clear, with higher displacement rates in all countries (except the United Kingdom) in 2009-10 than in previous years. Nevertheless, displacement rates are relatively low in all the countries examined, with displacement affecting between 1.5% and 7% of employees each year during the 2000s.⁷ Despite displacement only affecting a relatively small proportion of employees each year, displaced workers have quite different characteristics to other employees, which may impede their ability to find work quickly after displacement and justify greater policy intervention to prevent long spells of unemployment or inactivity.

Figure 1. Displacement rates, 2000-10^a

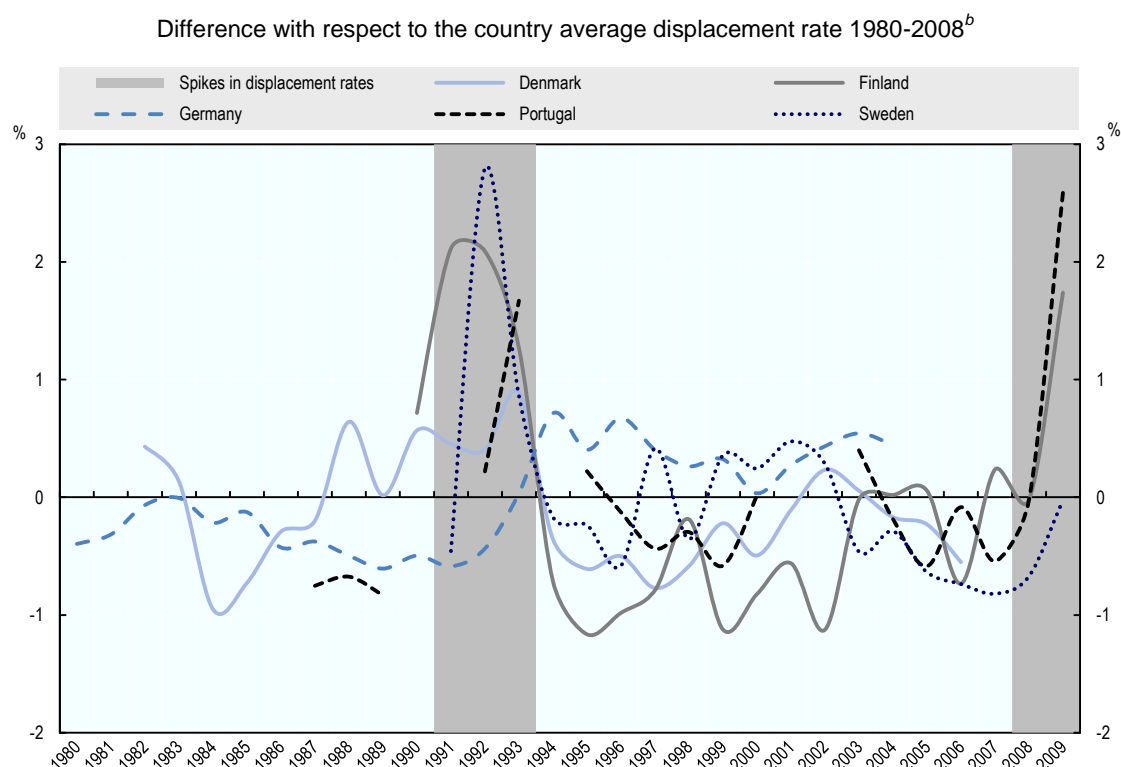
Percentage of employees aged 20-64 who are displaced from one year to the next, averages



a) See Annex A1 for a full description of the samples, years and definitions used for each country.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

As seen in the most recent economic downturn, job displacement is highly cyclical in most countries examined. A surge in displacement rates was also seen in previous recessions in the early 1980s and early 1990s in the few countries for which long time-series on displacement rates are available (Figure 2).

Figure 2. **Historical displacement rates^a**

a) See Annex A1 for a full description of the samples, years and definitions used for each country.

b) Displacement rates are calculated as the percentage of employees aged 20-64 who are displaced from one year to the next.

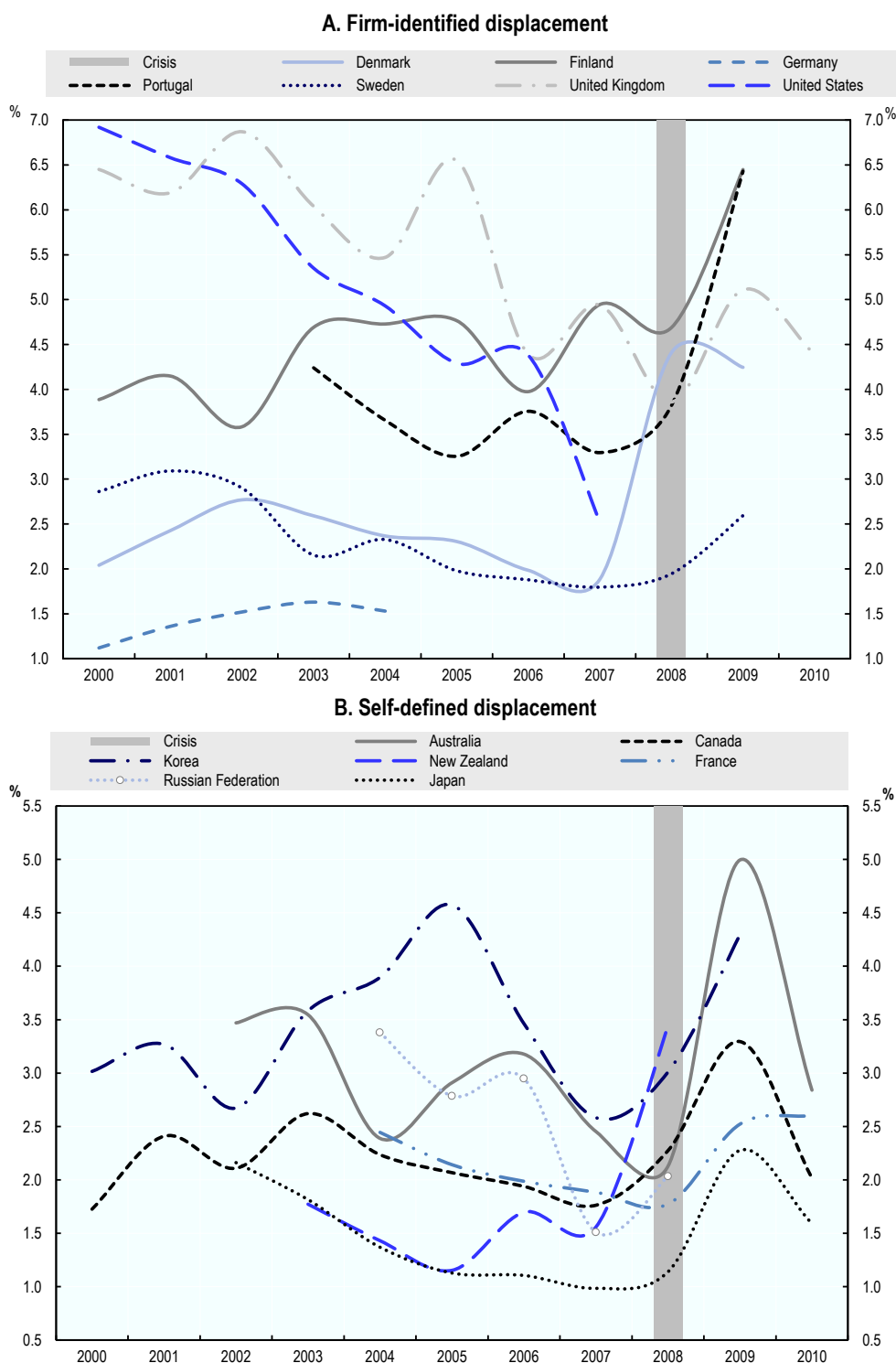
Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Outside these cyclical movements, however, there does not appear to have been any clear trend in the incidence of displacement over the past few decades in the countries examined in this report (Figure 3).

The extent to which cross-country differences in displacement rates reflect structural differences in labour market policies and institutions is unclear from this descriptive analysis. Despite the efforts made to ensure that consistent definitions and methods were used for every country, there remains some doubt about the cross-country comparability of estimates of displacement rates due to the issues discussed in Section 1. This should be kept in mind when interpreting the results presented in Figure 1 and in the remainder of the report.

Figure 3. Trends in displacement rates, 2000-10^a

Percentage of employees aged 20-64 who are displaced from one year to the next, averages



a) See Annex A1 for a full description of the samples, years and definitions used for each country.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Which workers have the highest risk of job displacement?

Figure 4 shows the relative incidence of job displacement by selected demographic and job characteristics. Displacement rates for men are, on average, higher than for women in most countries. The exceptions are Korea, Russian Federation, Japan and Finland, where women are more likely to be displaced than men, and Denmark and Portugal, where there is little difference. However, the gender gap in displacement rates may be driven by differences in the types of jobs that men and women hold, rather than any underlying discrimination against men when it comes to dismissal.

Table 1 shows that when other factors, including industry and occupation, are controlled for, men are not more significantly likely to be displaced than women except in Germany and Sweden. Indeed, in several countries, women are actually significantly more likely to be displaced than men. However, with the exception of Portugal, these positive effects are found in countries where it is not possible to control for contract type, suggesting that that women's increased risk of displacement may be due, in part, to their higher likelihood of having a non-permanent contract.

Displacement rates tend to be highest for the youngest and oldest workers. Figure 4 shows that in the Nordic countries, the United Kingdom, the Russian Federation, Germany and Australia, workers aged 20-24 years face displacement rates for the period 2000-08 approximately 20-70% higher than those for prime-aged workers, with the gap growing during the Great Recession in most of the countries for which data are available. These effects remain after controlling for other job and worker characteristics in Germany, Denmark, Finland and Sweden, although young workers are significantly less likely to be displaced than prime-aged workers in Portugal and the United States (Table 1).⁸

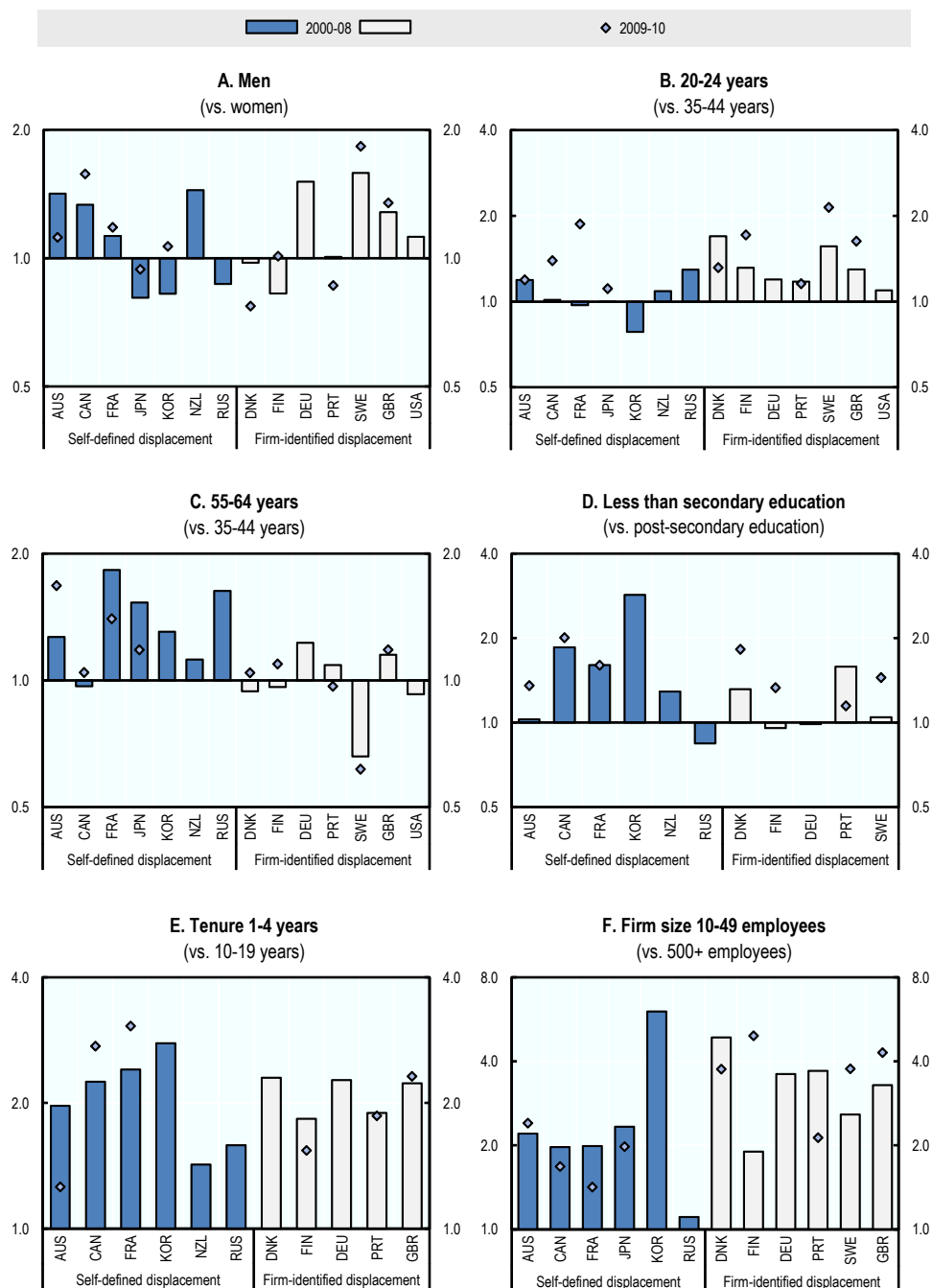
Older workers (aged 55-64 years) also have a higher incidence of displacement than prime-aged workers in Australia, France, Japan, Korea, the Russian Federation, Germany and the United Kingdom (Figure 4). Indeed, after controlling for other factors, older workers have a significantly higher risk of displacement than prime-aged workers in all the countries for which data are available except Korea, New Zealand, the Russian Federation and Sweden (Table 1). One of the reasons that this effect is less evident in the raw displacement rates in Figure 4 is that older workers have longer average tenure in their jobs, and long tenure protects workers against displacement (see below).

Workers with less than secondary education are more likely to be displaced than those with post-secondary qualifications in many countries (Figure 4). This effect was more pronounced during the Great Recession, coinciding with other evidence that the low-skilled were more adversely affected (e.g. OECD, 2010), and with previous work on displacement that found a higher risk of displacement for low-skilled workers (Borland et al., 2002). However, this effect disappears in some countries once other factors are controlled for.

The clearest cross-country trends in displacement probability relate to job tenure and firm size. Workers with 1-4 years of job tenure are approximately 1.5 to 3 times more likely to be displaced than those with 10-19 years of tenure. This is consistent with previous studies which find that long tenure protects workers against displacement (e.g. Albaek et al., 2002). The risk of job displacement decreases with firm size in all countries examined except the Russian Federation, so that workers in firms with 10-49 workers are 2-6 times more likely to be displaced than those in firms with 500 or more workers. This holds for both firm-identified and self-defined displacement, so cannot be attributable solely to the definition of mass dismissal used for firm-identified displacement. The impact of job tenure and firm size on displacement risk is statistically significant even after controlling for other personal, firm and job characteristics in most of the countries for which data are available (Table 1).

Figure 4. **Relative displacement rates by personal and job characteristics, 2000-10^a**

Ratios of the displacement rate for each specified group to that of the comparison group, 2000-08 and 2009-10 averages



Note: Logarithmic scales.

a) Each panel shows the ratio of the displacement rate for each specified group to that of the comparison group. See Annex A1 for a full description of the samples, years and definitions used for each country. No data on displacement rates by education for Japan or the United States. The firm-size categories are as shown except: the category *10-49 employees* refers to *less than 20 employees* for Australia and Canada, *10-29 employees* for Japan and *21-50 employees* for the Russian Federation; and the category *500+ employees* refers to *1 000+ employees* for Canada.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Table 1. **Factors affecting displacement risk, average 2000-10**

Results of regression analysis holding all other factors constant

	Australia	Canada	Denmark	Finland	France	Germany
Women (vs. men)	n.s.	n.s.	+	+	n.s.	-
20-24 years (vs. 35-44 years)	n.s.	n.s.	+	+	n.s.	+
55-64 years (vs. 35-44 years)	+	+	+	+	+	+
Education level	n.s.	n.s.	-	-	-	+
Firm size	-	-	-	-	-	-
Job tenure	-	-	-	-	..	-
Non-permanent contract (vs. permanent)	+	+	+	..
Public sector (vs. private sector)	-	-	-	..
	Korea	New Zealand	Portugal	Russian Federation	Sweden	United States ^a
Women (vs. men)	n.s.	n.s.	+	n.s.	-	+
20-24 years (vs. 35-44 years)	n.s.	n.s.	-	n.s.	+	-
55-64 years (vs. 35-44 years)	-	n.s.	+	n.s.	-	+
Education level	-	n.s.	-	+	+	..
Firm size	-	..	+	n.s.	-	-
Job tenure	-	-	-	-	..	-
Non-permanent contract (vs. permanent)	n.s.	..	+	+
Public sector (vs. private sector)	-	+	-	..

Note: The regressions include controls for industry, occupation, region and year.

+/-: Indicates that effect is positive/negative and significantly different from zero at 90% confidence level or higher.

n.s.: Indicates that effect is not significantly different from zero at 90% confidence level or higher.

..: Indicates that the variable was not included in the regression because data were not available. No comparable data available for Japan. See Annex A1 for a full description of the samples, years and definitions used for each country.

