



FÁS/ESRI Manpower Forecasting Studies Report No. 13

Occupational Employment Forecasts 2015

Jasmina Behan
Caroline Shally

February 2010

FÁS — The Training and Employment Authority
ESRI — The Economic and Social Research Institute

Acknowledgements

The authors would like to thank the Central Statistics Office, in particular the Labour Statistics Department, for the data used in the analysis, without which it would have been impossible to produce this report. We would also like to extend our thanks to Prof. Jerry Sexton, Dr. Pete Lunn (ESRI), Adele Bergin (ESRI), Prof. John Fitz Gerald (ESRI), Prof. Frances Ruane (ESRI), Nicola Doyle (Central Bank), Roger Fox (FÁS), John McGrath (FÁS), Brian McCormick (FÁS) and Terry Corcoran (FÁS) for their comments and suggestions which significantly improved the quality of this report.

The authors, however, take full responsibility for the content of the report and any errors contained therein.

Contents

Executive Summary..... 4

Introduction 17

Section 1: Methodology 19

Section 2: Economic Background..... 26

Section 3: Sectoral Employment Forecasts..... 29

Section 4: Occupational Employment Forecasts 34

Section 5: Drivers of Employment Growth (Shift-Share Analysis)..... 43

Section 6: Occupational Employment Forecasts by Gender..... 55

Section 7: Occupational Employment Forecasts by Education 61

Appendix A: FÁS/ESRI Manpower Forecasting Studies Series..... 65

Appendix B: Occupations and Job Titles 66

Appendix C: Occupational Project Codes..... 68

Appendix D: Conversion to ILO Definition 70

Appendix E Project Steering Group..... 71

Executive Summary

Introduction

This report is the 13th in the *Occupational Employment Forecasts* series (Appendix A) which has been published jointly by the Economic and Social Research Institute (ESRI) and FÁS since the early 1990s. It contains occupational employment forecasts for the Irish economy for 2015. The results were produced by FÁS using the occupational employment forecasting model developed by the ESRI.¹ The methodology used in this report is broadly in line with that used in previous reports in the series.

The main objective of this report is to provide an indication of how the occupational composition of the workforce is likely to change given the assumed performance of the global and domestic economy over the medium term. By identifying likely developments in the labour market at occupational level, particularly after the recession, and pointing to the expected change in the skills mix of the Irish economy in the medium term, the forecasts are useful in informing education/training, labour market and immigration policy, as well as career guidance advisors, students, and individuals making career and educational choices. The results are not, however, intended for manpower planning purposes.

The occupational employment forecasts are broadly based on the assumptions underpinning the economic forecasts for the Irish economy for the period 2009-2015, as set out in the ESRI report *World Recovery Scenarios for Ireland*, published in May 2009². The ESRI macroeconomic model and assumptions provide a forecast of the overall employment level for 2015, and they also provide projected employment totals for different sectors. The focus is on the medium term trend, not on the short term fluctuations around it. The ESRI produced two scenarios: recovery and prolonged recession. However, this report focuses only on the recovery scenario as there is no major difference in terms of total employment between the two and there are some indications that the global recession may be ending.

The report covers the following:

- an overview of the ESRI economic forecasts under a world recovery scenario in which employment growth resumes in 2011
- the forecasting period 2008-2015; as in previous reports, forecasts are presented for the final year; the movement of employment in the interim period follows a U-shaped curve, with a short-term contraction in employment followed by recovery after the recession period; therefore, the comparison of employment between the two end points of the forecasting period measures the extent to which employment for a particular group in the labour market recovers in the medium term relative to the peak year 2008

¹ This is the first report exclusively written by FÁS following the handover of the occupational forecasting models from the ESRI to FÁS in 2008. The ESRI provided historical data, technical support and peer review.

² Bergin, A, T. Conefrey, J. Fitz Gerald, I. Kearney, 2009. *Recovery Scenarios for Ireland*, Research Series, Number 7, May, Dublin: The Economic and Social Research Institute.

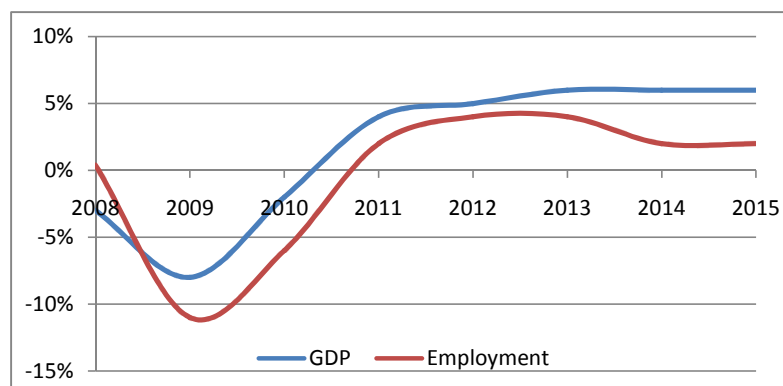
- a comparison with historical data, which illustrates the differences between the projected pattern of employment growth and that associated with the recent past
- employment forecasts for 19 broad occupational groups and 43 individual occupations
- an analysis of the drivers of employment change in each occupation³; this includes a measurement of the change in employment due to employment growth economy-wide (scale effect); the relative growth or decline in those industrial sectors in which an occupation is most concentrated (industry effect); the relative growth or decline in an occupation's share of total employment in those industries with which an occupation is associated (occupation effect)
- occupational employment forecasts by gender
- occupational employment forecasts by education.

Forecasts presented in this report have been produced in times of great uncertainty. All projections should be interpreted in the context of the assumptions outlined in the report, which concern the speed of the global economic recovery, the restoration of the financial sector, migratory flows, movements in nominal wage rates, the rate at which employment growth lags behind output and anticipated fiscal responses.

Economic Background

The ESRI's world recovery scenario assumes that most of the world's economies recover from recession from mid-2010 and grow at rates close to potential over the period 2011-2015. Assuming restored competitiveness, world demand for Irish exports is expected to recover from the current slowdown by 2011. Employment growth is expected to lag behind the movements in output growth (Figure 1), with both expected to follow a U-shaped curve between 2008 and 2010 and to remain positive thereafter. The total number of persons employed in 2008 was 2.03 million compared to 1.95 million expected for 2015, which is 3.8% lower. These forecasts are based on the assumption that the global economy recovers and that Ireland restores its competitiveness.

Figure 1: Output and Employment (Annual % Change)



³ It is assumed that the demographic composition of occupations will remain unchanged over the forecasting period.

Sectoral Employment Forecasts

Sectors which are expected to fully recover and surpass pre-recession employment levels by 2015 include all high tech manufacturing areas (chemicals, metals, machinery and equipment), transport, communications, business, finance, insurance and other market services (e.g. the rest of the services sector ranging from private services to art, recreation and entertainment) (Table 1). Sectors which are expected to resume growth beyond 2010 but not fully recover by 2015 include construction, hotels/restaurants, food manufacturing and all areas of distribution. Sectors expected to continue on a downward trajectory beyond 2010 include traditional manufacturing (textiles and other) and agriculture. Employment in health, education and public administration and defence is expected to decline by 2010 and remain relatively unchanged for the rest of the forecasting period.