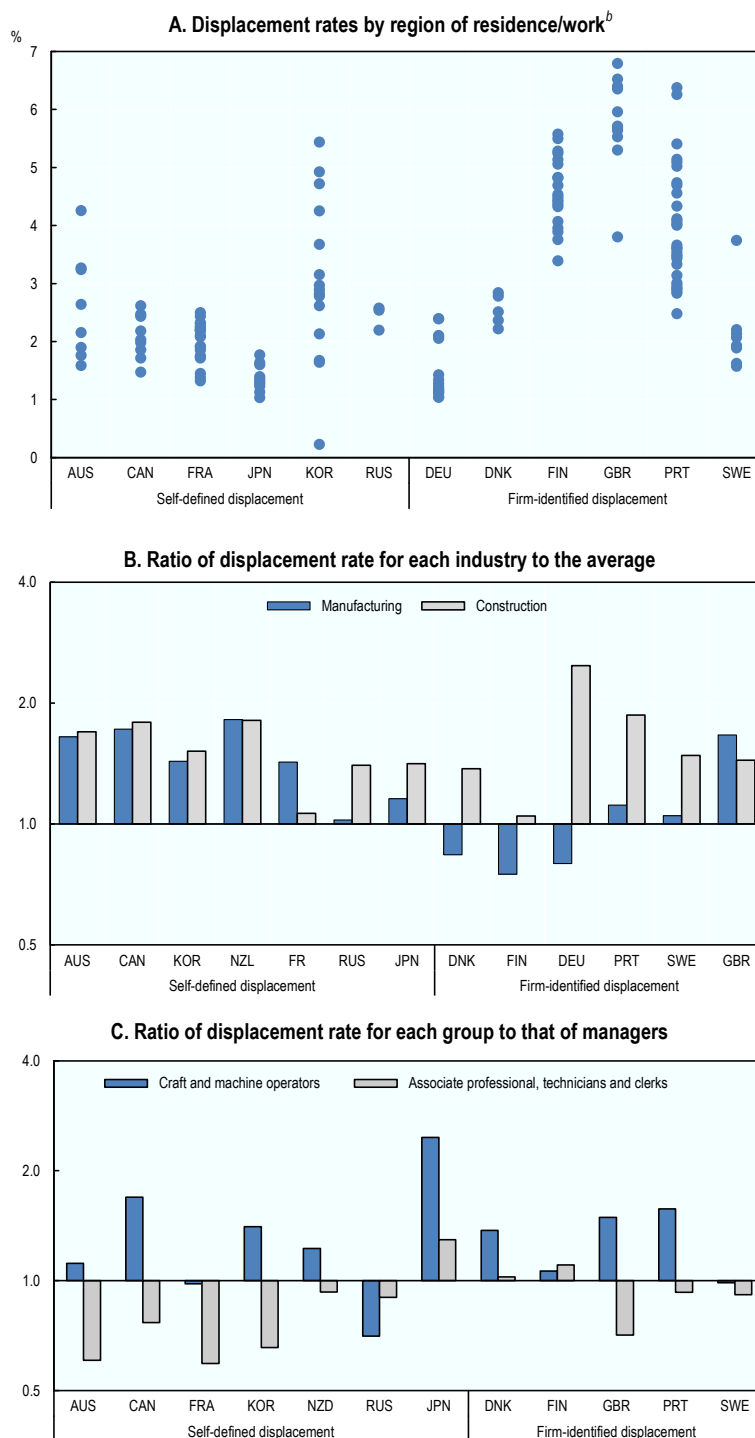
a) US results are based on firm-identified displacement from the *Longitudinal Employer Household Dynamics (LEHD) Database*.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Having a non-permanent contract significantly increases the risk of displacement, other things equal, in the few countries for which data are available except Korea (Table 1). Workers in the public sector are significantly less likely to be displaced than those in the private sector, which may reflect the greater difficulty of making dismissals in the public sector in many OECD countries, as well as the nature of work in the sector and its relative lack of exposure to market forces.

Finally, Figure 5 shows additional breakdowns of displacement rates by region, industry and occupation. Across regions, the largest dispersion is observed in Korea and Portugal but it is also fairly high in Australia, Finland and the United Kingdom. On the other hand, territorial differences appear to be much smaller in Denmark, Russia and Japan. The industries most affected by displacement vary across countries. However, workers in construction and manufacturing tend to be more affected than average in most countries. As far as occupations are concerned, craft workers and machine operators are significantly more likely to be displaced than managers. On the other hand, mid-level professionals – notably, associate professionals, technicians and clerks – are less likely to be displaced than managers in a majority of countries, with the most notable exception of Japan. This latest finding is interesting as it appears to suggest that the top occupational group is not necessarily faring the best as far as displacement is concerned. However, this result may be due to compositional effects and/or to the fact that the “managers” category may include self-employed individuals running small family businesses or SMEs at high risk of failure.

Figure 5. Variation in displacement rates by region, industry and occupation, 2000-08^a



Note: Logarithmic scales for Panels B and C.

- a) See Annex A1 for a full description of the samples, years and definitions used for each country.
- b) Displacement rates are calculated as the percentage of employees aged 20-64 who are displaced from one year to the next. They refer to the region of residence in countries where displacement is self-defined and the region of work for countries where firm-identified displacement rates are used.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

3. Getting back to work after job displacement

This section examines how long it takes workers to get back to work after displacement and the groups that are most at risk of losing touch with the labour market. The data available do not allow for examination of the average time spent out of work after displacement in a manner that is comparable across countries. Instead, annual data on employment status are used to determine the proportion of displaced workers who are employed within one and two years of displacement.⁹ For example, a worker who is observed in April each year and who is displaced between April 2007 and April 2008 is said to be re-employed within one year if he/she is employed in April 2008 and to be re-employed within two years if employed in April 2009 (regardless of whether or not he/she was employed in April 2008). This method tends to underestimate true re-employment rates because workers may be employed for some of the period following displacement but not in the month when they are observed again. By contrast, it may overestimate the extent of stable re-employment because workers may be employed in the month when they are observed but lose their new job quickly afterwards. It is not possible to determine how these biases vary across countries. These limitations and the other differences in the data and estimation methods used, as outlined in Section 1, should be kept in mind when making cross-country comparisons of re-employment rates.

Re-employment rates

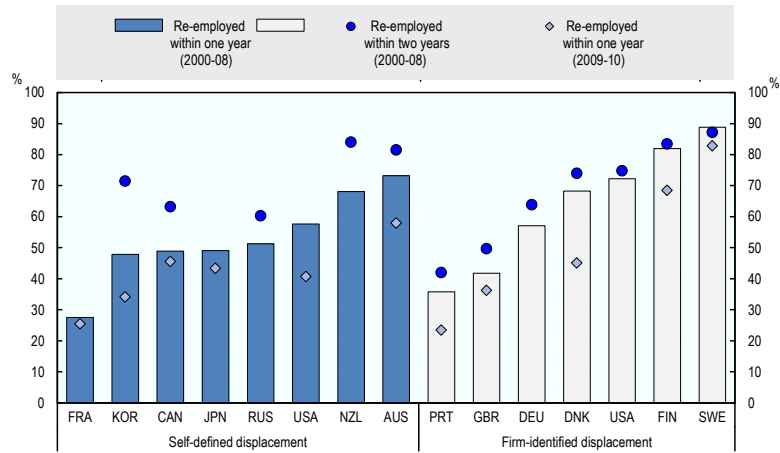
Figure 6 shows the proportion of displaced workers who were re-employed within one and two years in each of the countries for which data are available.¹⁰ Re-employment rates within one year of displacement range from around 30% in France and Portugal to more than 80% in Finland and Sweden. Several countries showed a marked improvement in re-employment rates between the first and second year after displacement, notably Korea and Canada. However, comparisons across countries should be made with caution for the reasons noted above. What is clear is that re-employment rates fell markedly across all countries during the Great Recession. The biggest falls were in Denmark, the United States and Portugal, which all suffered a large increase in unemployment. However, large falls in re-employment rates were also recorded in Australia and Korea where unemployment rates were much less affected.

Which workers take the longest to get back to work?

The speed of re-employment varies considerably across different demographic groups. Figure 7 shows the relative re-employment rates of various groups. Men have higher re-employment rates than women in most countries, although this trend was reversed in Denmark and Finland during the Great Recession. Low-educated people also have lower re-employment rates than those with post-school qualifications in all the countries for which data are available except New Zealand. The relative situation of the low-skilled deteriorated during the Great Recession in Denmark, Finland and France, but improved in Portugal and, to a lesser extent, in Canada. The evidence is mixed when comparing youth (aged 20-24 years) with prime-aged people (35-44 years), with youth getting back to work more quickly in Australia, Canada, Japan, Korea, Germany and Portugal, but more slowly in several other countries, notably France and the Russian Federation. However, older people (aged 55-64 years) are less likely to be working within a year of displacement than prime-aged people in all the countries examined, particularly in France, Germany and Portugal where re-employment rates for older people are less than half those for prime-aged people.

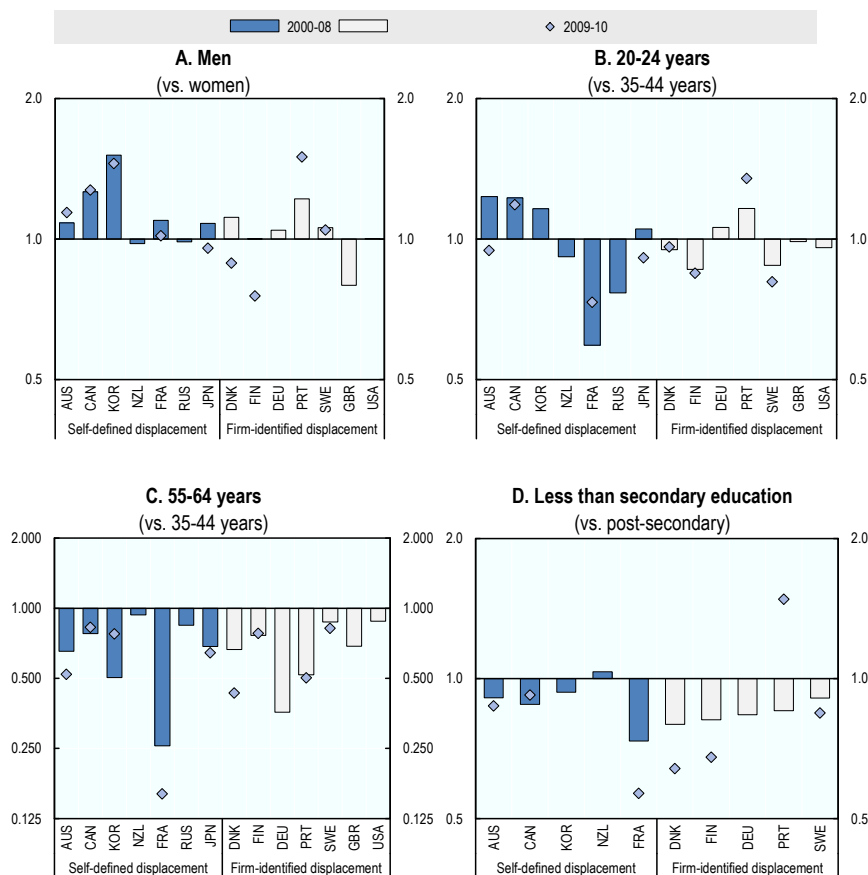
Figure 6. Re-employment after displacement^a

Proportion of displaced workers who are re-employed within one and two years, 2000-08 and 2009-10 averages



a) See Annex A1 for a full description of the samples, years and definitions used for each country.
 Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Figure 7. Relative re-employment rates by characteristics^a
 Averages



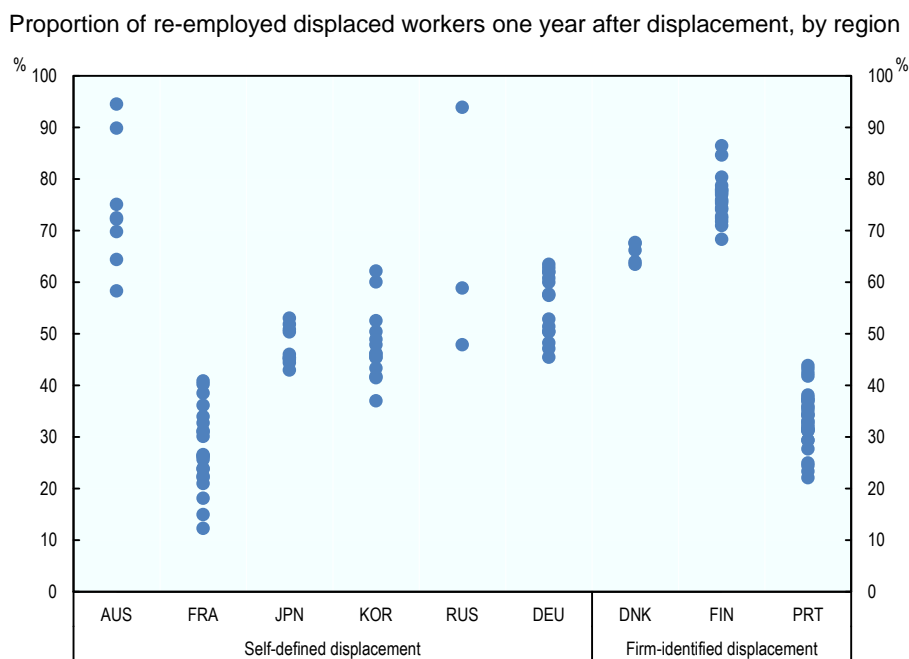
Note: Logarithmic scales.

a) Each panel shows the ratio of the re-employment rate for each group to that of the comparison group. See Annex A1 for a full description of the samples, years and definitions used for each country.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

As for displacement rates, re-employment rates vary markedly across regions (Figure 8), with the largest dispersion observed in Australia, France and the Russian Federation and the least in Denmark and Japan. Interestingly, in the Russian Federation displacement rates vary little across the three main regions reported while re-employment differ significantly. The opposite is true for Portugal where regions vary markedly in displacement rates but are more similar as far as re-employment rates are concerned. Indeed, not one-way association is found between displacement and re-employment rates, with some countries exhibiting a positive/negative relationship and others no relationship at all. Thus, the hypothesis that higher displacement rates tend to be accompanied by higher re-employment rates, signalling higher labour market dynamism may not hold in all countries.

Figure 8. Re-employment rates by region, 2000-08^a

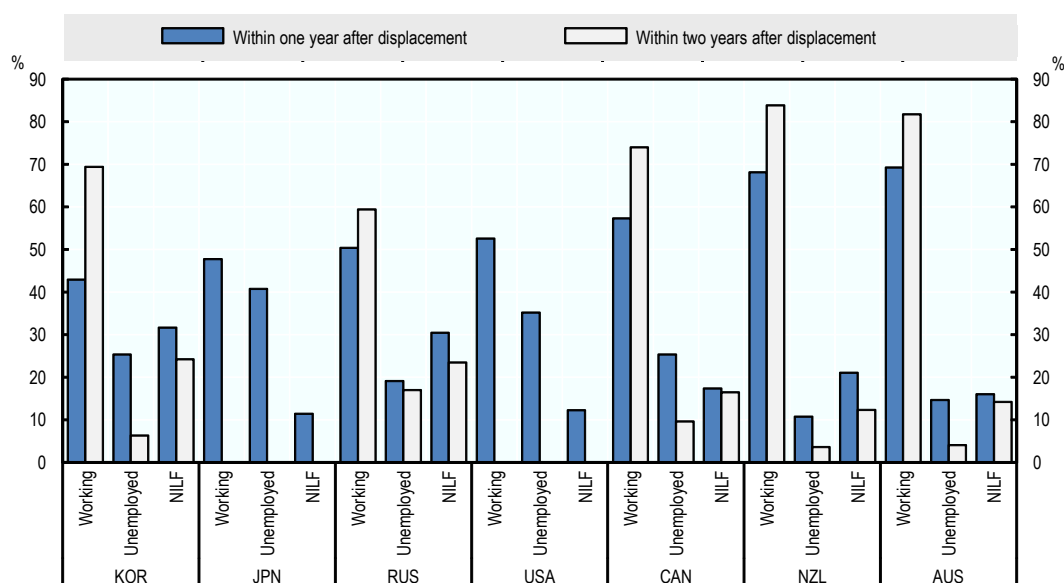


a) See Annex A1 for a full description of the samples, years and definitions used for each country. Data refer to the region of residence in countries where displacement is self-defined and the region of work for countries where firm-identified displacement rates are used.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

What happens to displaced workers who are not re-employed?

On average during the 2000s, around 50% of displaced workers are not employed within one year and 30% remain out of work one year later. For a sub-set of countries, it is possible to identify the main activity of those who are not employed to better understand post-displacement outcomes. Three main labour force states are examined in Figure 9: *working* (as an employee or self-employed); *unemployed* (i.e. not working but searching actively for work and available to start work); and *not in the labour force* (i.e. not working and either not searching actively for work or not available to start work or both). Within a year of displacement, the majority of those not working are unemployed in Canada, Japan and the United States, whereas a majority are not in the labour force in the other countries examined. Within two years, with the exception of the Russian Federation, there is a sizeable drop in the proportion unemployed in all countries and a smaller fall in the proportion that remains out of the labour force. This suggests that those who remain searching for work are more likely to re-enter employment within two years than those who are less connected with the labour force after one year.

Figure 9. Labour force status of displaced workers after displacement, average 2000-10^a

NILF: Not in the labour force.

a) Only countries using self-defined displacement have data available on labour force status after displacement. See Annex A1 for a full description of the samples, years and definitions used for each country.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Among those who have not re-entered work within one year of displacement, women are more likely than men to be out of the labour force, as are older people and those with lower levels of education (Table 2). These patterns are similar in all the countries examined. This may not be of concern if people give up searching for work in order to undertake education or training or to care for children or sick or elderly relatives. However, very few displaced workers are in full-time education or training within one year of displacement and those that are tend to have higher levels of education already. Many older displaced workers who are not re-employed retire completely from the labour force.

Table 2. Percentage of non-working displaced workers who are not in the labour force within one year of displacement, by characteristics, average 2000-10^a

	Australia	Canada	France	Japan	Korea	New Zealand	Russian Federation	United States
Men	47.6	33.0	38.3	9.9	46.0	61.3	60.5	19.8
Women	58.1	49.2	43.1	35.3	66.2	70.8	62.1	34.1
20-24 years	29.4	60.6	39.0	7.6	42.1	..	34.4	26.6
35-44 years	53.2	34.5	22.4	16.6	51.3	..	52.7	22.5
55-64 years	74.1	57.5	78.9	35.7	68.1	..	89.4	35.0
Less than secondary	64.0	46.9	44.7	..	60.8	..	61.8	32.4
Secondary	59.0	47.0	39.1	..	57.6	..	64.3	27.1
Post-secondary	43.9	34.7	35.9	..	45.5	..	58.1	23.4

.. Data not available.

a) Only countries using self-defined displacement have data available on labour force status after displacement. See Annex A1 for a full description of the samples, years and definitions used for each country.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

4. Earnings, hours and working arrangements after displacement

The previous section showed that most displaced workers get back into a new job within one or two years. However, the effects of displacement on their pay and working arrangements can be longer-lasting. This section examines the post-displacement earnings, hours, job security and other working arrangements of displaced workers. Due to data limitations, not all aspects could be examined for every country. A full analysis of the interaction between post-displacement pay and working arrangements, notably to examine whether workers trade off higher pay for better working arrangements (or *vice versa*) is beyond the scope of this report but would be a fruitful area for future research.

*Earnings losses after displacement*¹¹

The simplest way to determine the scale of earnings losses after displacement would be to compare workers' earnings before and after displacement and compute the difference. However, this is likely to underestimate the true cost of displacement because displaced workers are likely to have missed out on wage rises that would have occurred in their previous job had they not been displaced. The seminal paper of Jacobson et al. (1993) attempted to more accurately measure the cost of displacement by comparing earnings changes for displaced workers before and after displacement with those for workers who were not displaced.

This *difference-in-differences* approach has proven very influential and there is an extensive literature examining post-displacement earnings and wage losses in many OECD countries using methods similar to that of Jacobson et al. (1993) (see Annex A2 for a review). Accurate comparisons across country studies are very difficult to make because of differences in the definition of displacement, measures of earnings/wages and year and groups of workers on which authors focus. Nevertheless, the largest hourly, weekly or monthly wage losses appear to be found in Germany, Italy, the United Kingdom and the United States. On the other hand, in Belgium and Japan, wage losses are estimated to be rather low. Quarterly or annual earnings losses are larger than monthly, weekly or hourly wage losses as they reflect the combined effect of periods of non-employment and reductions in hourly wages or hours worked. For instance, earnings losses of about 30% are found in France compared with wage losses of about 9%. Similarly, in the United States, earnings losses range from 21% to 60% while wage losses are more modest varying between 8% and 16%. In studies where long time-series of data following displacement are available, the size of earnings and wage losses tend to decline over time, but generally persist for a number of years following displacement. Some studies also find that wages and earnings decline – albeit modestly – in the years leading up to displacement.