Table 1: Sectoral Employment Forecasts (000s)

| | 2008 | 2015 | Change 2008-2015 |
|---------------------------------|--------------|--------------|---------------------|
| Agriculture | 117 | 87 | -30 |
| High Tech Manufacturing | 138 | 160 | 22 |
| Metals | 28 | 31 | 3 |
| Machinery & Equipment | 69 | 72 | 4 |
| Chemicals | 42 | 57 | 15 |
| Traditional manufacturing | 146 | 100 | -46 |
| Food, Drink, Tobacco | 50 | 47 | -3 |
| Clothing & Textiles | 9 | 3 | -6 |
| Other Manufacturing | 87 | 51 | -37 |
| Construction | 254 | 191 | -63 |
| Distribution | 281 | 262 | -19 |
| Wholesale | 63 | 62 | -1 |
| Motor Vehicles etc. | 46 | 42 | -4 |
| Retailing | 171 | 158 | -13 |
| Transport and Communication | 117 | 128 | 11 |
| Transport | 80 | 86 | 6 |
| Communications | 37 | 42 | 5 |
| Other Market Services (OMS) | 508 | 567 | 59 |
| Finance & Insurance | 93 | 101 | 8 |
| Other Business Services | 194 | 231 | 37 |
| Hotels & Restaurants | 112 | 107 | -5 |
| Other Market Services | 109 | 128 | 19 |
| Public Administration & Defence | 110 | 110 | 0 |
| Health and education | 359 | 348 | -11 |
| Education | 142 | 138 | -4 |
| Health & Social Work | 217 | 211 | -6 |
| Total | 2,030 | 1,953 | -77 |

Occupational Employment Forecasts

As with sectors, employment growth is expected to vary by occupation, with some occupations emerging with strong employment growth after the recession and some failing to reach pre-recession levels by 2015. The highest employment growth is expected in professional and associate professional occupations in the areas of science, business and IT. The largest decline is expected for operatives and skilled building workers. Occupations forecast to remain relatively unchanged compared to 2008 are mostly those associated with the public sector (health, education and public administration).

In absolute terms, the greatest net job gains by 2015 are expected for professionals (business and related, science, IT and engineering), personal service providers, managers and sales agents; the greatest net losses for agricultural workers, construction workers (skilled building workers and wood craftpersons (carpenters)) and operatives (Figure 2).

Figure 2: Change in Employment by Occupation (000s), 2008-2015

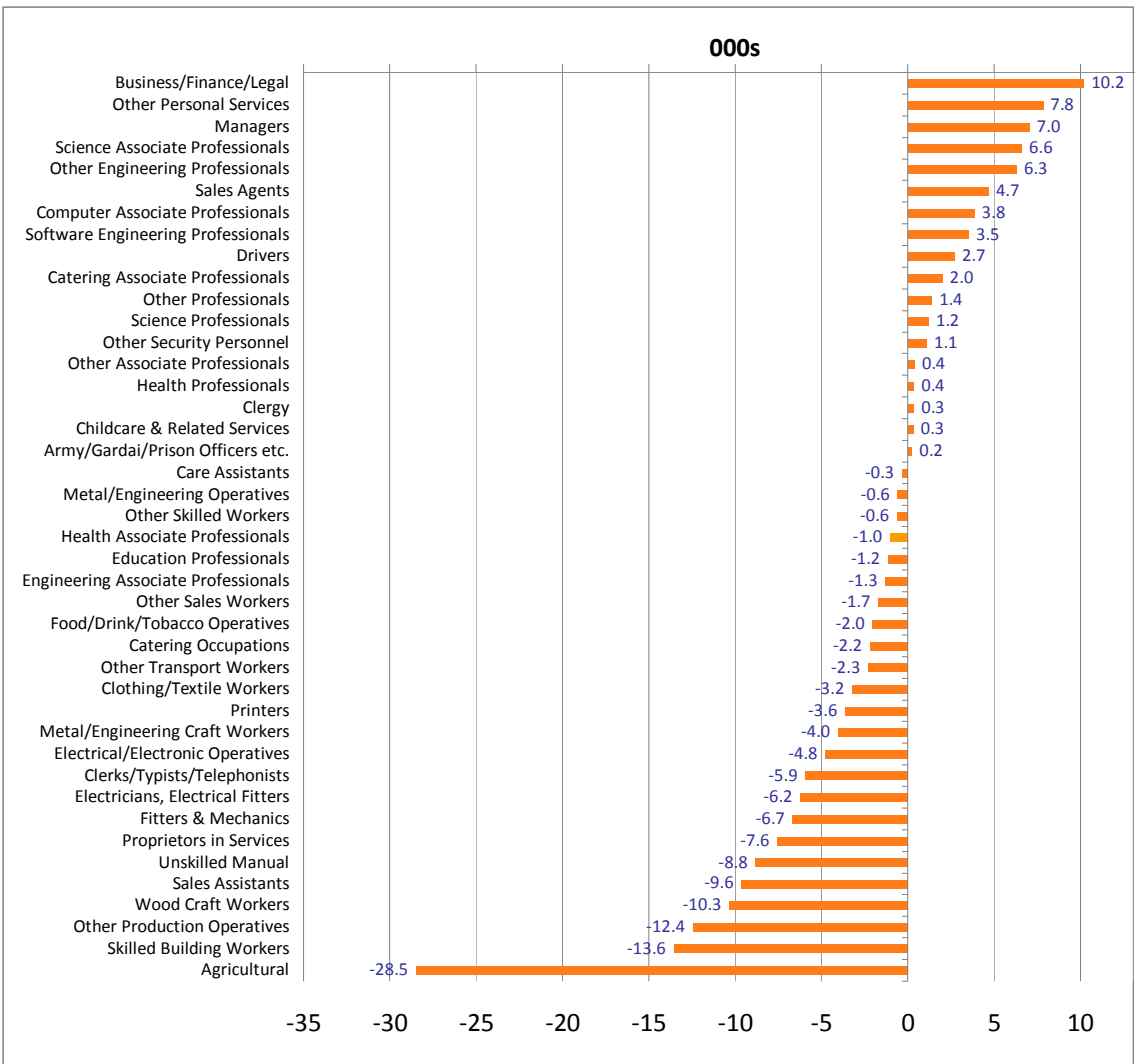


Table 2 shows a summary of the occupational employment forecasts and the key drivers of employment growth at occupational level. The change in employment is decomposed into three effects – scale (employment growth in the economy overall), industry (the relative growth of the different industrial sectors compared to national growth) and occupational (change in the relative share of an occupation in the sectoral skill mix).