In an attempt to provide comparable cross-country estimates of the impact of displacement on earnings, this report adopts a methodology based on Jacobson et al. (1993) and applies it to a similar sample of workers and years from broadly-comparable data sources for several OECD countries (see Box 1 for a full explanation of the methodology used). Most of the results presented below are estimates of real gross annual *earnings* losses in the years leading up to and after displacement due to a mass dismissal or firm closure for workers. They include losses due to lower wage rates, shorter hours as well as periods of non-employment when the displaced worker had no earnings. Periods of non-employment/earnings are included so that the full financial cost of displacement can be assessed,¹² but also because reliable estimates of monthly *wage* effects could not be made for most of the countries examined. However, for Germany, Portugal and the United Kingdom, estimates of monthly wage effects for workers with non-zero earnings in each year after displacement are calculated and are discussed in the text where relevant.

Box 1. Measuring the true value of earnings losses after displacement

The effect of displacement on earnings is estimated in this report using regression analysis similar to that used by Jacobson et al. (1993). The analysis is restricted to those countries for which displacement can be identified as due to mass dismissal or firm closure, as defined in Section 1. These are Denmark, Finland, Germany, Portugal, Sweden, the United Kingdom and the United States. One further restriction is applied on top of the general sample restrictions used elsewhere in this report (see Section 1), which is to limit the sample to those aged 25-54 years in the year prior to displacement.

The analysis examines displacements that occur between 2000 and 2005 and their impact on earnings in the two years before and five years after displacement. The model used assumes that there is no difference in the earnings movements of displaced and non-displaced workers in the third year prior to displacement. In each year between 2000 and 2005, workers in the sample are divided into a treatment group (displaced workers) and a control group (non-displaced workers) and their earnings followed for up to five years before displacement and five years afterwards. The six resulting cohorts of data are then pooled to increase the sample size. For example, the 2002 cohort will include data on earnings from 1997 to 2006, with the treatment group comprising workers who were displaced in 2002 and the control group workers who were not displaced in 2002 (but who may have been displaced after 2002). The only other restriction imposed is that workers must have earnings in at least one of the five years after displacement. This is to eliminate the possibility that some people do not appear to be re-employed after displacement when in fact they have permanently left the dataset (e.g. due to death, migration, retirement, etc.).*

The regression model is estimated using the following fixed-effects specification:

$$y_{it} = \alpha_i + \gamma_t + X_{it}\beta + \sum_{k=-3}^4 D_{it}^k \delta_k + \sum_{k=-3}^4 C_{it}^k \theta_k + \varepsilon_{it}$$

where y_{it} is either the monthly or annual earnings of worker i at time t ; D_{it}^k is a set of dummy variables capturing the event of displacement: $D_{it}^k = 1$ if, in period t , worker i , had been displaced k years earlier, where k ranges from -3 to 4; δ_k is the effect of displacement on a worker's wages/earnings k years following its occurrence; C_{it}^k is a set of dummy variables for each year in the cohort: $C_{it}^k = 1$ in period t for all workers, where k ranges from -3 to 4; θ_k captures the wage patterns of non-displaced workers in the lead up to and aftermath of the displacement event; X_{it} consists of the observed time-varying characteristics of the worker; γ_t are the coefficients of a set of dummy variables for each calendar year in the sample period that capture the general time pattern of wages in the economy (e.g. 2000, 2001, 2002, etc.); α_i are individual fixed effects; and ε_{it} is an error term assumed to have constant variance and to be uncorrelated across cohort-individuals and time, but may be correlated between the same individual who appears in multiple cohorts.

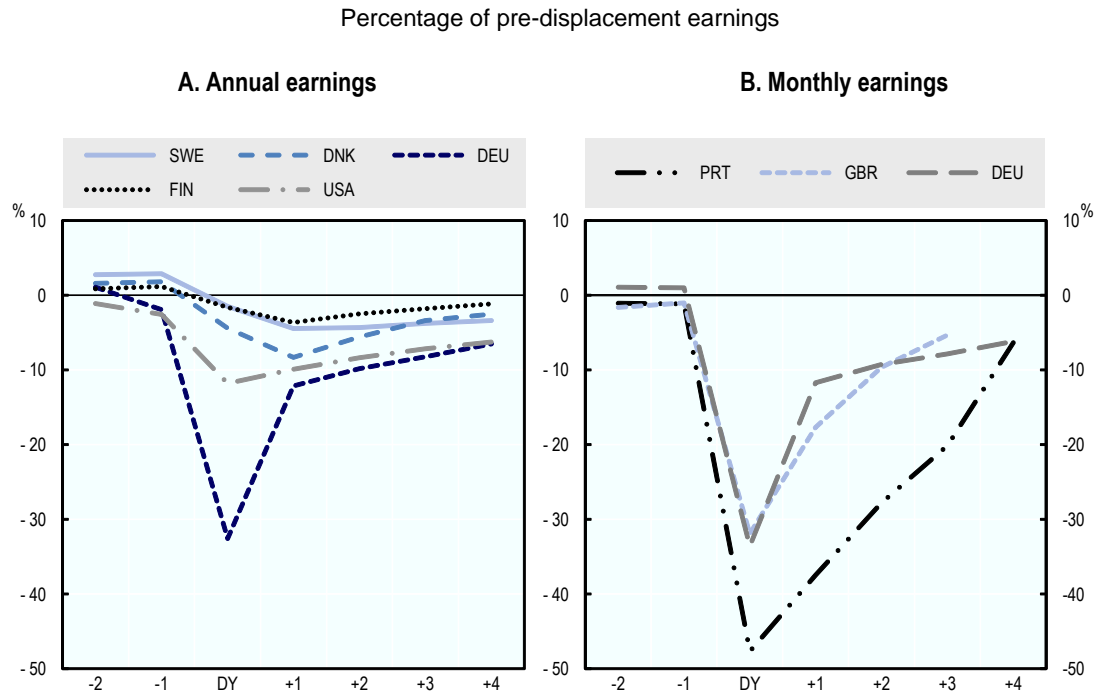
The dependent variable is real gross wage and salary earnings. In years when individuals do not have any earnings, they are assigned a value of zero, rather than being dropped from the sample. The estimation was done using either annual or monthly earnings (or both where available). The results reported in the report are from a fixed-effects model without controls for time-varying characteristics of the worker. The models were also estimated including controls for worker characteristics but the results were generally of a similar magnitude as the baseline models. These results were not included in the report because available data on worker characteristics varied across countries.

* Note that workers can appear in the treatment group in one cohort and the control group in another cohort. To allow for this possibility, errors are assumed to be correlated between the same individuals in different cohorts.

Figure 10 shows the estimated earnings effect of displacement. In all the countries examined, earnings fell significantly in the years following displacement, although the size of the effect varies considerably across countries. Displaced workers in the Nordic countries experience relatively small falls in earnings, while those in Germany, Portugal and the United Kingdom have losses of 30-50% in the year of displacement and the United States is somewhere in between.¹³ In all the countries examined, the earnings effects subside over time, although significant differences between pre- and post-displacement earnings remain in Germany and Portugal even five years after displacement. There is little evidence of large-scale pre-displacement earnings effects. Total *income* losses, while not examined here, are likely to be smaller than earnings losses because falling earnings will be offset for most displaced workers by unemployment benefits and reduced taxation. OECD (2011) examines the extent to which large declines

in earnings are offset by countries' tax and transfer systems, finding that the buffering effects of tax and transfer systems vary considerably across countries.

Figure 10. **Earnings changes before and after displacement^a**

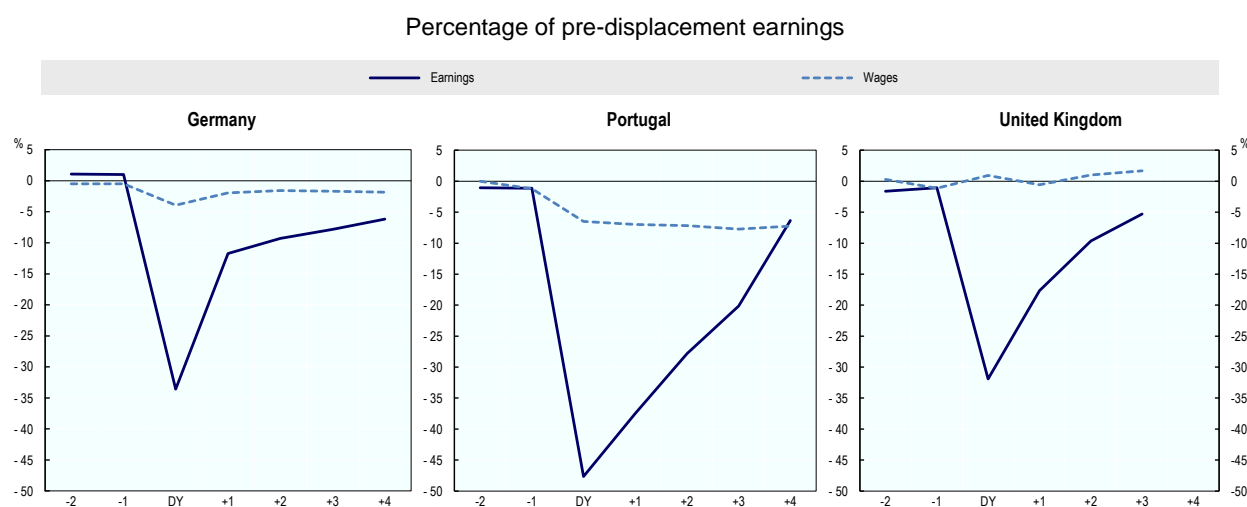


DY: Displacement year.

a) Pre-displacement earnings is average earnings in the year prior to displacement (-1 in the figure). See Annex A1 for a full description of the samples, years and definitions used for each country.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

As discussed in Section 3, many workers experience periods of non-employment after displacement, during which time their earnings will be zero. For most countries, it is difficult to determine how much of the estimated earnings effect shown in Figure 6 is due to non-employment and how much is due to lower wages in post-displacement jobs. However, for Germany, Portugal and the United Kingdom, monthly data allow for the separate estimation of earnings and wage effects, where wage effects are estimated only for workers who have non-zero monthly earnings in each year following displacement. The results, shown in Figure 11, suggest that most of the estimated earnings effects are due to non-employment, rather than lower wages. Indeed, in Germany and the United Kingdom, there is little evidence of post-displacement wage effects. However, it should be kept in mind that the estimates in Figure 11 are only for workers who return to work quickly after displacement. Workers who have long periods out of work may suffer greater wage losses when they do return to work, as well as earnings losses due to non-employment.

Figure 11. Monthly earnings and wage changes before and after displacement^a

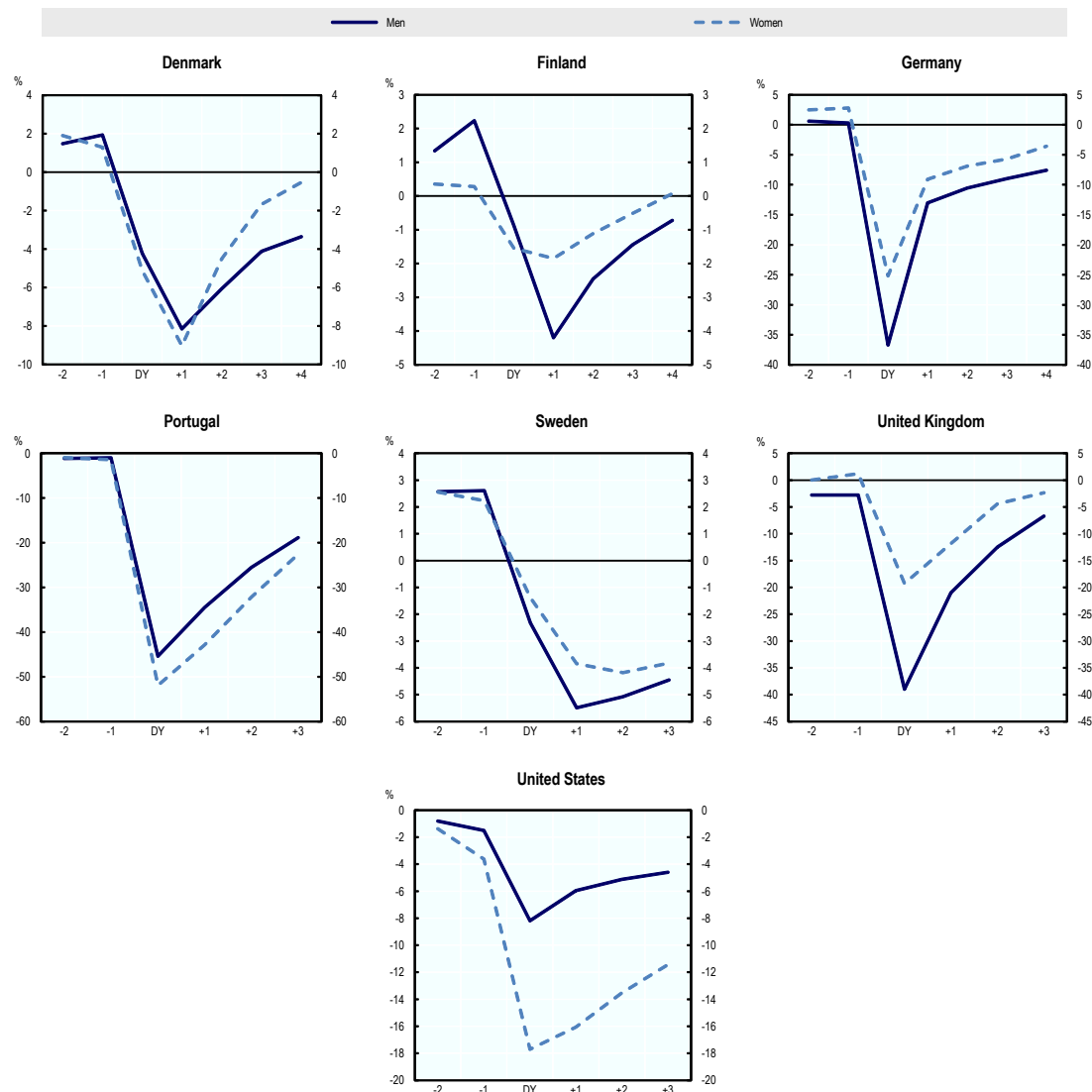
DY: Displacement year.

a) Pre-displacement earnings is average earnings in the year prior to displacement (-1 in the figure). Earnings effects are calculated for all displaced workers who have non-zero monthly earnings in at least one year after displacement. Wage effects are calculated for displaced workers who have non-zero monthly earnings in every year after displacement. See Annex A1 for a full description of the samples, years and definitions used for each country.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Figure 12 shows the earnings effects of displacement for men and women separately. In Finland, Germany, Sweden and the United Kingdom, men tend to suffer greater earnings losses than women after displacement, while in Denmark, women suffer slightly larger initial losses but bounce back quickly. This is despite women taking longer on average to re-enter work and being more likely to be completely disconnected from the labour force after displacement than men. This suggests that men may face bigger wage losses after displacement than women in these countries. These findings are consistent with some previous research on gender differences in earnings or wage effects after displacement (Crossley et al., 1994 for Canada; Appelqvist, 2007, for Finland; Abe et al., 2002 for Japan). However, in Portugal and the United States, women have bigger losses than men. In the United States, women's earnings are still around 10% lower than pre-displacement levels four years after displacement.

Figure 12. **Earnings changes before and after displacement by gender^a**
 Percentage of pre-displacement earnings



DY: Displacement year.

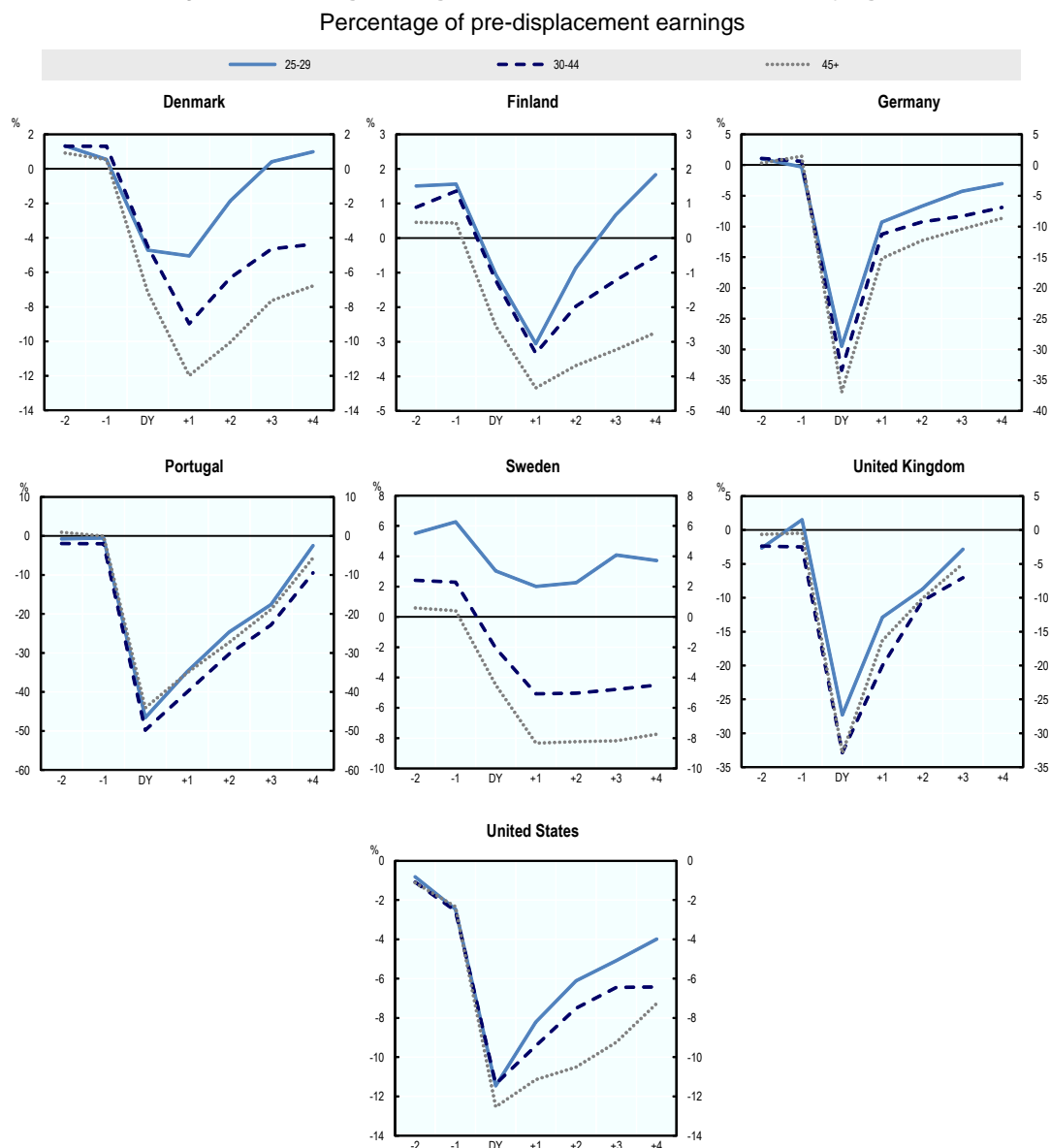
a) Pre-displacement earnings is average earnings in the year prior to displacement (-1 in the figure). See Annex A1 for a full description of the samples, years and definitions used for each country. Data refer to annual earnings for Denmark, Finland, Portugal, Sweden and the United States and monthly earnings for Germany and the United Kingdom.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Older workers tend to suffer from greater earnings losses after displacement than younger or prime-aged workers (Figure 13). The differences by age are particularly persistent in the Nordic countries, where the earnings of younger workers bounce back quickly after displacement. Indeed, in Sweden, the youngest workers actually see their earnings increase after displacement instead of decrease. No doubt part of the earnings-loss differential by age is due to the slower re-employment of older workers after displacement highlighted in Section 3.¹⁴ However, there is some evidence of negative monthly *wage* effects increasing by age even for those who return to work quickly in Germany and the United Kingdom, and to a lesser extent in Portugal (the three countries for which data are available). In the displacement literature, larger wage and earnings losses are commonly found for older workers or those with more seniority. (e.g. Morissette et al., 2007 for Canada; Lefranc, 2003 for France; Abe et al.,

2002 for Japan; Dixon and Stillman, 2009 for New Zealand; Borland et al. 2002 for the United Kingdom; and Abbring et al., 2002 and Couch and Placzec, 2010 for the United States).

Figure 13. Earnings changes before and after displacement by age^a



DY: Displacement year.

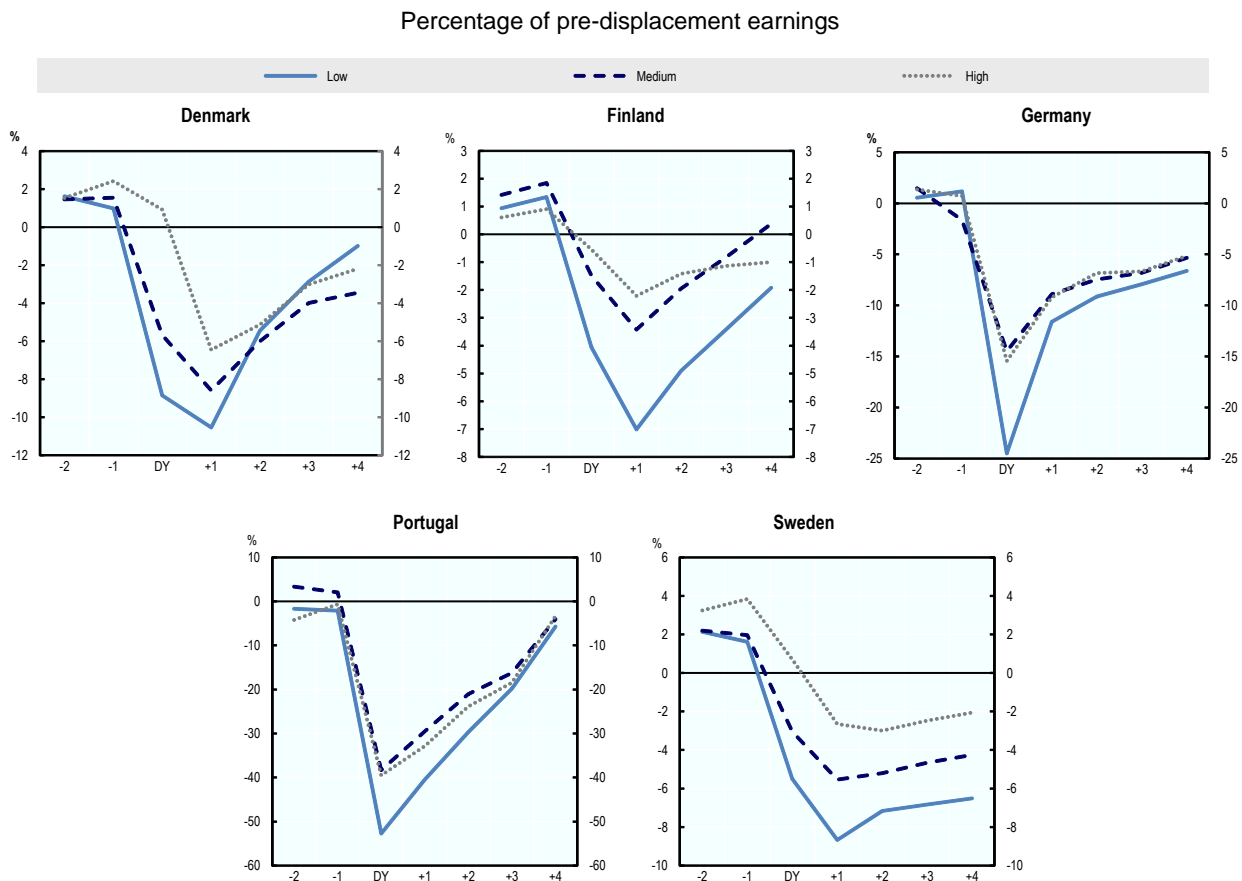
a) Pre-displacement earnings is average earnings in the year prior to displacement (-1 in the figure). See Annex A1 for a full description of the samples, years and definitions used for each country. Data refer to annual earnings for Denmark, Finland, Portugal, Sweden and the United States and monthly earnings for Germany and the United Kingdom.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Workers who have not finished secondary school also tend to experience larger earnings falls after displacement than those with higher educational qualifications (Figure 14). This pattern is evident in all the countries examined (although the differences are small in absolute terms in the Nordic countries), and can be explained in part by the poorer re-employment prospects of low-qualified workers after displacement (see Section 3). However, even workers who get back to work within one year experience a

lower monthly wage in Germany and Portugal (the only countries for which data are available) after displacement if they have lower educational qualifications (not shown in Figure 14). These findings are consistent with existing research that finds that the earnings or wage cost of displacement is highest for the least-educated workers (Borland et al., 2002; Kodrzycki, 2007; Podgursky and Swaim, 1987; Swaim and Podgursky, 1989).

Figure 14. **Earnings changes before and after displacement by education level^a**



DY: Displacement year.

a) Pre-displacement earnings is average earnings in the year prior to displacement (-1 in the figure). *Low*: less than secondary education; *Medium*: secondary education; *High*: post-secondary education. See Annex A1 for a full description of the samples, years and definitions used for each country. Data refer to annual earnings for Denmark, Finland, Portugal and Sweden and monthly earnings for Germany.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Working hours and job security after displacement

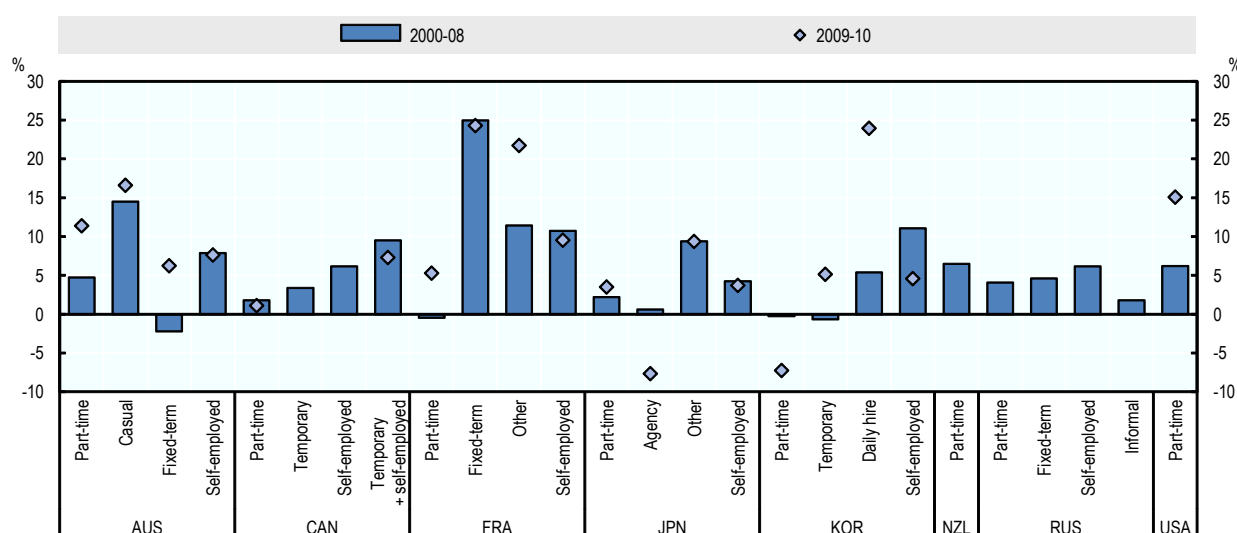
Increases in the incidence of non-standard working arrangements such as part-time or temporary work after displacement can have significant effects on workers' earnings, job quality and future job stability. Even if hourly wages are unchanged, if displaced workers are re-employed in jobs with fewer hours of work, they will experience a drop in total earnings. In some cases, a reduction in hours after displacement may be desirable, but in others, workers may be underemployed and prefer to work longer hours. Likewise, if displaced workers are hired in jobs with temporary contracts or set up their own businesses after displacement, then their future displacement risk may also be increased. These effects could potentially have an effect on workers' welfare as important as that caused by earnings losses.

Nevertheless, and with notable exceptions that are discussed below, the existing literature is relatively sparse when it comes to evidence of the impact of displacement on working hours and job security.

Farber (1999) finds that displaced workers in the United States, especially those who were previously employed full-time, are more likely to involuntarily work part-time after job loss, but that the likelihood of part-time work falls over time. Involuntary part-time work after displacement is more common and persistent for those with low levels of education and for older workers. Farber (1999) also finds that US job losers who find work are more likely than non-job-losers to have a temporary or part-time contract and less likely to be running their own small business. Von Greiff (2009) finds that Swedish workers have a higher probability of entering self-employment than those who were not displaced. People who become self-employed after displacement tend to be those with the poorest labour market prospects, while people who enter self-employment from employment are typically high-ability or high-wealth individuals. While not looking directly at contract type, Stevens (1995) finds that displaced workers face an increased risk of losing their job again in the future.

Figure 15 shows that, with the exception of Korea (and France prior to 2009), the incidence of part-time work tends to increase after displacement in the countries for which data are available. Displaced workers who are re-employed within one year work, on average, up to two hours less per week than before displacement and are less likely to be employed full-time. Hours reductions tended to be larger during the Great Recession than in the years that preceded it, although many non-displaced workers probably also experienced a reduction in hours during the recession due to the operation of short-time work and working-time account schemes as well as reductions in overtime hours (see OECD, 2010, for a discussion of hours adjustment strategies during the Great Recession).

Figure 15. **Change in working hours, job security and form of employment after displacement**^{a, b}
Percentage-point changes in employment shares between the pre- and post-displacement jobs^c



- a) Data on hours and contract type after displacement are only available for countries using data on self-defined displacement. Part-time is defined as working less than 30 hours per week in all countries except the United States, where it is defined as less than 35 hours per week and Japan, where it is defined using national definitions.
- b) Canada: Separate data for temporary and self-employed after displacement are not available for 2009-10. France: *Other* includes seasonal and interim contracts Japan: *Agency* refers to temporary employees dispatched from an agency; *Other* includes contract employees. Russian Federation: *Informal* refers to employees without a written employment contract.
- c) Sample restricted to workers re-employed within one year of displacement.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

In almost all cases, the incidence of non-standard types of work also increases after displacement.¹⁵ Casual contracts in Australia and fixed-term contracts in France appear to be particularly common after displacement. In the case of Australia, the incidence of casual work after displacement falls in subsequent years, but is still higher than the pre-displacement incidence two years after displacement. Self-employment is also relatively common after displacement, accounting for around 5-10% of re-employed workers. During the Great Recession, the likelihood of non-standard contract types after displacement increased in several countries, but the incidence of self-employment was unchanged from previous years. This may be because of a lack of opportunities for starting a new business during a downturn, or because the characteristics of those who were displaced during the recession were different to those of people who were displaced in better economic circumstances (see Section 2).

These results suggest that, in addition to having lower earnings, post-displacement jobs tend to be “worse” than pre-displacement jobs along a number of dimensions even if these do not account for all aspects of job quality. A fuller examination of the impact of displacement on job quality is limited by the availability of data. Many of the data sources used to study displacement do not contain information on a large number of working arrangements, non-pecuniary job benefits or subjective measures such as job satisfaction. However, preliminary results using data for a small number of countries suggest that displacement may have a negative impact on other working arrangements, apart from part-time working, and job benefits, particularly those that tend to be accumulated with tenure (see Box 2). The analysis in this section is somewhat limited because it does not take into account what would have happened to job quality in the absence of displacement, nor does it determine how persistent the observed negative effects are. Nevertheless, it suggests that future examination of the impact of job displacement should include some consideration of the effects on job characteristics other than earnings.

Box 2. Broader measures of job quality after displacement

Many job benefits, including job security and non-wage benefits, accumulate with tenure. Interruptions to job tenure as a result of displacement may therefore lead to a reduction in the quality of jobs along multiple dimensions. As a first step towards a better understanding of the full impact of displacement, the incidence of various types of job benefits changes after displacement is explored in more detail for three countries (Australia, France and Korea).

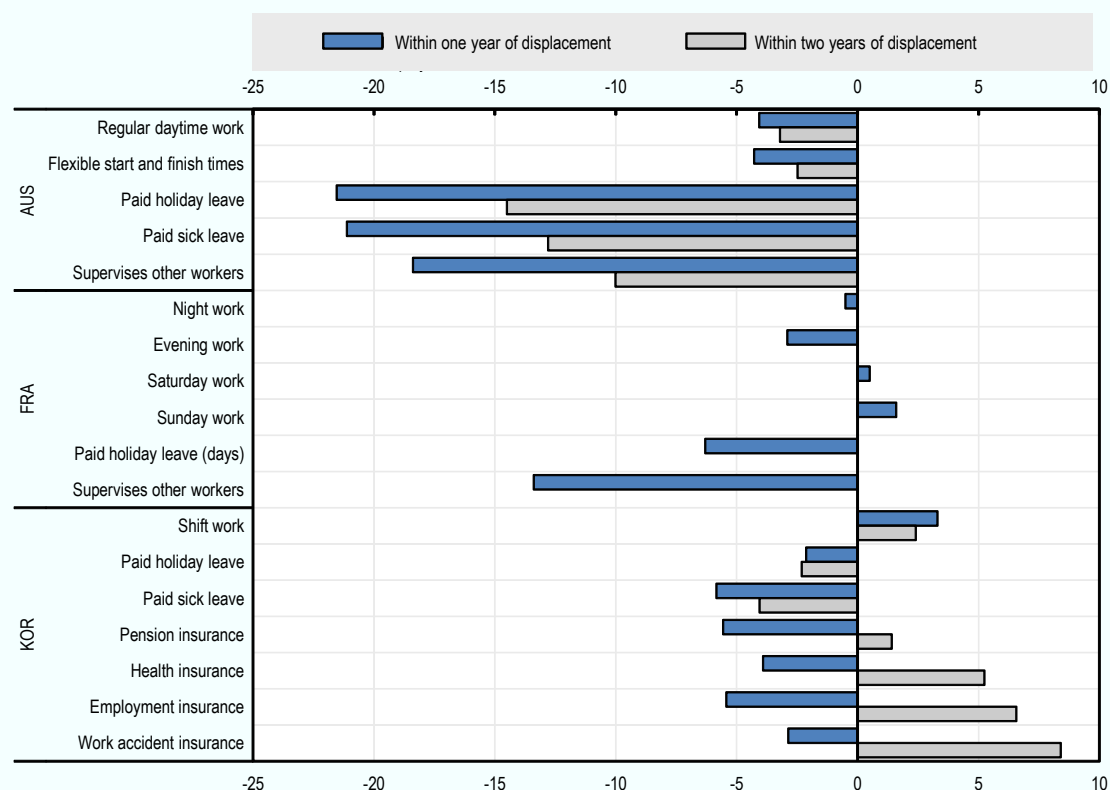
Very few existing studies examine aspects of job quality beyond earnings, hours or job security. Brand (2006) provides the most comprehensive examination of job benefits and characteristics in the United States. She finds that displaced workers have lower levels of occupational status, job authority/autonomy and employer-provided pension and health insurance than in their pre-displacement jobs. The biggest losses in employer-provided benefits are found for less-educated, blue-collar and manufacturing workers, while more highly-educated workers experience significant losses of occupational status, job autonomy and job authority. Several other authors have examined entitlement to health insurance in the United States, most finding that workers have a high probability of losing their health insurance coverage after displacement (Brand, 2006; Couch, 1998; Olsen, 1992; Podgursky and Swaim, 1987).

The figure below shows how the incidence of certain working arrangements and job benefits changes after displacement in the three countries included in this analysis. The incidence of entitlement to paid holiday and sick leave is lower in Australia and Korea and the number of days of paid holiday leave is smaller in France after displacement. The large negative impact of displacement on the incidence of paid leave in Australia is in large part due to the higher incidence of casual working arrangements after displacement (see previous section), as casual employees tend to have no access to paid leave arrangements. In Korea (for sick leave) and Australia, the incidence of leave improves after two years, but is still below the pre-displacement incidence.

Box 2. **Broader measures of job quality after displacement** (cont.)

Changes in the incidence of selected working arrangements and job benefits after displacement in Australia, France and Korea^a

Post-displacement incidence less pre-displacement incidence for displaced workers who are re-employed within one or two years (percentage points)



a) No data are available on working arrangements two years after displacement for France.
Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Workers in Korea have lower coverage by the major types of social insurance in the year after displacement than before. However, these effects appear to be relatively short-lived, at least in the period studied here. One of the reasons that social insurance coverage may be higher in the post-displacement job two years after displacement is that social insurance coverage for the population as a whole was increasing during this period (OECD, 2013). It would be interesting to adopt a difference-in-differences approach to measure the true cost of displacement for job benefits, similar to that used in the previous section to estimate earnings losses. However, the sample size of displaced workers in the datasets used is too small to produce reliable estimates. There is also some evidence that working-time arrangements are less favourable after displacement. In Australia, displaced workers are less likely to have regular daytime schedules and flexible start and finish times after displacement, while in Korea, shift work is more common. In France, there is little difference in the incidence of work at non-standard times after displacement, with a slight increase in the likelihood of work on Sundays and even a decrease in the incidence of evening work. However, once various worker and job characteristics (such as occupation and industry) are controlled for, workers have a significantly higher probability of work at non-standard times after displacement than before.

Finally, in terms of job duties, displaced workers in France and Australia are less likely to have supervisory responsibilities after displacement.