Table 2: Shift-Share Analysis of Employment Growth, 2008-2015

| | Scale | | Industry | | Occupation | | Residual | | Total | |
|--------------------------------------|-------|------|----------|-------|------------|-------|----------|------|-------|-------|
| | 000s | % | 000s | % | 000s | % | 000s | % | 000s | % |
| Agricultural | -4.1 | -3.8 | -20.2 | -18.9 | -4.9 | -4.6 | 0.7 | 0.6 | -28.5 | -26.7 |
| Managers | -8.1 | -3.8 | 6.5 | 3.1 | 9.3 | 4.4 | -0.7 | -0.3 | 7.0 | 3.3 |
| Proprietors in Services | -1.2 | -3.8 | -0.1 | -0.4 | -6.4 | -19.5 | 0.2 | 0.6 | -7.6 | -23.1 |
| Health Professionals | -0.6 | -3.8 | 0.2 | 1.1 | 0.7 | 4.3 | 0.1 | 0.7 | 0.4 | 2.3 |
| Education Professionals | -3.4 | -3.8 | 1.0 | 1.1 | 1.1 | 1.2 | 0.1 | 0.2 | -1.2 | -1.3 |
| Clergy | -0.1 | -3.8 | 0.4 | 18.0 | 0.0 | 0.0 | 0.0 | -0.6 | 0.3 | 13.5 |
| Science Professionals | -0.3 | -3.8 | 1.0 | 11.2 | 0.3 | 3.7 | 0.2 | 2.5 | 1.2 | 13.6 |
| Software Engineering Professionals | -0.3 | -3.8 | 1.5 | 17.5 | 2.1 | 25.5 | 0.3 | 3.2 | 3.5 | 42.4 |
| Other Engineering Professionals | -1.7 | -3.8 | 1.8 | 4.0 | 6.6 | 14.9 | -0.4 | -0.9 | 6.3 | 14.2 |
| Business/Finance/Legal Professionals | -2.4 | -3.8 | 9.9 | 15.6 | 3.5 | 5.5 | -0.8 | -1.2 | 10.2 | 16.1 |
| Other Professionals | -1.4 | -3.8 | 3.3 | 9.1 | -0.7 | -2.0 | 0.1 | 0.4 | 1.4 | 3.7 |
| Health Associate Professionals | -2.9 | -3.8 | 0.8 | 1.1 | 1.1 | 1.4 | 0.0 | 0.0 | -1.0 | -1.4 |
| Science Associate Professionals | -0.6 | -3.8 | 1.5 | 9.7 | 5.4 | 34.7 | 0.3 | 2.1 | 6.6 | 42.7 |
| Computer Associate Professionals | -0.6 | -3.8 | 2.4 | 15.5 | 2.1 | 13.3 | 0.0 | 0.0 | 3.8 | 25.0 |
| Engineering Associate Professionals | -0.4 | -3.8 | 0.0 | 0.1 | -1.1 | -9.0 | 0.2 | 1.6 | -1.3 | -11.2 |
| Catering Associate Professionals | -0.8 | -3.8 | 0.2 | 0.8 | 2.8 | 12.9 | -0.2 | -0.7 | 2.0 | 9.2 |
| Other Associate Professionals | -1.8 | -3.8 | 3.5 | 7.3 | -0.9 | -1.9 | -0.4 | -0.8 | 0.4 | 0.7 |
| Clerks/Typists/Telephonists | -9.6 | -3.8 | 15.1 | 6.0 | -9.1 | -3.6 | -2.3 | -0.9 | -5.9 | -2.4 |
| Skilled Building Workers | -3.2 | -3.8 | -15.1 | -18.1 | 5.7 | 6.8 | -1.0 | -1.2 | -13.6 | -16.3 |
| Electricians, Electrical Fitters | -1.4 | -3.8 | -3.2 | -8.8 | -1.1 | -3.0 | -0.5 | -1.3 | -6.2 | -16.9 |
| Fitters & Mechanics | -1.5 | -3.8 | -1.7 | -4.3 | -4.1 | -10.4 | 0.6 | 1.5 | -6.7 | -17.0 |
| Metal/Engineering Craft Workers | -1.0 | -3.8 | -3.4 | -13.3 | 0.2 | 0.8 | 0.1 | 0.3 | -4.0 | -16.1 |
| Wood Craft Workers | -1.7 | -3.8 | -10.3 | -22.9 | 2.5 | 5.6 | -0.9 | -1.9 | -10.3 | -23.0 |
| Clothing/Textile Workers | -0.2 | -3.8 | -2.0 | -42.3 | -2.1 | -43.7 | 1.0 | 21.5 | -3.2 | -68.3 |
| Printers | -0.3 | -3.8 | -2.0 | -25.0 | -1.8 | -23.1 | 0.4 | 5.7 | -3.6 | -46.2 |
| Other Skilled Workers | -0.2 | -3.8 | -1.0 | -22.0 | 0.1 | 2.2 | 0.4 | 9.1 | -0.6 | -14.6 |
| Electrical/Electronic Operatives | -0.5 | -3.8 | 0.7 | 5.4 | -4.9 | -38.0 | -0.1 | -0.6 | -4.8 | -37.1 |
| Metal/Engineering Operatives | -0.6 | -3.8 | 0.4 | 2.4 | -0.2 | -1.3 | -0.2 | -1.4 | -0.6 | -4.1 |
| Food/Drink/Tobacco Operatives | -0.9 | -3.8 | -0.5 | -2.3 | -0.8 | -3.3 | 0.1 | 0.6 | -2.0 | -8.9 |
| Other Production Operatives | -2.6 | -3.8 | -2.8 | -4.1 | -8.5 | -12.4 | 1.4 | 2.1 | -12.4 | -18.2 |
| Drivers | -3.1 | -3.8 | 2.6 | 3.2 | 3.9 | 4.8 | -0.7 | -0.8 | 2.7 | 3.3 |
| Other Transport Workers | -0.5 | -3.8 | 1.7 | 13.0 | -3.1 | -23.3 | -0.4 | -2.9 | -2.3 | -17.0 |
| Sales Agents | -1.4 | -3.8 | 2.0 | 5.3 | 4.5 | 11.7 | -0.3 | -0.9 | 4.7 | 12.3 |
| Sales Assistants | -4.8 | -3.8 | -3.7 | -2.9 | -1.5 | -1.2 | 0.4 | 0.3 | -9.6 | -7.6 |
| Other Sales Workers | -0.4 | -3.8 | 0.2 | 2.1 | -1.5 | -13.5 | -0.1 | -0.7 | -1.7 | -15.9 |
| Childcare & Related Services | -1.4 | -3.8 | 1.2 | 3.2 | 0.4 | 1.0 | 0.1 | 0.4 | 0.3 | 0.8 |
| Care Assistants | -1.8 | -3.8 | 0.9 | 2.0 | 0.6 | 1.3 | -0.1 | -0.2 | -0.3 | -0.7 |
| Army/Gardai/Prison Officers etc. | -0.9 | -3.8 | 0.9 | 3.8 | 0.3 | 1.3 | -0.1 | -0.4 | 0.2 | 0.9 |
| Other Security Personnel | -0.9 | -3.8 | 2.4 | 10.1 | -0.4 | -1.8 | 0.0 | 0.1 | 1.1 | 4.7 |
| Catering Occupations | -1.2 | -3.8 | 0.0 | -0.2 | -1.1 | -3.5 | 0.1 | 0.4 | -2.2 | -7.0 |
| Other Personal Services | -1.3 | -3.8 | 5.7 | 16.6 | 3.2 | 9.4 | 0.2 | 0.7 | 7.8 | 22.9 |
| Occupation Unstated | -0.4 | -3.8 | 1.4 | 13.6 | 0.6 | 5.3 | -0.2 | -1.6 | 1.4 | 13.5 |
| Unskilled Manual | -4.9 | -3.8 | -3.2 | -2.5 | -2.7 | -2.1 | 2.1 | 1.6 | -8.8 | -6.8 |
| Total | -77.3 | -3.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -77.3 | -3.8 |

Agricultural Workers

If employment in agricultural occupations were to contract in line with the overall employment decline of 3.8%, the number of agricultural workers would decline by 4,100 by 2015. However,

because employment in the agricultural sector, where more than 80% of agricultural workers are employed, is expected to contract more sharply than that in the overall economy, the decline is expected to be greater by an additional 20,000. In addition, due to technological and other changes, the share of agricultural workers in all sectors is expected to decline relative to other occupations, adding 4,900 to the loss.