5. The consequences of job displacement for skill use

Many researchers have speculated that wage losses after displacement can be attributed to the loss of industry-specific or occupation-specific human capital. This is mostly based on evidence that re-employed displaced workers who change industry and/or occupation suffer greater losses than those who do not. Another possibility is that wage losses following displacement are explained by human capital depreciation during the unemployment or inactivity spells that often follow displacement. All these explanations point to the importance of changes in human capital in explaining the effect of displacement on wages.

This section goes beyond industry or occupation as a source of skill specificity to study more directly changes in skills use as a result of displacement. In doing so, the actual extent of human capital loss¹⁶ following displacement can be examined, rather than relying on proxies such as the share of workers switching industries or occupations. In addition, human capital losses can be decomposed into more informative components. However, it is not possible to identify the source of human capital loss, i.e. whether the loss originates from the depreciation of human capital during unemployment or inactivity or from the difficulty of finding a job that uses existing skills optimally. In fact, because the skills analysis exploits information on the use of skills at work, supply and demand factors are confounded.

Very few existing studies have looked at changes in skills use between jobs following displacement. Polatev and Robinson (2008) analyse human capital specificity in the context of job changes following displacement. They identify four basic skills to characterise skill portfolios for each occupation and construct measures of distance between the portfolios. They find that wage losses following displacement in the United States are more closely associated with switching skill portfolios than switching industry or occupation *per se*, and that switches cause large decreases in the skill portfolio in the post-displacement job. Similarly, Gendron (2011) finds that involuntary occupational movers suffer a wage penalty which increase with the distance in terms of skills requirements between the previous and new occupation.

In addition, a small but growing literature focuses on changes in skill requirements as workers transfer between jobs (not necessarily as the result of displacement) to test the specificity of human capital (Lazear, 2003, Regula and Backes-Gellner, 2009; Kambourov and Manovskii, 2009; Gathman and Schonberg, 2010; and Nedelkoska and Neffke, 2011). Papers in this literature use US or German data on tasks carried out at work to measure the distance between jobs in terms of skills requirements rather than relying on inferences based solely on changes in occupations or sectors. Overall, the findings suggest that: skills are more portable than previously thought based on studies of occupational and sectoral mobility; individuals tend to move to occupations with similar task requirements; and the distance of moves declines with experience. Nedelkoska and Neffke (2011) also find that workers moving directly between jobs are more likely to move to jobs that minimise human capital loss while those experiencing unemployment between two jobs tend to move to occupations where human capital loss is larger, presumably because they are forced to change jobs.

Measuring changes in skill use following displacement

Available data on displacement do not contain direct measures of skill use. Therefore, in order to study skill use and how it changes following displacement, this report uses data on occupations before and after displacement linked with detailed information on skill requirements by occupation (see Box 3). Each occupation is associated with measures of required maths, verbal, cognitive, interpersonal, craft, and gross and fine physical skills and a measure of the number of years of education required. Once skill requirements are attached to each occupation, comparisons between occupations before and after

displacement are relatively straightforward. Changes in required education between two jobs are expressed in years. However, because the other skill requirements are standardised to have mean zero and standard deviation of one, changes in these cases are expressed in units of a standard deviation.

Box 3. Measuring skills used at work

With existing data sources, it is not possible to directly measure the skills that displaced workers use in their pre- and post-displacement jobs. Instead, this report uses detailed information on the skills required for different occupations derived from the United States Occupational Information Network (O*NET) survey. The skill measures are then matched with data on the occupations of displaced workers to examine how skill requirements change after displacement.*

O*NET is a labour market information tool intended to facilitate matches between jobseekers and employers. The database contains numerical ratings at a detailed occupation level for 239 job characteristics, based mostly on responses to surveys of large representative samples of workers, as well as some job analyst ratings of certain job characteristics. While O*NET relates to occupations in the United States, Handel (2012) finds there is substantial consistency in occupational skill scores across countries and substantial agreement across different skill databases.

This report uses the first complete version of O*NET, released in mid-2008, to obtain nine skill requirements by occupation and match this information to country-specific data on displacement. Cronbach's Alpha, a statistical technique, is used to test that the items used to derive skill requirements are grouped appropriately (Handel, 2012). The derived skill requirements include seven composite measures of mathematics, verbal, cognitive, interpersonal, craft, and gross and fine physical skills (see the table below). All composite measures are standardised to have a mean of zero and a standard deviation of one. In addition, a measure of required education is also derived and is expressed as years of education needed to be newly hired in a given occupation. Occupations are classified using the International Standard Classification of Occupations (ISCO, 1998) at the two-digit level. Where necessary, national classifications are converted into ISCO 1998 as feasible and appropriate. As each occupational code is assigned a score for each of the seven skill requirements listed above, it is possible to calculate how a change in occupation following displacement translates into a change in skills use.

Skill requirements: O*NET items^a

Detailed items used to derive skill requirements

Required education: years of schooling required to be hired for a job, recoded from level of education.

Maths requirements: 1) mathematics skills; 2) mathematics knowledge; 3) mathematical reasoning; 4) number facility ($\alpha=0.92$).

Verbal requirements: 1) reading comprehension; 2) writing skills; 3) writing comprehension; 4) writing ability; 5) knowledge of English language rules (spelling, grammar, composition); 6) frequency of using written letters and memos ($\alpha=0.95$).

General cognitive demands: 1) analytical thinking; 2) critical thinking; 3) complex problem solving; 4) active learning; 5) analysing data or information; 6) processing information; 7) thinking creatively; 8) updating and using relevant knowledge; 9) deductive reasoning; 10) inductive reasoning; 11) fluency of ideas; 12) category flexibility ($\alpha=0.97$).

Interpersonal skills: 1) persuasion; 2) negotiation; 3) speaking skills; 4) frequency of face-to-face discussions; 5) frequency of public speaking; 6) communicating with persons outside organisation; 7) dealing with external customers or public; 8) performing for or working directly with the public; 9) customer and personal service knowledge; 10) service orientation; 11) dealing with angry people; 12) dealing with physically aggressive people; 13) frequency of conflict situations; 14) resolving conflicts and negotiating with others; 15) instructing skills; 16) training and teaching others; 17) education and training knowledge; 18) interpreting the meaning of information for others; 19) social orientation; 20) social perceptiveness ($\alpha=0.94$).

Craft skills: 1) controlling machines and processes; 2) repairing and maintaining mechanical equipment; 3) repairing and maintaining electronic equipment; 4) equipment maintenance; 5) repairing machines; 6) troubleshooting operating errors; 7) installing equipment, machines, and wiring ($\alpha=0.95$).

Gross physical requirements: 1) handling and moving objects; 2) general physical activities; 3) static strength; 4) dynamic strength; 5) trunk strength; 6) stamina; and time spent 7) sitting, 8) standing, 9) walking, 10) twisting body, 11) kneeling, crouching, stooping, or crawling ($\alpha=0.98$).

Fine physical requirements: 1) handling, controlling or feeling objects and tools; 2) operating vehicles, mechanised devices or equipment; 3) arm and hand steadiness; 4) manual dexterity; 5) finger dexterity; 6) multi-limb co-ordination; 7) rate control ($\alpha=0.95$).

a) Cronbach's Alpha calculated from employment data by occupation; for 1992 from the US Current Population Survey. Questionnaires available at onetcenter.org/questionnaires.html.

Box 3. **Measuring skills used at work** (*cont.*)

In this report, changes in skills use are summarised by the average change in the score of each skill requirement across individuals and for specific socio-demographic groups. In addition, three measures of global distance between jobs based on composite skill requirements are constructed. These measures use information on changes in the ranking of skills requirements based on their scores and on changes in the scores of the main skills requirements, excluding required education.** The three measures of skills-set switching are defined as follows:

- *Switch measure 1* – Change in ranking of top skill factor: A worker is defined as having switched skills set if the main skill requirement before the occupational change moved down by at least two positions. For example, if verbal skills had the highest score in the pre-displacement job but were only the third ranked skills in the post-displacement job, then the worker is said to have switched skills set.
- *Switch measure 2* – Change in ranking and size of top skill factor: A worker is defined as having switched skills set if the main skill requirement based on its score before the occupational change moved down by at least two positions and its score changed by at least half of a standard deviation. For example, if verbal skills had the highest score in the pre-displacement job but were only the third ranked skills in the post-displacement job *and* the score for verbal skills changed by at least half a standard deviation, then the worker is said to have switched skills set.
- *Switch measure 3* – Change in size of top three skill factors: A worker is defined as having switched skills set if the top three skill requirements based on their score before the occupational change all changed by at least half of a standard deviation. For example, if verbal, mathematics and cognitive skills were the top three skills in the pre-displacement job, but the score for each of these skills changed by at least half a standard deviation in the post-displacement job, then the worker is said to have switched skills set.

Finally, skill switches that are accompanied by an increase in required education of at least one year are classified as “skills upgrading” while those associated to a decrease in required education of at least one year are called “skills downgrading”. Changes in required education are used to discriminate between skill switch types because required education does not enter in the definition of the switch measures and because it is a relatively objective measure of job “complexity”.

This approach has the advantage of looking at skills use changes directly rather than approximating them with occupational (or sectoral) changes. However, also it also has limits. Notably, it assumes that jobs described by the same occupational code have the same skill requirements, i.e. occupation change is a necessary but not sufficient condition to detect changes in skills use. It also assumes that occupations have been coded correctly. If the coding of occupations is different over time, spurious occupational and skill changes may be identified.

* It is noteworthy that most papers in the literature derive skill requirements from the Dictionary of Occupational Titles, the precursor to O*NET.

** Required education cannot be included because its metric is different from that used in the other skills requirements, which makes ranking and level comparison impossible. On the other hand, required education can be used at a later stage to discriminate between negative and positive switches.

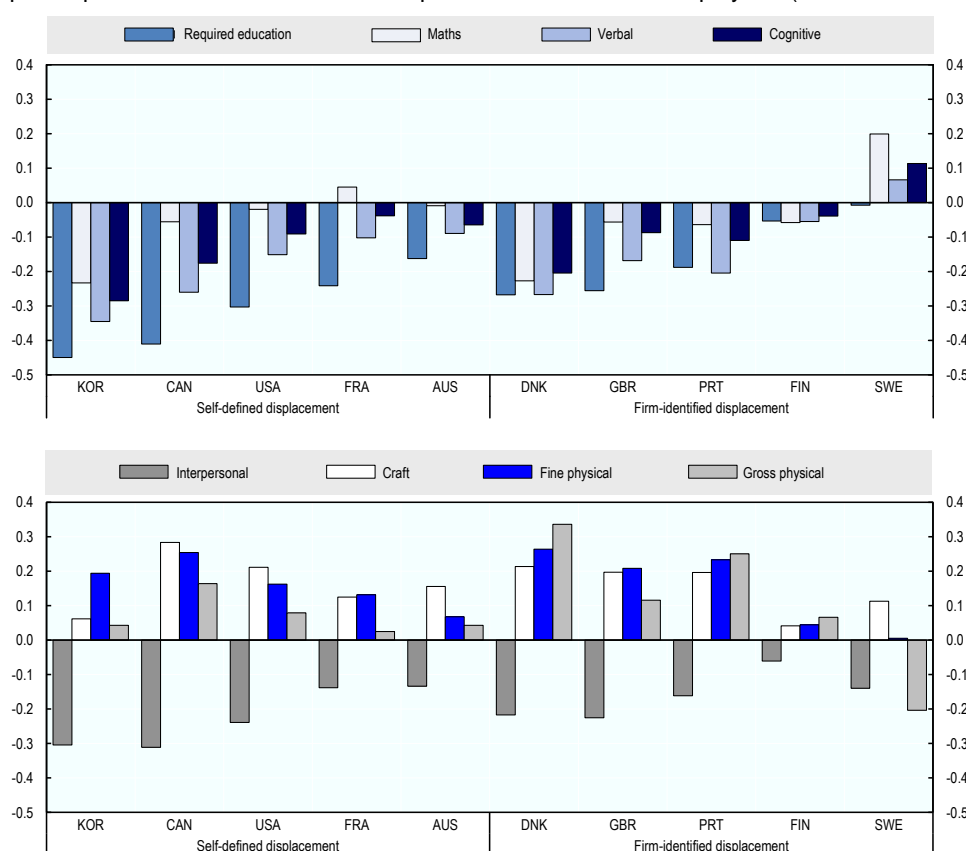
In addition to looking at changes in the use of individual skills, this report presents a measure of the overall distance between occupations in terms of skill use, very similar to the one developed by Polatev and Robinson (2008). This makes it possible to determine whether individuals who change occupations move to completely different jobs or to jobs that require similar skills. To measure this distance, skill requirements are ranked based on their intensity of use in each occupation, where changes in ranking and/or intensity of use are used to determine whether individuals have moved to an occupation associated with very different skill requirements compared to their pre-displacement job – so-called *skill switchers* – or to a similar occupation – so-called *skill stayers*. Skill switchers are then further classified as upgrading – if they move to jobs requiring at least one more year of education – or downgrading – if they move to jobs requiring at least one year fewer of education (see Box 3 for more details).

Portable skills and re-employment chances

Displaced workers differ quite markedly from the average employee in terms of the skills they use in their pre-displacement job. On the one hand, with few exceptions, displaced workers use less mathematics, verbal, cognitive and interpersonal skills in their pre-displacement jobs than the average employee and are in jobs with lower-than-average educational requirements (Figure 16). This is not the case in Sweden due to the composition of displaced workers, particularly during the first half of the 2000s. Over that period, displacement affected mostly white-collar employees in highly-paid jobs with high education requirements. On the other hand, displaced workers tend to use more craft and physical skills than on average for all employees.¹⁷

Figure 16. Skill use before displacement, 2000-10^a

Difference in pre-displacement skill use between displaced workers and all employees (units of a standard deviation)



a) Skill requirements are measured by indices with mean zero and unit standard deviation (see Box 3). This figure reports the difference in skill requirements between displaced workers and all employees.

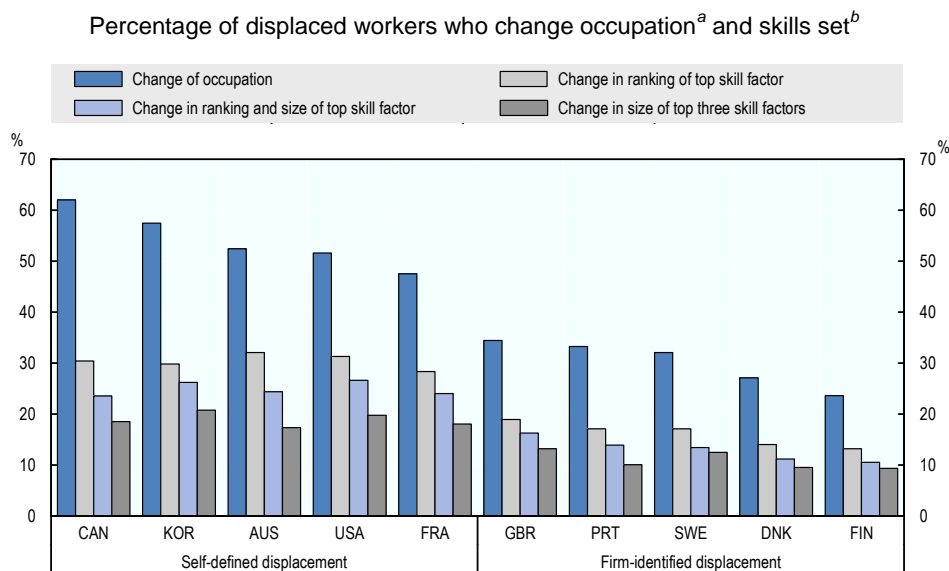
Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

These results do not bode well for the re-employment chances of displaced workers in light of the growing demand for the types of skills they appear to be lacking (or, more precisely, were not required to use in their former job) and also highlight why they have a greater probability of displacement in the first place. Handel (2012) shows rising demand for cognitive, verbal and interpersonal skills, as well as declining demand for craft and physical skills in both the United States and Europe since the 1990s. While this finding is based on changes in occupational shares,¹⁸ the author also studies overall changes in skill requirements – confounding between and within occupation effects – and finds that jobs in Denmark, Germany, Finland and Portugal were substantially more likely to involve complex tasks in 2005 than a decade earlier.¹⁹

Occupational changes and changes in skill requirements after displacement

Among displaced workers who find work within one year, many change occupation following displacement. However, far fewer move to occupations with very different skill requirements. Figure 17 shows that occupational changes following displacement are very frequent, with between one-quarter and half of workers changing occupations in the countries for which data are available.²⁰ It is interesting to note that the share of workers shifting occupations and skills is higher, on average, in countries where displacement is self-defined than in countries where it is firm-identified. This may be due to differences in the way that occupations are coded in survey and administrative data (with coding error likely to be greater in the former than the latter) or because workers displaced due to firm closure or mass dismissal have different characteristics or re-employment prospects than those displaced individually. Unfortunately, it is not possible to determine which definition yields the most accurate measure of occupation and skill changes. These limitations should be kept in mind when comparing levels across countries in the remainder of this section.

Figure 17. Changes in occupation and skills set after displacement, 2000-10



- a) Occupation is defined at the ISCO-88 two-digit level, with the exceptions of Canada and the United States where it is defined using the US Census Occupational Classification at the three- and two-digit levels, respectively.
- b) For skills set changes, the ranking of the top factor is considered to have changed if it has fallen by at least two positions and only changes in skill factor sizes of at least half a standard deviation are considered (see Box 3).

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

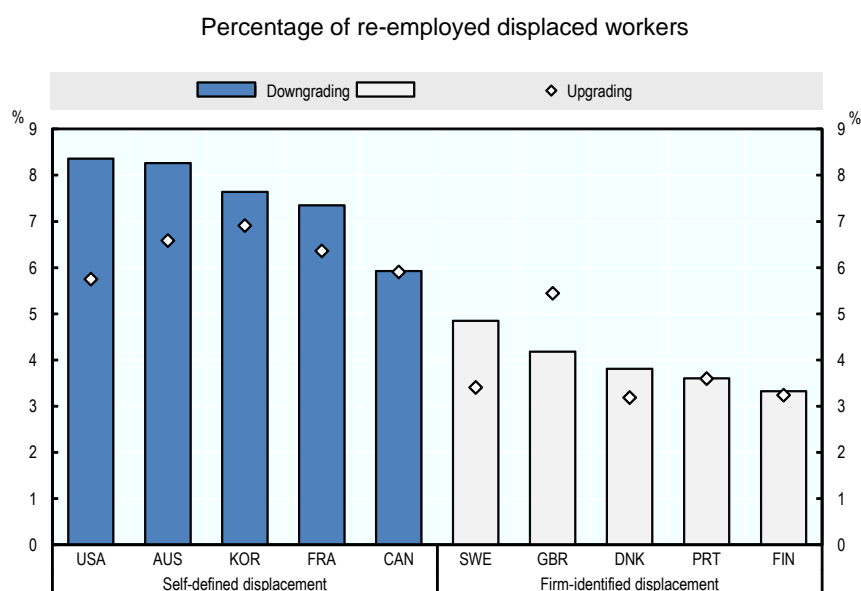
If human capital is completely occupation-specific, widespread occupational changes suggest very sizeable skill losses following displacement. However, it is likely that many skills are useful in a range of occupations. Indeed, many workers appear to change occupation but continue to use similar skills. Figure 17 also shows three alternative measures of skills switching. All three skills-related measures – based on changes in the ranking of key skill requirements as well as changes in the intensity with which key skills are required – show significantly fewer switches than occupational changes. For instance, in Canada, while 60% of workers change occupation after displacement, only 20-30% of workers switch skills. Similar patterns are observed in other countries: two to three times as many workers change occupation as experience skill switches.²¹

Many workers change industry, instead of or as well as occupation, after displacement. Those who change industry are about twice as likely to change occupation as those that are re-employed in the same industry. However, with the exception of Korea, there is no evidence that changes in occupation between two different industries are more likely to lead to skill switches than changes in occupation within the same industry.²² Overall, the evidence presented above shows that displacement results in a sizeable share of workers moving to jobs with significantly different skills requirements, which is a potential source of post-displacement wage losses. However, not all industry and occupational moves lead to a significant change in the skills used at work. As will be shown below, changes in skill sets play a clear role in explaining earnings losses after displacement, even after accounting for changes in industry.