Managers

Employment growth, which is expected to resume in 2011, is expected to be further enhanced by the above average growth projected for the high tech manufacturing and market services sectors (industry effect), where a significant number of managers are employed. In addition, managers are expected to continue to gain share in the occupational distribution of many sectors, which will add to employment growth through a positive occupational effect. For instance, in the retail, wholesale and hotel sectors the share of managers has been increasing, while the share of proprietors has been declining. This is likely to be a result of consolidation within these sectors, with some small businesses being replaced by large, in some cases multinational, chains (e.g. supermarkets).

Proprietors

Proprietors are expected to suffer from all three employment drivers: the overall economic performance (negative scale effect), a greater than average decline in the retail and hotel sectors where almost 60% of proprietors have businesses (negative industry effect), and a loss of share in the occupational distribution which mirrors the increase in the share of managers for the reasons outlined above (negative occupational effect).

Professionals

Although all professional occupations are expected to be negatively affected by the overall economic downturn, particularly in the short term, this negative effect is expected to be more than off-set by the positive industry effect. These occupations are typically employed in sectors which are expected to recover strongly beyond 2010: one in two scientists is employed either in the high tech sector (chemicals in particular) or market services (research and consultancy); almost three in four software engineers are employed in market services (IT consultancy and finance); three in four business professionals are employed in the market services sector (accountancy, finance, legal etc.). As the move up the value chain in many sectors continues, the occupational effect for professionals is expected to be positive and to further enhance employment growth for this occupational group.

Associate Professionals

The employment of science and computer associate professionals, which includes laboratory technicians and computer programmers, is expected to resume strong growth after recession, being driven by factors similar to those driving employment growth for professional occupations in these fields.

The number of engineering associate professionals (engineering technicians, civil engineering technicians, draughtspersons, building inspectors and quantity surveyors) is expected to be lower in

2015 compared to 2008. This is because almost one in two engineering associate professionals is employed in the construction sector (either directly or through architectural, surveying etc. services) which is not expected to recover to the pre-recession levels of activity in the medium term. The share of technicians is expected to continue to decline compared to other occupations, particularly engineering professionals, to reflect a move to higher skilled activities within sectors employing engineering technicians (e.g. high tech manufacturing, construction etc.).

The employment of catering associate professionals (chefs) is expected to move broadly in line with the overall economy. A positive influence on employment is expected to come from an expected change in the occupational distribution of the hotel and restaurant sector, which would include a rise in the share of qualified chefs compared to other lower skilled catering and other occupations.

Education, Health and Care Occupations

A significant majority (at least three quarters) of employment in each of these occupations is located in the health and education sectors, which are heavily dependant on public sector spending. Due to the budgetary constraints facing the economy, we assume that employment levels in the public sector will remain relatively flat over the medium term.

Following an increase in 2009, employment is expected to contract somewhat in 2010, but is kept flat thereafter. This leads to a small positive industry effect for most occupations arising from the expected growth in other sectors where these occupations are employed (e.g. some pharmacists and health professionals are employed in the chemicals and medical devices sectors, 15% of childcare workers are employed in the services sector - private crèches).

The fashion in which the funds allocated for health, education and care will be prioritised in terms of the sectoral skill mix is unknown. For that reason, one could not confidently assume that past trends (which among other things included a significant increase in the share of care and childcare workers compared to other occupations in the health and education sectors) will continue into the future. Instead, it is assumed that no significant shifts in the occupational distribution in these sectors will occur resulting in a broadly neutral occupational effect for these occupations.

Clerical

The number of clerks increased from 178,000 in 1996 to 250,000 in 2008, while in 2015 it is expected to be 245,000. At almost 10,000, the negative scale effect for clerks is particularly large reflecting the fact that, in employment terms, this is the largest occupational group. A third of clerical employment is concentrated in the business and financial sectors, which are anticipated to grow strongly after recession, leading to the positive industry effect. However, the occupational effect for clerks is expected to continue to be negative as process automation and information technology replace some clerical tasks and clerks lose their share in the sectoral skill mixes. This trend was observed prior to the recession and is expected to continue over the medium term across virtually all sectors, preventing a full recovery in this occupational group by 2015.

Skilled Building Workers⁴

Over the medium term, the construction sector is not expected to recover to the levels recorded at the peak of the boom and employment in 2015 is expected to be a quarter lower than in 2008. As a result, the industry effect for skilled building workers is negative and in absolute terms the second largest (after agricultural) compared to other occupations. The negative impact of scale and industry factors are expected to be somewhat offset by the gains through the occupational effect. The skill mix of the construction sector is expected to change in favour of qualified craftspersons (skilled building workers), with their share increasing relative to lower skilled or unskilled building workers.

Skilled Maintenance Workers

The number of electricians is not expected to recover to the 2008 level in the medium term. This is because, in 2008, one in two electricians was employed in the construction sector, which is expected to fare worse than most other sectors over the coming seven years. Growth in communications, business and high tech manufacturing, which also employ electricians, will not be sufficient to offset this decline, leading to a negative effect on balance. In addition, a negative impact on employment is expected to result from a decline in the share of electricians in the skill mix within the communications and business services (primarily IT services) sectors, as the share of engineering and software professionals increases.

The number of fitters (metal working production and maintenance fitters and motor mechanics) is expected to be 6,000 lower by 2015. The industry effect is expected to be negative due to the anticipated lower than average performance in the motor vehicle and traditional manufacturing sectors which combined employ half of all mechanics and fitters. The strong recovery expected in high tech manufacturing, which employs one fifth of fitters, is unlikely to compensate fully for this decline. In addition, employment is expected to be negatively affected through the occupational effect: in high tech and traditional manufacturing, the share of skilled manual workers is expected to decline relative to the share of engineers; in the motor sector, the share of mechanics relative to the share of sales agents is expected to decline.

Other Skilled Manual

The employment of other skilled manual workers, who are predominantly employed in the construction sector (metal and wood manual workers (carpenters)) is expected to decline in the short term and to slowly recover beyond 2010, but fail to reach pre-recession levels by 2015. As the construction industry is expected to recover more slowly than most other sectors of the economy, the industry effect for these occupations is negative. Some gains are expected for carpenters through the occupational effect, as the skill mix in the construction sector is expected to continue to change in favour of skilled craftspersons relative to operatives and unskilled workers.

The employment of skilled manual workers, who are predominantly employed in traditional manufacturing (textile workers, printers etc.), had been contracting prior to the recession due to the move of some manufacturing operations out of Ireland to lower cost locations. This trend is

⁴ Carpenters are not included in this occupational group

expected to continue into the future and this is reflected in the negative industry effect for these occupations. Operations remaining in Ireland are likely to be in the area of design and research and require a higher skill mix (professionals, associate professionals etc.), which is reflected in a negative occupational effect for medium and lower skilled occupations.

Operatives

Operatives are employed in all sectors of the economy, although predominantly concentrated in the manufacturing sector (electrical and metal), construction sector (metal) and food sector (food operatives). While high tech sector growth is expected to create a positive industry effect on employment, particularly after 2010, traditional manufacturing and construction will counteract it and the balance varies per occupation depending on its prevalence in a particular sector. Occupational effects for operatives are negative as most sectors are expected to exhibit a shift in relation to the skill mix, with the share of operatives decreasing relative to the share of professional (engineers) and associate professional (technicians) occupations. Employment for each operative category is expected to be lower in 2015 compared to 2008, even lower than the levels recorded in 1996.