Professional down-grading following displacement

Not all skill switches imply a negative outcome. Some displaced workers who are re-employed in occupations with different skill requirements move to jobs with higher skill requirements than those from which they were displaced. As a result, it is important to isolate negative skill switches from positive or neutral ones. One way to do so is to use the change in the years of education required at work as a result of displacement, under the assumption that an increase in required education is a signal that the person has moved up the career ladder while a negative change points to a move to a lower-level job.²³ Figure 18 shows the share of displaced workers who experience a skill switch²⁴ accompanied by a fall in required years of education of at least one year, referred to below as *professional downgrading*, or a skill switch accompanied by an increase in required years of education of at least one year, referred to below as *professional upgrading*. Roughly 3-8% of displaced workers experience professional downgrading, while slightly fewer, on average, experience professional upgrading. While the estimates vary considerably across countries, again it should be noted that the cross-country differences appear to be driven in part by the data source and/or definition of displacement used, so cross-country estimates should be made with caution.

Figure 18. **Incidence of professional upgrading and downgrading following displacement, 2000-10^a**



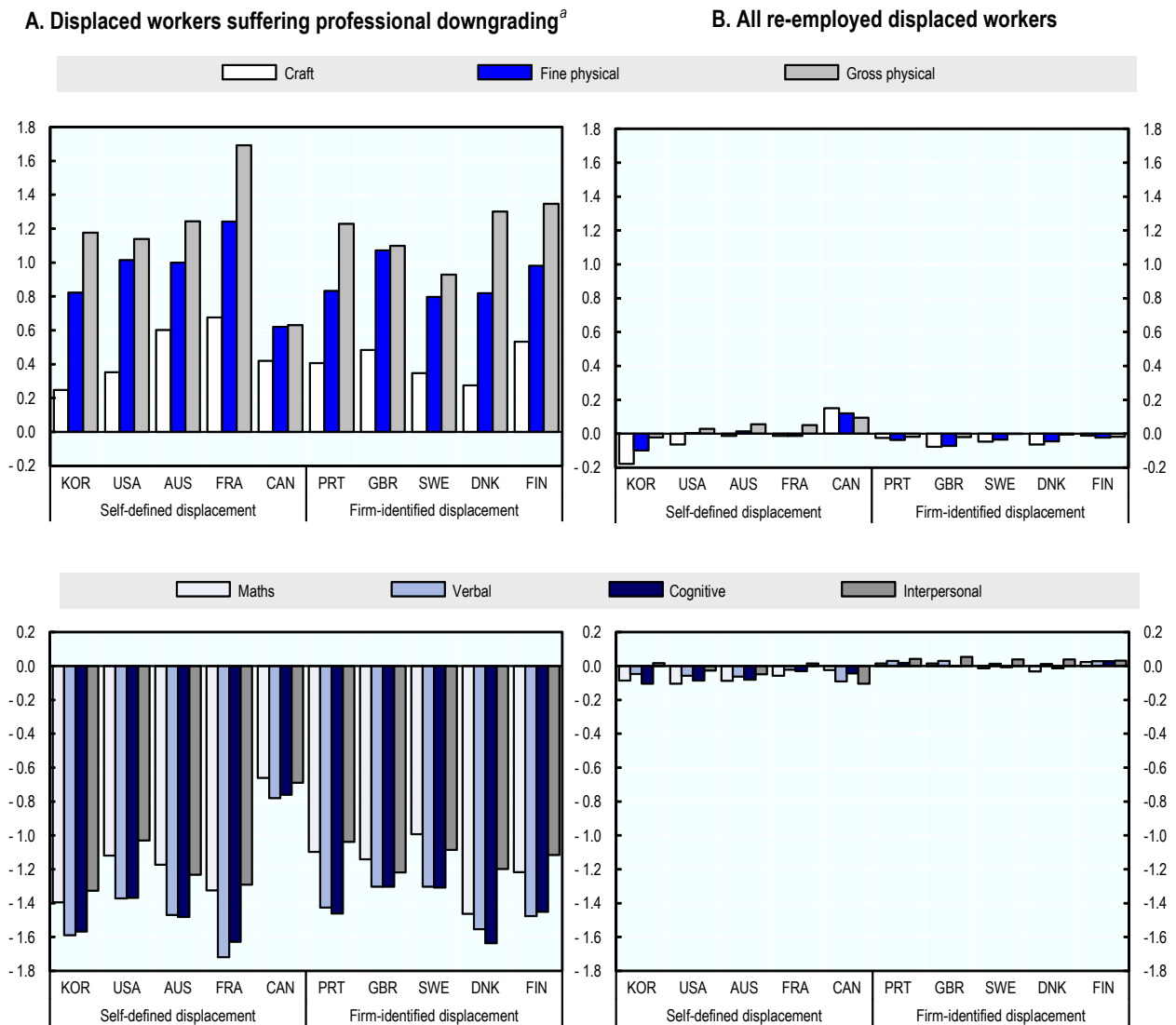
a) Professional downgrading is defined as a skill switch (based on switch measure 2, see Box 3) accompanied by a fall in required years of education of at least one year; professional upgrading is defined as a skill switch accompanied by an increase in required years of education of at least one year.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

While not all displaced workers suffer human capital losses, for a small sub-group the losses are likely to be sizeable. Figure 19 presents average changes in skills use following displacement for all displaced workers and for the subgroup who suffered professional downgrading. Average changes in skill use are close to zero when looking at all displaced workers. However, displaced workers who suffer professional downgrading experience significant losses in math, verbal, cognitive and interpersonal skills, modest gains in the use of craft skills and significant increases in the use of physical skills. These patterns are very consistent across countries.

Figure 19. Human capital loss following displacement, 2000-10

Average change in each skill factor (units of a standard deviation)



a) Professional downgrading is defined as a skill switch (based on switch measure 2, see Box 3) accompanied by a fall in required years of education of at least one year.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Changes in skill requirements: who is most affected?

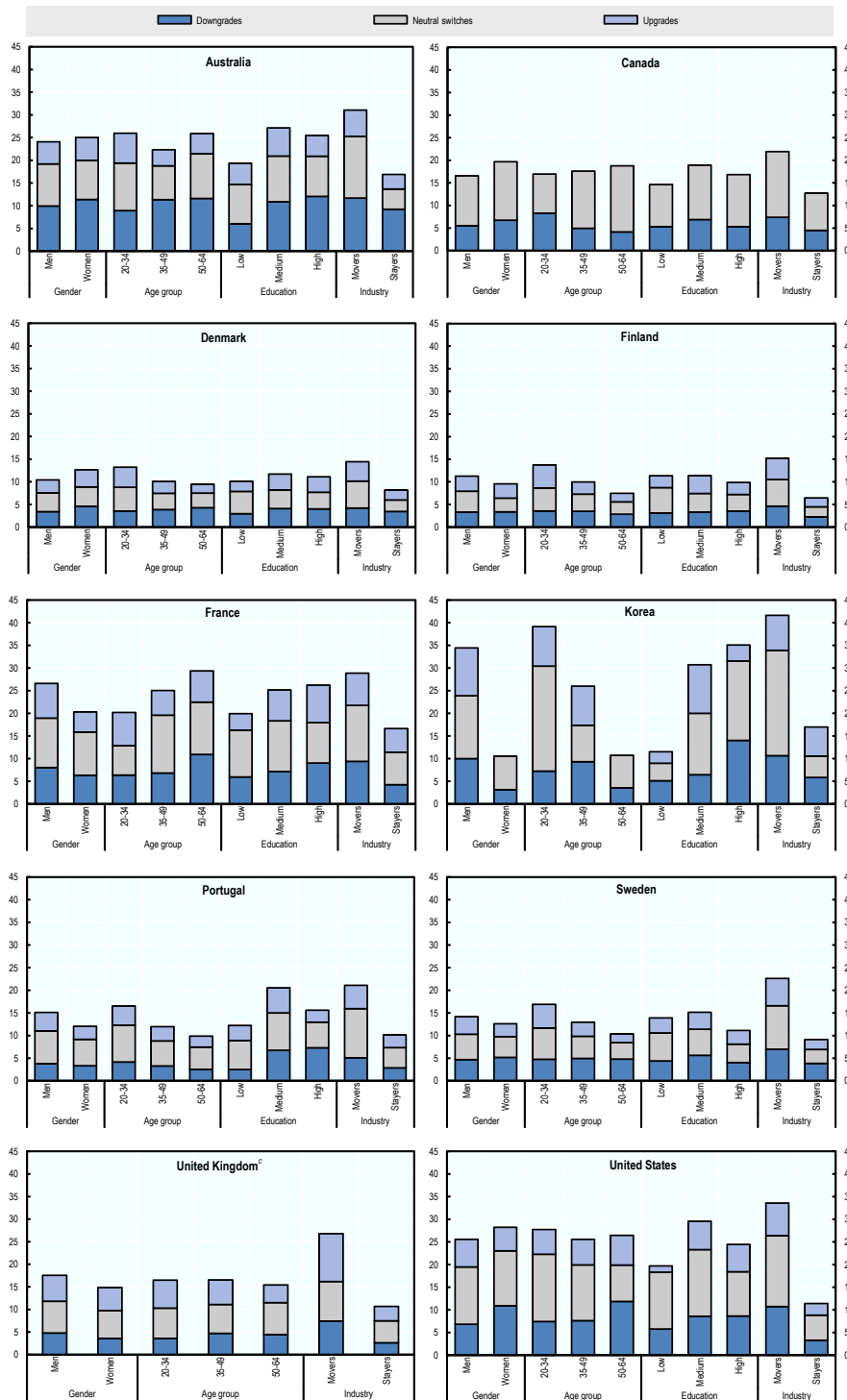
Figure 20 shows the share of displaced workers who experience a skill switch by gender, age, education level and whether or not they also change industry. It also shows the nature of the switch – whether it is neutral or involves professional upgrading or downgrading. There is little difference in the overall incidence of skill switches between men and women, with the exceptions of France and Korea, where men are markedly more likely to experience changes in skill requirements than women, and in Canada where the opposite is true. In many countries, women switching to occupations with very different skill requirements are more likely to experience professional downgrading than men following displacement. However, in Canada, Denmark and Finland, women are also more likely to experience professional upgrading than their male counterparts.

With some exceptions – Australia and France – the likelihood of skill switches is lower for older workers than for youth, probably reflecting a mixture of supply and demand factors: older and more experienced workers may be less willing to move to a job with very different skill requirement or may face larger implicit opportunity costs while for some youth, a move away from the skill requirements of their pre-displacement job may even be desirable. On the demand side, employers may be less willing to offer older workers a job in which they have limited experience as they may be perceived as less adaptable. Among skill-switchers, professional downgrading tends to be rarest among the youngest workers, possibly because youth are more likely to take advantage of displacement for positive career moves (or more likely to have been in low-level jobs in the first place).

Across qualification levels, the likelihood of changes in skill requirements takes an inverted U shape, with upper-secondary graduates being the most likely to move away from the skill content of their pre-displacement job.²⁵ This could be explained by the fact that upper-secondary graduates may have both the skills and willingness to move to a job with very different skill requirements. In fact, the limited mobility of the low-educated could be due to their less portable skills (or lower capacity to adapt to new skill requirements) while tertiary graduates with more portable skills may be less willing to leave their main field of work at the risk of suffering wage penalties. In most countries, the incidence of professional downgrading among skill switchers tends to be higher among middle- and high-educated workers.²⁶

Finally, switches in skill requirements are more likely among industry movers than industry stayers in all the countries examined. As mentioned above, this is related to the fact that occupational changes are more frequent among industry movers rather than to the fact the type of occupational changes that happen more frequently in conjunction with industry changes are more likely to give rise to changes in skill requirements. However, in all countries except France and the United States, industry stayers experience more dramatic skill moves – more professional downgrading and upgrading and fewer neutral switches – than industry movers.

Figure 20. Skill switches,^a by nature of the switch and socio-demographic characteristics,^b 2000-10
Percentages



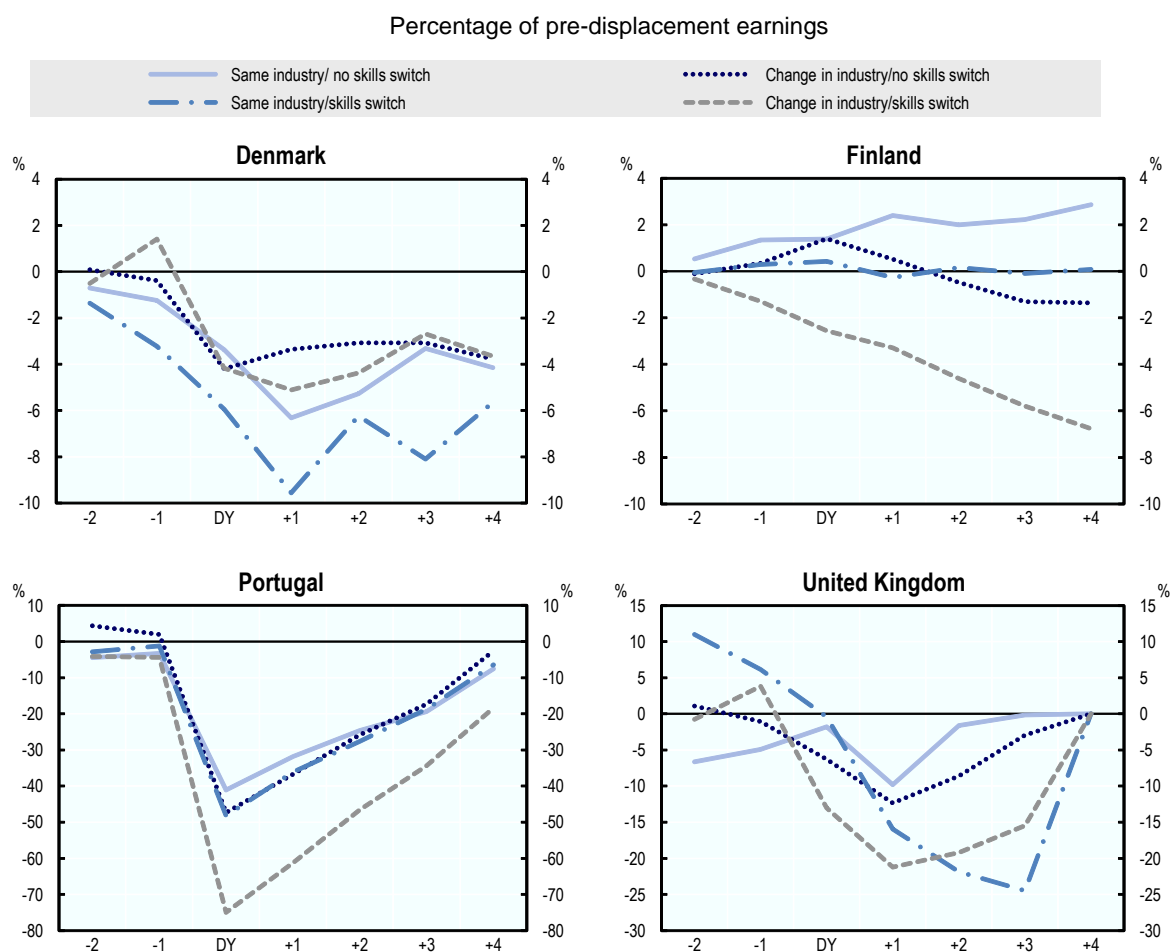
- a) All skills switches are based on switch measure 2. Professional downgrading (upgrading) is defined as a skill switch accompanied by a fall (rise) in required years of education of at least one year; the remainder of the skill switches are defined as neutral (see Box 3).
- b) For education: *Low*: less than secondary education; *Medium*: secondary education; *High*: post-secondary education.
- c) No data on education for the United Kingdom.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Can skills switches explain post-displacement earnings losses?

To assess the relative importance of skill specificities and industry-specific human capital in explaining wage/earnings losses after displacement, the earnings estimates presented in Section 4 are reproduced by industry/skill change status for four countries: Denmark, Finland, Portugal and the United Kingdom. The crucial role played by changes in skills set emerges in all countries. In fact, workers who experience no change in skills set, with or without a change in industry, tend to experience the lowest earnings penalties following displacement (Figure 21). However, if changes in skills set were all that mattered in explaining earnings losses, the outcomes of workers experiencing a skills switch but no industry change would be very similar to the outcomes of those for whom the skills switch is accompanied by an industry move.²⁷ This hypothesis is not supported by the data presented in Figure 21. In Portugal and Finland, the effect of skill-switching appears to be magnified by industry moves. In Denmark, the largest losses are for those who switch skill-sets within the same industry (although these effects are only statistically different from zero in the first two years following displacement).

Figure 21. Earnings changes before and after displacement by skill-switch and industry-move status^a



DY: Displacement year.

a) Pre-displacement earnings is average earnings in the year prior to displacement (-1 in the figure). See Annex A1 for a full description of the samples, years and definitions used for each country. Data refer to annual earnings for Denmark, Finland and Portugal and monthly earnings for the United Kingdom.

Source: Compiled by the OECD Secretariat using data sources described in Annex A1.

Conclusions

This report provides new and more extensive evidence of job displacement and its consequences for a large number of countries. Despite significant differences in the available data, the analysis highlights many similarities across countries in the types of workers most at risk of displacement and those who find it most difficult to return to work afterwards. The innovative analysis of skill use after displacement also sheds new light on some of the barriers to re-employment and drivers of earnings losses after displacement.

The findings point to a number of policy-relevant issues that will need to be addressed in future work. *First*, the costs of displacement appear to be mainly due to non-employment spells, prompting the question of whether helping people return to work quickly should be made a priority to limit earnings losses and skill depreciation after displacement. If so, the findings in this report suggest the certain types of workers should be targeted if resources to help displaced workers are scarce. Women, older workers and the low-skilled are most likely to drop out of the labour force completely after displacement, and so should be encouraged to continue job search through appropriate activation measures. More generally, some workers are more prone to job displacement, and to negative consequences after displacement, than others. In particular, older workers and those with low education levels have a higher displacement risk, take longer to get back into work and suffer greater (and more persistent) earnings losses in most countries examined. While youth also have a higher risk of displacement than prime-aged workers, they fare better afterwards. Young workers generally find work relatively quickly after displacement, often in jobs with greater skill requirements than their previous jobs.