Transport Occupations

Although the number of drivers is expected to decline in the short term, by 2015 it is projected to recover and exceed the levels recorded in 2008. One in two drivers is employed in the transport sector. Although the expected decline of the construction and traditional manufacturing sectors will contribute negatively to the employment growth in this category, the transport sector is expected to recover somewhat faster than the overall economy and record net job gains by 2015. On balance, the industry effect for drivers is expected to be positive, although not sufficiently so as to offset the overall economy performance (scale effect). However, a positive occupational effect, resulting from an increase in the share of drivers particularly in the transport sector relative to other transport workers (e.g. signalmen, ticket collectors etc.) or clerks, is likely to add to the overall positive outlook in the medium term.

Sales Occupations

In 2015, the number of sales agents (e.g. technical and sales reps, insurance agents, etc.) is expected to be greater than the level recorded in 2008. Sales agents are employed across many sectors, mostly in the manufacturing and distribution sectors, as well as business services (insurance agents). As the business sector, high tech manufacturing and wholesale are expected to recover strongly beyond 2010, the industry effect for sales agents is positive. In addition, an increase in the share of technical sales representatives in the wholesale and other sectors (e.g. services) compared to other sales occupations (e.g. street vendors, roundsmen/women etc.) is expected to create a positive occupational effect. On balance employment is expected to exceed 2008 level by 2015.

Sales assistants are primarily employed in the retail sector (70% of the total). Following the credit crunch, the retail sector is not expected to recover to the pre-recession level in the medium term. As a result, the industry effect for sales assistants is negative. In addition, within the retail sector, the share of sales assistants is expected to decline relative to other occupations (e.g. managers,

sales agents) resulting in a negative occupation effect. Overall employment for sales assistants is not expected to recover to the pre-recession levels by 2015.

Other Services and Protective Activities

The number of security workers (security guards, watchmen etc.) is expected to recover to pre-recession levels by 2015. Almost a half of security workers are employed in the business sector which is expected to grow strongly beyond 2010 resulting in a positive industry effect for this occupation. Although the occupational effect for this occupation is slightly negative (possibly as a result of technological advances in security), the overall employment outlook for 2015 is positive.

The number of service workers (e.g. hairdressers, photographers, cleaners, etc.) increased significantly during the boom years. The employment outlook for this occupational group is positive as the service sector is expected to grow faster than average after the recession. In addition, the occupational effect is expected to be positive as the share of service workers within the services sector increases relative to some other occupations (e.g. clerks, construction related professionals etc.).

Due to the budgetary constraints facing the economy, we assume that employment levels in the public sector will remain relatively flat over the medium term. Therefore, the impact of all drivers of employment growth on the number of army, gardaí and prison officers is projected as broadly neutral, in line with other public sector employment forecasts.

Unskilled Manual

Unskilled workers are employed in all sectors of the economy. On balance, the industry effect is positive, suggesting that the growth in the high tech manufacturing and service sectors will outweigh declines in agriculture, construction and traditional manufacturing. However, the occupational effect for unskilled workers is negative: as the skill mix changes in favour of high skilled workers (e.g. professionals and managers), the share of unskilled workers declines.

Interestingly, in some sectors (e.g. chemicals and retail) there appears to be a hollowing in the middle of the occupational distribution with the share of operatives, clerks and skilled manual workers decreasing, and the share of professional/associate professional and unskilled workers increasing. The polarisation of the skill mix is typically associated with:

- the skill-biased technological change⁵ which leads to the substitution of medium level skills by high level skills and
- the demand for low skilled manual workers who conduct operations which cannot be easily automated (e.g. cleaning).

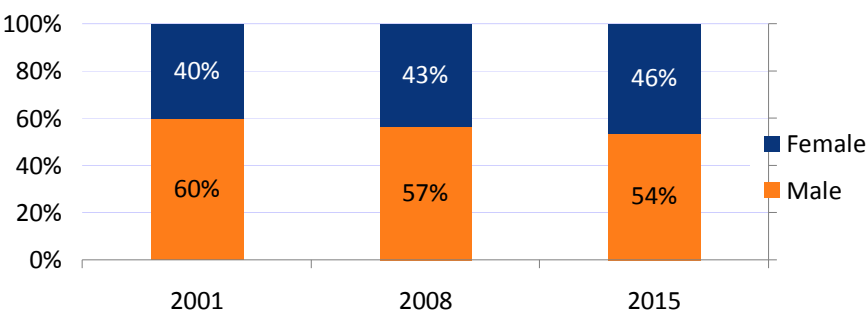
On balance, the employment level of unskilled workers is not expected to recover to the level recorded in 2008 by 2015.

⁵ McGuinness, S., F. McGinnity and P.J. O'Connell. "Changing Returns to Education During a Boom? The Case of Ireland". LABOUR: Review of Labour Economics and Industrial Relations, 2009, Vol. 23, pp. 197-221.

Employment Forecasts by Gender

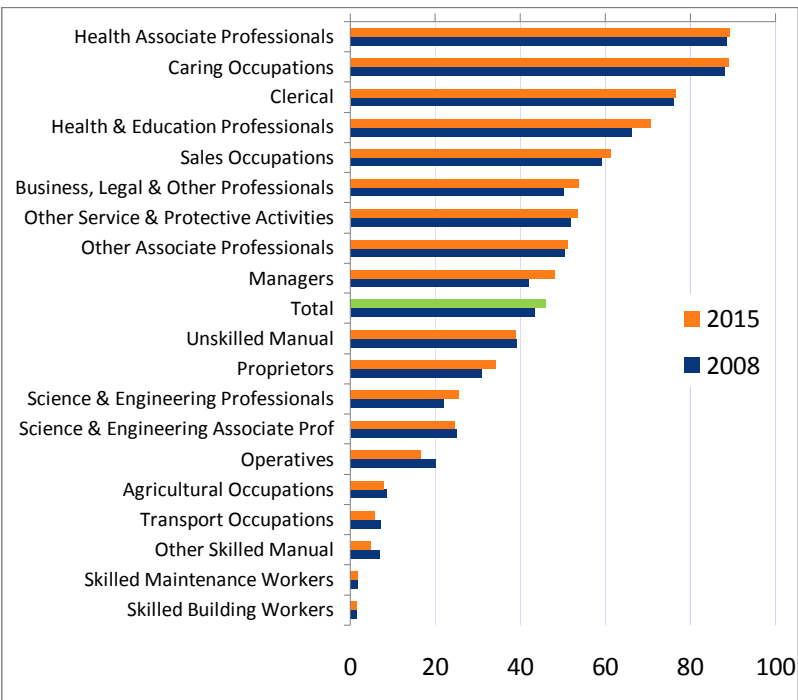
Between 2001 and 2008 the share of females increased from 40% to 43% of total employment and this trend is expected to continue, resulting in a further three percentage point gain by 2015 (Figure 3.). This means that, in absolute terms, the number of females in employment is expected to recover faster beyond 2010, and exceed its pre-recession level by 2015, while male employment is not expected to fully recover to the pre-recession level by 2015.

Figure 3: Gender Composition of Employment



Females are gaining share in many occupations, most notably so in high skilled ones (Figure 4). By 2015, females are expected to account for more than a half of business etc. professionals and almost a half of all managers. At the same time, the female presence amongst operatives is expected to decline by almost four percentage points relative to 2008.

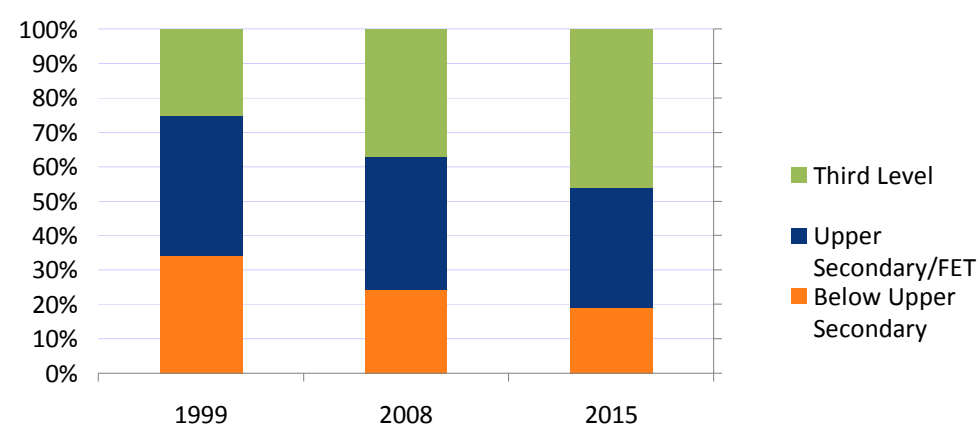
Figure 4: Forecast Female Employment Share (%) in 2015



Employment Forecasts by Education

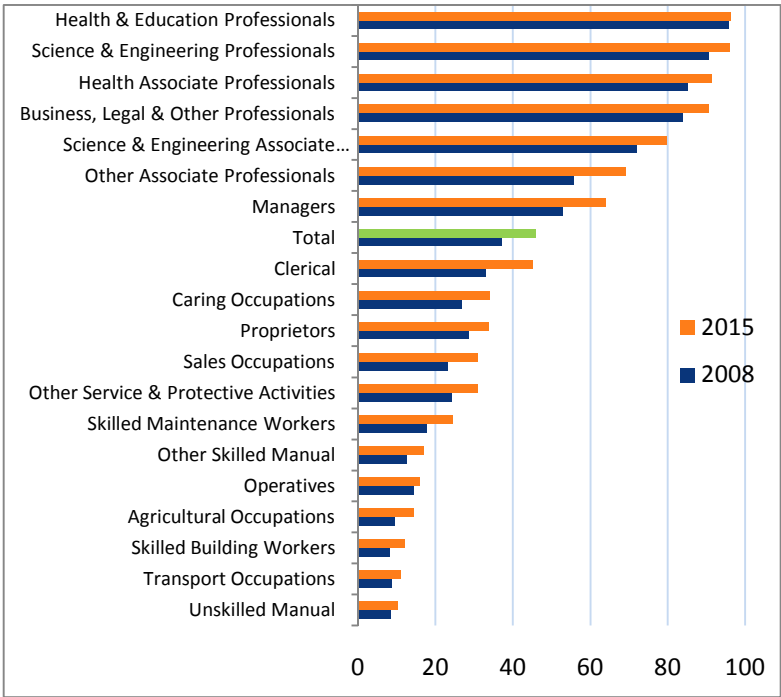
Assuming past trends continue, the educational composition of national employment will continue to improve. By 2015, 46% of employed persons are expected to hold third level qualifications (National Framework of Qualifications (NFQ) level 6+).

Figure 5: Educational Composition of Employment



During the period 2008-2015, improvements in the educational profile are expected to be observed in all broad occupational groups, with the share of third level graduates increasing in each category (Figure 6). By 2015, over 90% of all professionals are expected to hold a third level qualification. In fact, by 2015 even low skilled occupations, such as unskilled manual, are expected to have at least 10% of employment at this level of educational attainment.

Figure 6: Share of Third-Level Graduates by Occupational Group



After the Recession

Assuming global economic recovery and the restoration of Irish competitiveness, the recession is expected to bottom out in 2010, with growth resuming thereafter. Between 2010 and 2015 employment is expected to grow, with net job creation estimated at almost 250,000. In absolute terms, the greatest net job creation between the low point of 2010 and 2015 is expected for occupations which employ over 100,000 persons: managers, clerks, sales assistants and unskilled manual. In relative terms, the greatest gains are expected for craftspersons (skilled building workers, including carpenters) as they climb from the furthest dip, although still failing to reach pre-recession levels by 2015. Net job creation is also expected to be significantly above average for professionals/associate professionals (business, finance, software, engineering, science) and service providers (e.g. personal services, security, catering etc.). Occupations for which job losses are expected to exceed job creation even after the recession include agricultural workers and various types of operatives (e.g. food, textile, printers).

Interpreting the Forecasts

Forecasts presented in this report should be interpreted in the context of two key assumptions: that the ESRI macro-economic model provides a good approximation of the state of the Irish economy in 2015, and that shifts in the occupational distribution within each economic sector observed between 1998 and 2008 continue to 2015.

As with all quantitative models, the model used here is inherently limited. Therefore, the forecasts should not be interpreted as a precise prediction of the future but rather an indication of a likely outcome should the underpinning assumptions materialise.

It is possible that the sharp decline in employment observed in recent times may have altered the sectoral employment structure, both in terms of sub-sectors (e.g. the share of motor trade in the distribution sector) and occupational mix (e.g. the share of engineering associate professionals which includes civil engineering technicians and quantity surveyors, in the business services sector). Although efforts have been made to control for such changes, the possible presence of significant structural breaks in the employment series would reduce the predictive power of the models used.

It should also be borne in mind that the ESRI HERMES model provides projections of employment based on an equilibrium between the supply and demand in the labour market; therefore, the forecasts of employment by industry or occupation cannot be used as a direct measurement of the future demand at occupational level independent of the supply.

The speed and extent of the global economic recovery, the performance of the financial sector, migratory flows, wage adjustments, the degree of hysteresis in unemployment and fiscal responses will determine future occupational employment growth. Forecasts presented in this report should be interpreted in the context of assumptions made about these factors.

Introduction

Background

Since the early 1990s, the Economic and Social Research Institute (ESRI) and FÁS have been jointly publishing the *Occupational Employment Forecasts* series (Appendix A). This report is the 13th in the series. It contains occupational employment forecasts for the Irish economy for 2015. The results were produced by FÁS using the occupational employment forecasting model developed by the ESRI. The methodology used in this report is broadly in line with that used in previous reports in the series.

The occupational employment forecasting model used here represents an extension to the ESRI macro-econometric HERMES model which is used for the production of medium term economic forecasts for the Irish economy. The HERMES model produces employment forecasts by broad economic sector, which are used as an input into the occupational employment forecasting model.

Objective

The main objective of this report is to provide an indication of how the occupational composition of the workforce is likely to change given the assumed performance of the global and domestic economy inherent in the ESRI medium term economic forecasts.

By identifying likely developments in the labour market at occupational level, particularly after the recession, and pointing to the expected change in the skills requirements of the Irish economy in the medium term, the forecasts are useful in informing:

- education and training policy
- labour market policy (e.g. the development of activation programmes for the unemployed)
- immigration policy
- career guidance advisors, students, and individuals making career and educational choices.