Second, several OECD countries require firms, particularly large firms, to provide outplacement or retraining services to workers if they intend to make redundancies or mass layoffs. However, in all the countries examined, workers in the smallest firms have a much higher risk of displacement than those in larger firms. While the number of displaced workers involved in redundancies and mass layoffs by large firms may still justify the application of existing obligations on firms, relying only on these types of measures may miss out on helping those most at risk of displacement. Future work should look at if and how general active labour market programmes, such as job-search assistance and retraining programmes through public employment services, may be appropriate substitutes or complements to subsidised outplacement services provided by firms, to ensure that the workers most affected by displacement can be reached and receive the necessary support.

Third, the findings provide some insights into the amount and types of training that should be provided to displaced workers but further work is needed to identify clear policy directions. Not all displaced workers will need retraining to find a new, high-quality job. Even though many workers change industry or occupation after displacement, not all such moves lead to a significant change in the skills used at work. Indeed, even among displaced workers who use different skills in their new jobs, a number actually experience an upgrading in skill requirements. However, for a subset of displaced workers who experience professional downgrading – mostly women, older and mid-to-high-skilled workers – displacement brings in its train substantial human capital losses. These workers suffer a significant reduction in the use of mathematics, verbal and cognitive skills. This represents a pool of unutilised human capital and appears to be a significant factor behind the large wage losses experienced by displaced workers. In addition, there is evidence that displaced workers may be unprepared to take up jobs in growing occupations as they tend to lack key generic skills such as mathematics, verbal, cognitive and interpersonal skills that are increasingly in demand. These findings suggest that, where necessary, retraining programmes for displaced workers should focus on these key generic skills.

Finally, the report also highlights the limitations of available data for cross-country analyses. Despite going to great lengths to make the methodology and samples used comparable across countries, there remain substantial differences in the way the data were collected and the available variables to examine displacement. This means that it is unwise to make strong inferences from the cross-country estimates about the impact of policies and institutions on displacement, re-employment, and the earnings and skills effects of displacement. Further work is needed on these issues, but based on a micro-level analysis of how policies and institutions can best help displaced workers get back into good jobs quickly. This will be the focus of the second part of the OECD's work on displaced workers that will focus on a series of country-specific reviews of policies to help displaced workers, culminating in a synthesis report highlighting best-practice examples from participating countries.

Notes

1. The results presented in this report were compiled from analyses undertaken by a network of researchers as well as the OECD Secretariat. The OECD Secretariat wishes to thank the following researchers for their contributions to the project: Benoit Delage and Marc Gendron from Human Resources and Skills Development Canada; Kent Eliasson and Pär Hansson from the Swedish Agency for Growth Policy Analysis; Anabela Carneiro from Porto University; Sylvia Dixon from the New Zealand Ministry of Business, Innovation and Employment; Arto Huh and Kristiina Huttunen from the Aalto School of Economics; Ryo Kambayashi from Hitotsubashi University; René Morissette from Statistics Canada; Pedro Portugal from the Bank of Portugal; Johannes Schmieder from Boston University; Fabian Slonimczyk from the Higher School of Economics, Moscow; Richard Upward from the University of Nottingham; Lars Vilhuber from Cornell University; Till von Wachter from the University of California Los Angeles; Niels Westergaard-Nielsen and Simon Bodilsen from Aarhus University; Peter Wright from the University of Sheffield; and officials at the Japanese Ministry of Health, Labor and Welfare.
2. In the case of Sweden, the definition of displacement is based on establishments rather than firms. Using firms would lead to an over-estimation of displacement events due to frequent changes in firm identification numbers. To avoid this problem, other countries – notably Finland – have adjusted figures by excluding firm closure when 70% or more of employees are all found employed by a firm with a different identifier a year later.
3. While the thresholds used to identify mass dismissals are arbitrary, they are based on those used widely in the literature.
4. Dismissals for cause are included because in a number of the countries examined in this report it is not possible to distinguish between economic dismissal and dismissal for cause. Dismissals for cause tend to be a very small proportion of job displacements and are relatively stable over time. Preliminary analysis for the countries where these types of displacements could be identified separately shows that the inclusion of dismissals for cause does not appear to have a major impact on the results presented in the report.
5. Hence, while all temporary workers are included in the base sample and in the analysis of this chapter, only those who report having lost their job for economic reasons are counted as displaced.
6. While the downturn had already hit some countries in late 2008, 2008 is included in the pre-crisis period because it refers to displacements that occurred between 2007 and 2008, most of which were before the onset of the downturn. In fact, most countries experienced lower-than-average displacement rates in 2008.

7. As mentioned above (see endnote 2.), Figures for Sweden are derived using establishment level data rather than firm-size data. If firm-size data was used, without correcting for changes in firm’s identifiers, the rate would be approximately double.
8. Results for Japan are not included in Table 1 as they cannot be produced on an internationally-comparable basis using the Japanese Labor Force Survey, the survey used throughout this report. However, analysis carried out using the Employment Status Survey shows a similar picture as for the other countries included in Table 1. Women are more likely to be displaced than their male counterparts. The likelihood of displacement also increases with age, but declines with tenure, education and firm size. Non-regular workers are more likely overall to be displaced than their regular counterparts. However, the displacement rate is particularly low for temporary and daily employees, probably because very few workers in these types of jobs satisfy the one-year tenure threshold used to define displacement in this report.
9. Re-employment rates tend to stabilise within two years of displacement and are only marginally higher in the third and fourth year after displacement, so are not shown here.
10. Data on re-employment rates are available from two sources for the United States. As well as data from the *Longitudinal Employer Household Dynamics (LEHD) Database* used in the previous section to estimate displacement rates, data from the Displaced Worker Supplement (DWS) to the Current Population Survey can be used to estimate re-employment rates using a self-identified definition of displacement. On the other hand, the DWS cannot be used to calculate annual displacement rates on a base sample comparable to that specified in Section 1 of this report.
11. In this section, “earnings” refers to wage and salary income earned over a period of longer than one month (generally annual earnings) while “wages” refers to wage and salary income earned over a shorter period (either monthly, weekly, daily or hourly wages).
12. Earnings losses due to non-employment may be offset, to some extent, by the receipt of unemployment benefits or other forms of social assistance. Hijzen et al. (2010) is one of the few studies to adjust income losses for unemployment benefit receipt while non-employed. They find losses of 23% if displaced workers are assumed to receive the UK Jobseeker Allowance while non-employed and 27% if they are assumed to have zero benefits. The small difference between the estimated earnings effect including and excluding benefits probably reflects the low replacement rate of unemployment benefits in the United Kingdom and is likely to be much larger in countries with more generous benefits.
13. Losses in the Nordic countries appear to be higher in the year following displacement than in the displacement year itself. This may be because, due to the timing of the survey, during the year of displacement, some workers may still be employed in their pre-displacement job for at least part of the year. For Germany, the estimated earnings effects are similar using annual and monthly earnings measures, suggesting that the observed difference in magnitude between the Nordic countries, on the one hand, and Portugal and the United Kingdom, on the other, are not purely due to measurement differences.
14. The estimates in Figure 9 only include people who have positive earnings in at least one year after displacement so those who retire completely after displacement are excluded from the analysis.
15. The sample examined includes only workers who were displaced due to economic reasons or force cause, not those who were displaced due to the end of a temporary contract (see Section 1 for a discussion). However, the broad trend of an increase in the incidence of non-standard forms of work is also observed if displacements due to the end of a temporary contract are also included.
16. The term “human capital loss” is employed here to indicate that skills previously used on the job are no longer needed and as a result are left idle or used to a lesser extent and may even deteriorate over time if the situation persists. Because there is a cost to accumulating human capital, private and public, the fact that acquired skills are left idle represents a loss. However, some qualifications are needed here. Individuals moving up the career

- ladder may no longer use certain skills but still benefit overall. As a result, when assessing human capital losses, this report will focus primarily on individuals experiencing career downgrading.
17. The differences shown are statistically significant at the 1% level with the exception of differences in the use of: craft (10%) and gross physical skills (not significant) in Korea; math skills (not significant) in the United States; gross physical skills (not significant) in Australia.
 18. The author uses O*NET to derive the skill requirements that are adopted in this report (capturing between-occupation differences), hence changes over time are due to changes in the composition of the labour force by occupation.
 19. Note that the inverse is true in Sweden and the United Kingdom, while no information is available for the other countries included in this study.
 20. Occupational changes are measured at the two-digit level using the 1988 International Standard Classification of Occupations (ISCO-88), except for Canada and the United States which use the US Census Occupational Classification at the three- and two-digit levels, respectively and the United Kingdom where changes in occupation are measured using ISCO-88 at the one-digit level.
 21. Using occupational classifications at different levels of detail affects the share of workers recorded as changing occupation: for instance, the relatively high share of occupational changes in Canada may be due to the fact that the Canadian figure is based on a more detailed occupational classification than the other countries in Figure 13. On the other hand, using an occupational classification at the two-digit level does not appear to underestimate skill switching compared to using the same classification at the three-digit level, based on evidence from countries for which data are available at both levels. This is not surprising, as differences in skill requirements between three-digit occupations within two-digit groups are likely to be smaller than differences between two-digit groups. Hence, adding an additional digit-level is likely to increase switching but the marginal effect is probably small.
 22. In Korea, workers who change occupation and industry are more likely to experience skill switches than those who change occupation within the same industry.
 23. As detailed in Box 3, the measures of skills switching presented in Figure 13 are based on the ranking and changes in value of mathematics, verbal, cognitive, craft, interpersonal, gross physical and fine physical skills requirements. Because of measurement issues, required years of education are not included in the definition of skill switches, making them an ideal item to classify switches as bad or good. Changes in years of required education have the additional advantage of providing a simple objective measure of professional upgrading and downgrading.
 24. Based on skill switch measure 2 in Box 3, whereby skill switches are defined as occupational moves that imply a change in ranking and size of the top skill factor.
 25. The only exceptions to this pattern are Korea and France where the tertiary-educated are the most affected by skill switches.
 26. This is partly by construction, as the least-educated workers are more likely to occupy jobs with very few years of required education to start with.
 27. This assumes that all changes in the skills used at work can be accurately measured. As discussed in Box 3, skill switches are identified in this report using measures of generic, rather than job-specific, skills. To some extent, changes in industry may be a proxy for changes in job-specific skills that are not accurately captured in the skill-switch measures used in this report.

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ANNEX A1

Data sources and definitions

Table A1.1. Data sources and definitions

Country	Data source	Data type	Displacement years	Sample characteristics (in year prior to displacement)	Displacement definition
Australia	Household Income and Labour Dynamics in Australia (HILDA) survey ^a	Household panel	2002-10	Employees aged 20-64 years, single job holders with job tenure of at least one year excluding ISIC Rev. 3 groups L, O and Q ^b	Self-defined: layoff, no work available, retrenched or made redundant
Canada	Survey of Income and Labour Dynamics (SLID)	Household panel	2000-10	Employees aged 20-64 years, single job holders with tenure of at least 12 months excluding ISIC Rev. 3 groups L, O and Q (derived from NAICS 2007 concordance)	Self-defined: company moved or went out of business; layoff/business slowdown (not caused by seasonal conditions); dismissed by employer
Denmark	IDA Database	Matched employee-employer panel using administrative data	1982-2009	Private-sector employees aged 20-64 years, single job holders, with tenure of one year or more in firms with 10 or more employees excluding ISIC Rev. 3 groups L, O and Q	Firm-identified: separation from a firm experiencing mass dismissal or firm closure ^c
Finland	Finnish Longitudinal Employer-Employee Database (FLEED)	Matched employee-employer panel using administrative data	1989-2009	Private-sector employees aged 20-64 years, single job holders, with tenure of one year or more in plants with 10 or more employees excluding ISIC Rev. 3 groups L, O and Q	Firm-identified: separation from a plant experiencing mass dismissal or plant closure
France	<i>Enquête Emploi</i> (Labour Force Survey)	Labour force survey with six-quarter panel component	2004-10	Employees aged 20-64 years, single job holders with job tenure of at least one year excluding ISIC Rev. 3 groups L, O and Q	Self-defined: dismissal for economic reasons, firm closure due to bankruptcy or other reasons, and (since 2009) <i>rupture conventionnelle</i> ^d .
Germany	IAB Database	Matched employee-employer panel using administrative data	1980-2004	Employees aged 20-64 years, single job holders, with tenure of one year or more in establishments with 10 or more employees excluding ISIC Rev. 3 groups L, O and Q	Firm-identified: separation from an establishment experiencing mass dismissal or establishment closure
Japan	Labor Force Survey	Labour force survey with retrospective displacement questions	2002-10	Employees (including board members) aged 20-64 years excluding the equivalent of ISIC Rev. 3 groups L, O and Q. Note that it was not possible to exclude multiple job holders or employees with less than one year of tenure.	Self-defined: separation due to bankruptcy and personnel cutbacks
Korea	Korean Labor and Income Panel Survey (KLIPS)	Household panel	2000-09	Employees aged 20-64 years, single job holders with job tenure of at least one year excluding ISIC Rev. 3 groups L, O and Q	Self-defined: bankruptcy, closure or shutdown of the business; made redundant/dismitted; dismissal for cause; involuntary separations due to lack of work
New Zealand	Survey of Families, Income and Employment (SoFIE)	Household panel	2003-09	Employees aged 20-64 years, single job holders with job tenure of at least one year excluding ISIC Rev. 3 groups L, O and Q	Self-defined: laid off/dismitted/made redundant

Table A1.1. **Data sources and definitions** (cont.)

Country	Data source	Data type	Displacement years	Sample characteristics (in year prior to displacement)	Displacement definition
Portugal	<i>Quadros de Pessoal</i> Database	Matched employee-employer panel using administrative data	1987-2009 (excluding 1990, 1991, 2001 and 2002)	Employees aged 20-64 years, single job holders, with tenure of at least 12 months in firms with 10 or more employees excluding ISIC Rev. 3 groups L, O and Q	Firm-identified: separation from a firm experiencing mass dismissal or firm closure
Russian Federation	Displacement Supplement to the Russian Longitudinal Monitoring Survey ^e	Household panel with retrospective displacement questions	2004-08	Employees aged 20-64 years, single job holders with job tenure of at least one year excluding ISIC Rev. 3 groups L, O and Q	Self-defined: firm or organisation closed down, moved, reorganised, went bankrupt or was privatised; terminated by employer; laid off
Sweden	IFDB Database	Matched employee-employer panel using administrative data	1991-2009	Employees aged 20-64 years, with tenure of one year or more in establishments with 10 or more employees excluding ISIC Rev. 3 groups L, O and Q. Note that it was not possible to exclude multiple job holders.	Firm-identified: separation from an establishment experiencing mass dismissal or establishment closure
United Kingdom	Annual Survey of Hours and Earnings + Business Structure Database	Matched employee-employer panel using survey and administrative data	2000-10	Employees aged 20-64 years, with tenure of one year or more in establishments with 10 or more employees excluding the equivalent of ISIC Rev. 3 groups L, O and Q. Note that it was not possible to exclude multiple job holders.	Firm-identified: separation from a firm experiencing mass dismissal or firm closure
United States	Displaced worker supplement to the Current Population Survey	Labour force survey with retrospective displacement questions	2000-10 (once every two years)	Employees aged 20-64 years, with tenure of one year or more excluding ISIC Rev. 3 groups L, O and Q. Note that it was not possible to exclude multiple job holders.	Self-defined: plant or company closed down or moved; insufficient work; position or shift abolished
United States	Longitudinal Employer Household Dynamics (LEHD) Database	Matched employee-employer panel using administrative data	2000-07	Employees aged 20-64 years, single job holders with tenure of at least one year excluding federal government employees and state/local government employees working in the primary government sector	Firm-identified: separation from a firm experiencing mass dismissal or firm closure

- a) The HILDA Project was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this report, however, are those of the author and should not be attributed to either FaHCSIA or the Melbourne Institute.
- b) International Standard Industrial Classification (ISIC) Revision 3 categories: L: *Public administration and defence; compulsory social security*; O: *Private households with employed persons*; and Q: *Extra-territorial organisations and bodies*.
- c) Mass dismissal: firm/plant/establishment experienced an absolute reduction in employment of five employees or more *and* a relative reduction in employment of 30% or more. Firm/plant/establishment closure: Firm/plant/establishment ceased to operate.
- d) *Rupture conventionnelle*, first introduced in 2008, allows termination of the contractual relationship between the employer and the employee through mutual agreement. In practice, many redundancies are completed through the *rupture conventionnelle*, because it is easier and less costly than the traditional *licenciement économique* (layoff for economic reason).
- e) The Russian Longitudinal Monitoring Survey was conducted by HSE and ZAO “Demoscope” together with Carolina Population Center, University of North Carolina at Chapel Hill and the Institute of Sociology RAS.

Source: Author’s compilation for the OECD.

ANNEX A2

Review of literature

Table A2.1. Review of literature

Country	Author	Data	Years	Short-term earnings loss	Long-term earnings loss	Earnings definition	Long-term definition	Displacement definition and studied group (if targeted study)	Special points
Australia	Boreland et al. (2002)	Youth in Transition Survey	1981-94	No losses - possibly because sample covers youth only				Youth only; retrenchment (layoffs for economic reasons)	Displacement rate declines with tenure
Austria	Schwerdt et al. (2008)	Austrian Social Security Database (all private sector workers, linked to establishment information)	1982-88	1-20 quarters post displacement (average) White collar: 8.1% Blue collar: 2.3%	21-40 quarters post displacement White collar: 8.2% Blue collar: 0.6%	Mean daily earnings	5-10 years	Plant closures only	
Belgium	Albaek et al. (2002)	Administrative data from Belgian social security system	1980-91	2%	3.70%	Daily wages	3 years	Workers separating from firms with at least 5 employees before layoffs started and where employment fell by at least 30%; private sector only; workers with 3+ years of tenure; multiple job holders excluded	Losses primarily due to non-employment effects
Canada	Abe et al. (2002)	Canadian Out of Employment Panels (COEP)	1995	1.3% men 2.4% women		Respondents asked to report wage change		Permanent layoffs	
Canada	Crossely et al. (1994)	Ontario Ministry of Labour – survey of mass layoffs	1982	Workers with 3-5 years of tenure: 4% men, 14% women workers with 25+ years of tenure: 24% men, 37% women		hourly wages		Plant closure or mass layoffs involving 50 or more workers	No counterfactual; women lose more than men and the size of loss increases with tenure
Canada	Morisette et al. (2007)	Statistics Canada Longitudinal Worker File (10% of Canadian workers who were displaced because of mass layoffs or firm closure)	1983-2002		25% men and 35% women - including those who experience non-employment 18% men and 26% women - only displaced workers with no non-employment	Annual earnings	5 years	Workers displaced from the commercial sector because of firm closure or mass layoffs (30%+ fall in employment), aged 25-49 and with 5+ years of tenure	No counterfactual; fixed-effect estimates; most substantial losses experienced by high-seniority workers
Canada	Neil and Schirle (2007)	Survey of Labour and Income Dynamics	1997-2006	23% high-educated workers 40% low-educated workers 29% urban workers 40% rural workers		Annual earnings		Job separations due to company closure or business slowdown; sample includes individuals displaced from a full-time job aged 50+ and observed returning to full time employment within 5 years	

Table A2.1. Review of literature (cont.)