Scope

The report covers the following:

- an overview of the occupational forecasting model and the forecasting method used (Section 1)
- the forecasting period 2008-2015; as in previous reports, forecasts are presented for the final year. It should be noted that the movement of employment in the interim period follows a U-shaped curve, with a short-term contraction in employment followed by a recovery after the recession period; hence, the comparison of employment between the two end points of the forecasting period measures the extent to which employment for a particular group in the labour market recovers in the medium term relative to the peak year 2008
- a comparison with historical data which illustrates the differences between the projected pattern of employment growth and that associated with the recent past

- an overview of the ESRI economic forecasts under the world recovery scenario in which employment growth resumes in 2011 (Section 2)
- employment forecasts for 20 economic sectors (Section 3)
- employment forecasts for 19 broad occupational groups and 43 individual occupations (Section 4)
- an analysis of the drivers of employment change in each occupation; this includes a measurement of the change in employment due to employment growth economy-wide (scale effect); the relative growth or decline in those industrial sectors in which an occupation is most concentrated (industry effect); the relative growth or decline in an occupation's share of total employment in those industries with which an occupation is associated (occupation effect) (Section 5)
- occupational employment forecasts by gender (Section 6)
- occupational employment forecasts by education (Section 7)
- employment forecasts are expressed in principal economic status (PES) terms as dictated by the historical data and the ESRI HERMES output; the conversion into ILO employment definition is provided in the Appendix D.

Interpreting the Forecasts

The forecasts should be interpreted in the context of the following:

- As with all quantitative models, the model used here is inherently limited; for instance, one of the methods used is a linear regression trend analysis, whereas a past trend in itself is driven by many factors, some non-quantifiable. In order to minimise forecasting error, the validity of the forecasts was assessed through a lengthy internal and external consultation process and the forecasts were amended in line with the feedback. Therefore, the forecasts should not be interpreted as a precise prediction of the future but rather an indication of a likely outcome should the underpinning assumptions materialise.
- It is possible that the sharp decline in employment observed in recent times may have altered the sectoral employment structure, both in terms of sub-sectors (e.g. the share of motor trade in the distribution) and occupational mix (e.g. the share of engineering associate professionals which includes civil engineering technicians and quantity surveyors, in the business services sector). Although efforts have been made to control for such changes, the possible presence of significant structural breaks in the employment series would reduce the predictive power of the models used.
- The forecasts rest on two key assumptions: that the ESRI macro-economic model provides a good approximation of the state of the Irish economy in 2015, and that shifts in the occupational distribution within each economic sector observed between 1998 and 2008 continue to the year 2015.
- The ESRI HERMES model provides projections of employment based on an equilibrium between the supply and demand in the labour market; therefore the forecasts of employment by industry or occupation cannot be used as a direct measurement of the future demand at occupational level independent of the supply.

Section 1: Methodology

This section provides an overview of the methods and sectoral and occupational classifications used in compiling the occupational employment forecasts for the target year 2015. Detailed descriptions of the methods used to compile occupational employment forecasts have been presented in earlier reports in this series, particularly Reports No. 3 and 4 (Appendix A). Figure 1.1 provides a graphical representation of the FÁS/ESRI occupational forecasting model.

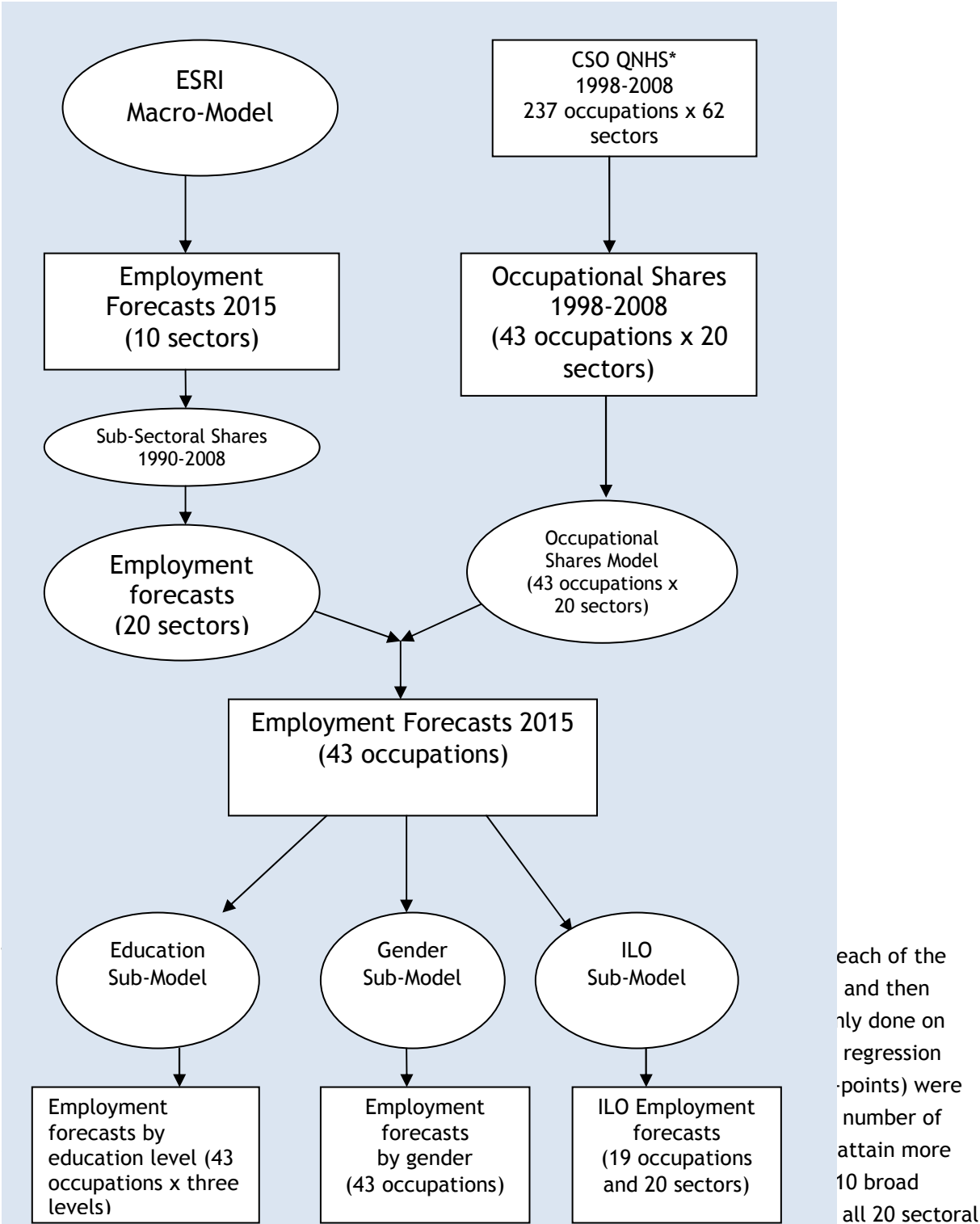
Sectoral Employment Forecasts

The starting point involved the use of sectoral employment projections for the target year (2015), which were derived from the ESRI macro-economic model (HERMES) for 10 economic sectors. The sectoral employment forecasts were disaggregated in the FÁS/ESRI sub-sectoral model to provide projections of employment for 20 more detailed sectoral categories – some sectors were disaggregated into two or three sub-sectors (left-hand side of Figure 1.1). The match between the original 10 sectors and the 20 FÁS/ESRI sectors is shown in Table 1.1.