Country	Author	Data	Years	Short-term earnings loss	Long-term earnings loss	Earnings definition	Long-term definition	Displacement definition and studied group (if targeted study)	Special points
Canada	Morissette, Qiu, and Chan (2013)	Statistics Canada Longitudinal Worker File (10% random sample of all Canadian workers)	1978-2009	Men 11-18%, women 12-22% (higher in manufacturing sectors) Men 23-31%, women 30-41% if inclusion of laid-off workers with no earning in the year following displacement	Men 3-4%, women 2-7%. Men 17-18%, women 22-27% with broader treatment group. 10 to 18% for high-seniority workers and individuals with stable labour market attachment (narrow treatment group).	Annual earnings	5 years	Permanent layoffs. 2 treatment groups: broader (laid-off workers with no earning in the year following displacement included) and narrow (positive earning only), aged 25-54. Two sectors (manufacturing, non-manufacturing)	Fixed-effect estimates; Short-term earning losses highly sensitive to labour market tightness, long-term losses also sensitive but in a lesser extent.
Canada	Bonikowska and Morissette (2013)	Statistics Canada Longitudinal Worker File (10% random sample of all Canadian workers)	1984-2008		Men 13-20%; Women 7-15%. Even during expansionary periods, and also for low-seniority workers.	Annual earnings	5 years	Permanent layoffs. Workers laid off during one of the 2 reference periods (1990-1993 or 2000-2003), with stable labour market attachment prior to job loss. Distinction between employment trajectories (high-seniority, low-seniority and previously laid-off);	Control groups; fixed-effect estimates; No clear evidence of higher losses in tighter labour market conditions for high/low-seniority, but for previously laid-off workers.
Denmark	Albaek et al. (2002)	Firm-based data linked to individual records	1980-91	4%	6.4%	hourly wages	3 years	Workers separating from firms with at least 5 employees before layoffs started and where employment fell by at least 30%; private sector only; workers with 3+ years of tenure; multiple job holders excluded	Losses primarily due to wage effect
Finland	Appelqvist (2007)	Finnish Longitudinal Employer Employee Data (FLEED)	1992 and 1997	1992: 42% 1997: 23%	1992: 9.2% 1997: 4%	Annual earnings	5 years	Workers aged 21-52 with 3+ years of tenure separating from private sector plants from each 50%+ employees left in base years: 1992 (depression) and 1997 (recovery)	Effect of displacement strongest for females
France	Bender et al. (2002)	<i>Déclarations Annuelles des Données Sociales</i> (Annual Social Data Reports) + INSEE <i>Échantillon Dynamique Permanent</i> (Permanent Dynamic Sample) + <i>Système Unifié de Statistiques d'Entreprise</i> (Unified System of Enterprise Statistics)	1976-95	32%	20%	Log of total real annual earnings	5 years	Separations due to firm closure; men aged 26-50, with 4 or more years of seniority in 1984	

Table A2.1. Review of literature (cont.)

Country	Author	Data	Years	Short-term earnings loss	Long-term earnings loss	Earnings definition	Long-term definition	Displacement definition and studied group (if targeted study)	Special points
France	Lefranc (2003)	<i>Enquête Emploi</i> (French LFS)	1990-97	Average: 12% weekly wage 9% hourly wage Medium educated: 14% weekly and 11% hourly wage Low educated: 10% weekly and 7% hourly wage High educated: 6% weekly and 4% hourly wage		Weekly/ hourly wages		Workers on collective permanent layoffs and workers on individual permanent layoffs	Comparison of hourly and weekly losses indicates that displacement also induces a fall in hours worked; wage losses increase with seniority
Germany	Bender et al. (2002)	<i>Beschäftigungsstichprobe</i> (BS) of IAB (1% sample of overall employees' statistics from the Historic File of the Federal Department of Employment)	1975-90	11%	10-12%	Gross daily earnings	5 years	Men aged 25-50 in 1984 with 4 years of tenure - displacement defined as establishment closing down or reducing its workforce by at least 40%	
Germany	Burda and Mertens (2001)	German Socio-Economic Panel and IAB Social Insurance File	1986	Loss of 3.6% on average gain of 2% in lowest quintile loss of 38% in highest quintile	loss of 2.2% on average gain of 2.7% in lowest quintile loss of 34.4% in highest quintile	Daily wages	4 years	Involuntary job separations predicted from German Socio-Economic Panel and imputed to IAB individuals; full-time workers only, only first unemployment spell (occurring in 1986) is considered and workers are followed until 1990	Largest wage losses are associated with changes in industry
Germany	Couch (2001)	German Socio-Economic Panel	1991-96	16.5%	3.5%	Annual earnings	2 years	West Germany only, displaced because of business closure or layoff	
Germany	Schmieder et al. (2009)	IAB Employment History File, matched information on unemployment insurance reciprocity and German administrative data on mass layoffs and plant closings	1981-85	25-30%	12.0%	Annual earnings	10 years	Job separations during mass-layoffs (30% reduction in workforce or closure) at firms with 50+ employees	Reduction and recovery in time worked plays a role in explaining earnings losses during the first 10 years but majority of the long-run loss is due to a decline in wages

Table A2.1. Review of literature (cont.)

Country	Author	Data	Years	Short-term earnings loss	Long-term earnings loss	Earnings definition	Long-term definition	Displacement definition and studied group (if targeted study)	Special points
Italy	Rosolia (2002)	Random sample of Social Security individual records on non-agricultural private sector salaried employees	1974-97	11%	10%	Weekly year earnings	4 years	All job separations; workers with tenure of at least 16 quarters by second half of 1992	Largest losses observed for workers with very short spells of non-employment and for those who experience non-employment spells longer than 1 year
Japan	Abe et al. (2002)	Employment Mobility Survey - Survey of Employment Trends	1995	4.25% men; no effect for women; gains for age<44-54; losses at 55+		Respondents asked to report wage change		Layoffs for: management convenience (including <i>shukko</i>); firing; mandatory retirement	Earnings fall rises with age, particularly for men (age 60-64: 14.5% men and 4.4% women)
Japan	Bognanno and Delgado (2008)	Data provided by a firm engaged in job placement services	2000-03	25.7%; no effect at age 30-34; rising losses 35+		Yearly earnings		All separations excluding quitters; workers displaced from high-paying large firms	Workers incur larger penalties when they change industry after displacement
Japan	Bognanno and Kambayashi (2007)	Employment Mobility Survey - Survey of Employment Trends	1991-2005	1.28% overall; gains for age<55-59; 5% for 55-59 and 13% for 60-64		Respondents asked to report wage change		Layoffs for: management convenience (including <i>shukko</i>); firing; mandatory retirement	During the period, job-change penalties and the extent to which they are wage-related increased; effect of displacement stronger for men
Netherlands	Abbring et al. (2002)	Firm employment dataset + administrative longitudinal UI data set + Dutch labour force survey	1992-96	No loss on average 5% for workers with at least 1 year of tenure significant wage losses for workers who experience long joblessness		Weekly earnings		Workers displaced from firms reducing their workforce by at least 30%	Short-tenured workers more likely to be displaced than long-tenured workers
New Zealand	Dixon and Stillman (2009)	Statistics New Zealand's Linked Employer-Employee Data (LEED)	2001-04	22%	16%	Monthly earnings	4 years	Firm closures only; 25-64-year olds with at least 2 months of tenure	Employees displaced from small and medium-sized establishments experienced greater employment and earnings losses and so did older and longer-tenured employees

Table A2.1. Review of literature (cont.)

Country	Author	Data	Years	Short-term earnings loss	Long-term earnings loss	Earnings definition	Long-term definition	Displacement definition and studied group (if targeted study)	Special points
Norway	Huttenen et al. (2005)	Norwegian employer-employee survey	1988-2000	2%	5%	Annual earnings	3 years	Plant closure; workers observed in the years preceding and following closure; full time male workers aged 25-55	
Portugal	Carneiro and Portugal (2003)	<i>Quadros de Pessoal</i> (all workers, administrative)	1994-96	10% men 7% women	12% men 9% women	Real hourly earnings	4 years	Workers displaced due to firm closure	35% of re-employed workers changed industry
Sweden	Eliason and Storrie (2006)	Linked employer-employee data	1986-87	Earnings differential = SEK 8 394	SEK 5 584	Annual earnings	3 years	Workers aged 21-50 in 1986, displaced due to establishment closure	
United Kingdom	Boreland et al. (2002)	British Household Panel Survey	1991-96	14% total 9% full-time before and after		Weekly earnings		Workers stating that they left their previous job for reason of redundancy or the end of a temporary contract	Older and low-educated workers least likely to return to work; largest wage losses for women (22%), long-tenured (30%), older (23% for 50+) and low-educated (19%) workers
United Kingdom	Hijzen et al. (2010)	New Earnings Survey Inter-Departmental Business Register Annual Business Inquiry	1994-2003	Yearly losses (average over 5 years 1998-2002) firm-closure: 35% total; 18% displaced only once; 1% no unemployment spell mass layoff: 25% displaced one or more times; no loss if no unemployment		Annual income		Firm closures and mass layoffs	Losses computed assuming UI income during unemployment (larger losses if income during unemployment set at 0); income losses driven by non-employment
United States	Abbring et al. (2002)	Displaced Workers' Surveys (DWS - regular supplement to the February Current Population Survey)	1993-95	On average, wage gain but significant dispersion: one-third of displaced workers earn 10% more than before displacement but weekly earnings fall by 25% for 52% of workers		Average real weekly earnings		Permanent job separations initiated by employers because of adverse economic conditions	Age differences in re-employment rates are small up to late forties but workers 50+ suffer more prolonged unemployment; likelihood of joblessness after displacement rises with tenure and age; workers 55+ experience very large wage losses

Table A2.1. Review of literature (cont.)

Country	Author	Data	Years	Short-term earnings loss	Long-term earnings loss	Earnings definition	Long-term definition	Displacement definition and studied group (if targeted study)	Special points
United States	Carrington and Zaman (1994)	Displaced Workers' Surveys (DWS - regular supplement to the January Current Population Survey)	1984-88	From loss of 45.5% in petroleum and gas extraction to gain of 3% in leather products manufacturing; At 1-digit industry: losses in mining 40%, construction and manufacturing 15-16%, retail and finance 11-12%, transport, trade and agriculture 10% and gain of 3% in services		Weekly earnings		Sample restricted to males, aged 21-63, displaced in plant closings or mass layoffs from full-time, private sector jobs; uses County Business Patterns data to distinguish firm-level displacement from working in declining state or industry	The tenure and experience profiles of wage reductions vary by industry and are not fully explained by cross-industry variation in firm size, unionization, wage levels, and the incidence of employer-provided training
United States	Cha and Morgan (2010)	Displaced Workers' Surveys (DWS - regular supplement to the January Current Population Survey)	2006 and 2008	Industry movers - manuf. to: service (36%); sales (42%); construct. (52%); pub. Admin. (40%); transp. (3%); agric. (9%) - all other moves 15%		Weekly earnings		Individuals aged 18-64 with positive earnings suffering involuntary separation based on operating decisions of the employer	Industry stayers experience mix of gains and losses: manuf., transp. & utilities, agric. gain (2, 6, 15% resp.) - service, sales, construct., pub. admin loss (13, 11, 14, 60% resp.)
United States	Couch and Placzec (2010)	Administrative files from Connecticut linked to wage data from the quarterly census of employment and wages	1993-2004	No comparison group 33% with comparison group 32%	No comparison group 15% with comparison group 12%	Quarterly earnings	6 years	Includes quitters and workers fired for cause in the main estimation	Older workers and women found to suffer larger losses; focusing only on UI recipients ensures that quitters and workers fired for cause are excluded but overestimates the effect of layoffs because it excludes job-to-job movements: earnings loss 49% at separation and 32% six years later
United States	Couch et al. (2009)	Administrative files from Connecticut linked to wage data from the quarterly census of employment and wages	1993-2004	40-year olds: 22% 57-year olds: 48%	40-year olds: 14% 57-year olds: 52%	Quarterly earnings	6 years	Mass layoff: job loss occurring within a year either before or after a quarter in which a firm's employment was 30% less than the max observed over the period long-tenured workers only (workers continuously employed between 1993 and 1998) and aged 40+	Losses are larger when displaced workers change industry

Table A2.1. Review of literature (cont.)

Country	Author	Data	Years	Short-term earnings loss	Long-term earnings loss	Earnings definition	Long-term definition	Displacement definition and studied group (if targeted study)	Special points
United States	Fallick et al. (2011)	US Census Bureau's Longitudinal Employer-Household Dynamics matched with Quarterly Census of Employment and Wages	1991-2008	No losses for workers re-employed in same quarter of separation; 20% losses if 4 quarters of non-employment		Quarterly earnings		Workers aged 25-55 with 1+ year of job tenure who experience a separation in their main job in 1995; only transitions within states are included; distressed-firm separations if firm experiences a 30%+ reduction in employment in the year ending with the quarter after separation	In 1995: most displacement from financial sector; in 2001, most displacement from professional and business services; both 1999 and 2001 higher share of manufacturing displacement than in 1995
United States	Farber (1993)	Displaced Workers' Surveys (DWS - regular supplement to the January Current Population Survey)	1982-91	1984 12% 1986 14% 1988 12% 1990 10% 1992 17%		Weekly earnings		Individuals 20-64 suffering involuntary separation based on operating decisions of the employer	No counterfactual available in DWS
United States	Farber (1997)	Displaced Workers' Surveys (DWS - regular supplement to the January Current Population Survey)	1981-95	13% (average 1981-1995) 9% FT to FT (6.4% FT to FT with college; 9.3% FT to FT with high-school education)		Weekly earnings		Individuals 20-64 suffering involuntary separation based on operating decisions of the employer	No counterfactual available in DWS
United States	Farber (2011)	Displaced Workers' Surveys (DWS – regular supplement to the Current Population Survey)	1981-2010	FT-to-FT job losers: 1998-00: 1% 2002: 8% 2004: 12% 2006-08: 5% 2010: 11%		Weekly earnings		Individuals 20-64 suffering involuntary separation based on operating decisions of the employer - rates for 1981-1995 as in Farber (1997)	No counterfactual available in DWS; non-employment after displacement is higher for youth and older workers; higher for women; higher for low-educated
United States	Jacobson et al. (1993)	Longitudinal dataset constructed from UI tax records and firms' quarterly reports on employment	1982	50%	25%	Quarterly earnings	5 years	Pennsylvania only (i.e. dominated by traditional sectors, notably automobile industry); workers with 6+ years of tenure and positive earnings every year (i.e. only short unemployment durations captured); firms reducing employment by 30%+ but reason for separation unknown	Losses vary modestly with local labor-market conditions, industry and firm size; do not vary with gender and age; are large even if re-employed in similar firms

Table A2.1. Review of literature (cont.)

Country	Author	Data	Years	Short-term earnings loss	Long-term earnings loss	Earnings definition	Long-term definition	Displacement definition and studied group (if targeted study)	Special points
United States	Kodrzycki (2007)	Matched data from: JTPA (Massachusetts); Massachusetts unemployment insurance (UI) claims files; and Massachusetts UI-covered wage records	1993-2003	21%	11%	Annual earnings	10 years	All permanent involuntary layoffs; Massachusetts only; compares permanently displaced workers to recalled workers	Recalled workers suffered substantial wage losses; costs of permanent job loss larger for workers with no formal education beyond high school than for those with at least some college; participation in job training or gen. education as part of JTPA did not augment re-employment pay compared with only basic re-employment services
United States	Podgursky and Swaim (1987)	Displaced Workers' Surveys (DWS - regular supplement to the January Current Population Survey)	1979-84	10% Blue-collar workers 5% Service and white-collar workers		Weekly earnings		Sample of workers aged 20-61 who lost or left a full-time job because of a plant closing, an employer going out of business, or other permanent layoff; non-agricultural jobs only between 1979 and 1984	Greater general education significantly reduces earnings losses for both blue-collar and white-collar and service workers; it also significantly increases the likelihood of full-time re-employment; workers with large investments in specific human capital suffer larger re-employment earnings losses
United States	Ruhm (1991)	Panel Study of Income Dynamics	1971-75	16%	14%	Weekly wages	4 years	Plant closures or permanent layoffs (excluding departures from temporary or seasonal jobs); only workers in labour force between t and $t+5$	
United States	Shoeni and Dardia (1996)	Administrative data from California	1991	59%	17%-25% (depends on counterfactual used for non-separating workers)	Quarterly earnings	3 years	Reason for separation unknown; 2/3 of sample in aerospace sector; positive earnings for every year required (i.e. only short unemployment durations captured)	No pre-displacement losses found; losses vary among workers, year of displacement, economic conditions, firm size and industry of re-employment and number of subsequent separations

Table A2.1. Review of literature (cont.)

Country	Author	Data	Years	Short-term earnings loss	Long-term earnings loss	Earnings definition	Long-term definition	Displacement definition and studied group (if targeted study)	Special points
United States	Stevens (1997)	Panel Study of Income Dynamics	1968-88	25% annual earnings; 13% hourly wages	10%: 4 years after job loss; 6%-7%: 10+ years after job loss	Real hourly wages and annual earnings	10+ years	Household heads present in the survey every year (1968-1988) with positive earnings each year; leaving due to plant or business closure or to being laidoff or fired	Persistence explained by additional job losses in years following initial displacement; workers who avoid additional displacements have earnings and wage losses of 1% and 4% 6 or more years after job loss; risk of further job loss is 10%-12% in first 2 years and 6%-9% in the following 3 years; less educated workers more likely to experience multiple displacements
United States	Swaim and Podgursky (1989)	Displaced Workers' Surveys (DWS - regular supplement to the January Current Population Survey)	1984-86	Median losses by education years: <=11y 16.1%; 12y 10.2%; 13-15y 8.4%; 16+y 2%		Weekly earnings		Sample of workers aged 20-61 who lost or left a full-time job because of a plant closing, an employer going out of business, or other permanent layoff; non- agricultural jobs only between 1979 and 1984	Strongest (negative) effect of education on full-time weekly earnings losses observed for white-collar and women in service sector; strongest (negative) effect on loss of work weeks observed for blue-collar women
United States	von Wachter et al. (2009a)	Match of Displaced Worker Survey and administrative wage records from California	1991-2000	50-70%		3-year change in quarterly earnings		Permanent layoffs, plant closing, employer going out of business; workers aged 20-64	Earnings measure chosen (weekly vs. quarterly, survey vs. administrative) can make an important difference for assessing the cost of job loss
United States	von Wachter et al. (2009b)	Continuous Work History Sample, Master Earnings File, Longitudinal Employee-Employer Data	1980-86	30%	20%	Annual earnings	10-20 years	Workers dismissed during mass layoffs over 1980-1986 followed up to 2004	