Table 1.1: Disaggregation of MTR Sectors into FÁS/ESRI Sectors

| MTR Sector | FAS/ESRI Sector(s) |
|---------------------------------|---|
| Agriculture | Agriculture |
| High-Tech Manufacturing | Metals Machinery & Equipment Chemicals |
| Other Manufacturing | Food, Drink, Tobacco Clothing & Textiles |
| Utilities | Other Manufacturing |
| Building | Construction |
| Distribution | Wholesale Motor Vehicles etc. Retailing |
| Transport & Communications | Transport Communications |
| Other Market Services | Finance & Insurance Other Business Services Hotels & Restaurants Other Market Services |
| Public Administration & Defence | Public Administration & Defence |
| Health and Education | Education Health |

Figure 1.1: FÁS/ESRI Occupational Forecasting Model



categories. The outcome of this process is a set of forecasts for employment in each of the 20 industrial sectors in 2015.

Occupational Employment Forecasts

The occupational classification used in this report is that used by the Central Statistics Office (CSO) in the QNHS (Quarterly National Household Survey). It is based on the UK 1990 Standard Occupational Classification (SOC) (with modifications to reflect Irish labour market conditions) and is compatible with the International Labour Office (ILO) ISCO (88) International Standard Classification of Occupations.

Details of the occupational structure adopted in this report are set out in Table 1.2. The most detailed occupational classification relates to 43 occupational categories which were, in turn, amalgamated into 19 broad occupational groups. These groups formed the basis of most of the analytical presentations made because of the sampling constraints associated with the QNHS estimates. The 43 categories were initially formed by amalgamating a much larger number of occupational categories, (corresponding to some 237 in total) used in the QNHS. In order to facilitate the reader in understanding the coverage of each of the 43 occupational sub-groups, Appendix B contains a written description of the main activities included under each of these groups, while Appendix C contains a full list of the occupational codes and their corresponding descriptions.

The right-hand side of Figure 1.1 shows the process involved in calculating the projected occupational distributions within the 20 industrial sectors. This was accomplished by taking account of past trends and expectations related to the evolution of skills and occupations. The data used to analyse occupational shares within industries was taken from the CSO QNHS carried out for the period 1998-2008⁶. This data source provided consistent employment data, classified simultaneously by occupation and industry, at the detailed level of 237 occupations by 62 industries. The data was then aggregated into matrices showing employment for the 43 occupations in the 20 industries for the eleven-year period. This process generated a times series of 11 data-points for 43 occupations in each of the 20 sectors – 860 time-series in total.

Table 1.2: Occupational Classification

| Group | Sub-Group | Occupational Code (SOC) |
|--|--|--|
| 1. Agricultural Occupations | 1.1 Agricultural | 160, 595, 594, 901, 902, 903, 904 |
| | | 023, 100, 101, 102, 103, 110, 111, 112, 113, 120, 121, 122, 123, 124, 126, 127, 130, 131, 139, 140, 141, 142, 150, 151, 152, 154, 155, 160, 169, 171, 172, 173, 174, 175, 176, 177, 178, 179, 190, 191, 199, 232, 700, 701 |
| 2. Managers | 2.1 Managers | |
| 3. Proprietors | 3.1 Proprietors in services | 171, 172, 173, 174, 175, 176, 177, 178, 179, 199, 702, 703 |
| 4. Health & Education Professionals | 4.1 Health professionals | 220, 221, 222, 223, 345 |
| | 4.2 Education professionals | 230, 231, 233, 234, 235, 239 |
| | 4.3 Clergy | 292 |
| 5. Science & Engineering Professionals | 5.1 Science professionals | 200, 201, 202, 209 |
| | 5.2 Software engineering professionals | 214 |

⁶ The QNHS data used related to the second quarter of each year.

| | 5.3 Other engineering professionals | 210, 211, 212, 213, 215, 216, 217, 218, 219, 260, 261, 262 |
|--|--|--|
| 6. Business, Legal & Other Professionals | 6.1 Business/finance/legal professionals | 125, 240, 241, 242, 250, 251, 252, 253, 362, 363, 364 |
| | 6.2 Other professionals | 270, 271, 290, 291, 293, 224, 380, 384, 385, 387, 390, 392 |
| 7. Health Associate Professionals | 7.1 Health associate professionals | 340, 341, 342, 343, 344, 346, 347, 348, 349, 396, 643 |
| 8. Science & Engineering Associate Professionals | 8.1 Science associate professionals | 300, 309 |
| | 8.2 Computer associate professionals | 320 |
| | 8.3 Engineering associate professionals | 301, 302, 303, 304, 310, 311, 312, 313 |
| 9. Other Associate Professionals | 9.1 Catering associate professionals | 620 |
| | 9.2 Other associate professionals | 330, 331, 332, 350, 361, 370, 371, 381, 382, 383, 391, 393, 394, 395, 399 |
| 10. Clerical | 10.1 Clerks/typists/telephonists | 132, 400, 401, 410, 411, 412, 420, 421, 430, 440, 441, 450, 451, 452, 459, 460, 461, 462, 463, 490, 491, 613 |
| 11. Skilled Building Workers | 11.1 Skilled building workers | 022, 500, 501, 502, 503, 504, 505, 506, 507, 509, 922, 923, 924 |
| 12. Skilled Maintenance Workers | 12.1 Electricians, electrical fitters | 520, 521, 522, 523, 526 |
| | 12.2 Fitters and mechanics | 515, 516, 540, 543, 544 |
| 13. Other Skilled Manual | 13.1 Metal/engineering craft workers | 517, 518, 532, 533, 541, 542, 596 |
| | 13.2 Wood craft workers | 570, 571, 572, 573, 579 |
| | 13..3 Clothing/textile workers | 550, 551, 552, 553, 554, 555, 556, 557, 559 |
| | 13.4 Printers | 560, 561, 562, 563, 569 |
| | 13.5 Other skilled workers | 590, 591, 592, 593, 597, 598, 599 |
| 14. Operatives | 14.1 Electrical/electronic operatives | 524, 525, 529, 850 |
| | | 510, 511, 512, 513, 514, 519, 530, 531, 534, 535, 536, |
| | 14.2 Metal/engineering operatives | 537, 830, 831, 832, 833, 834, 839, 840, 841, 842, 843, 844 |
| | 14.3 Food/drink/tobacco operatives | 580, 581, 582, 800, 801, 802, 809 |
| | | 020, 810, 811, 812, 813, 814, 820, 821, 822, 823, 824, 825, 826, 829, 851, 859, 860, 861, 862, 863, 864, 869, 885, 886, 887, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899 |
| 15. Transport Occupations | 15.1 Drivers | 872, 873, 874, 875, 882, 883, 884, 941 |
| | 15.2 Other transport workers | 630, 631, 870, 871, 880, 881, 934, 940 |
| Group | Sub-Group | Occupational Code (SOC) |
| 16. Sales Occupations | 16.1 Sales agents | 170, 360, 710, 719, 730 |
| | 16.2 Sales assistants | 622, 720, 721, 722 |
| | 16.3 Other sales workers | 731, 732, 733, 790, 791, 792, 959 |
| 17. Carers | 17.1 Childcare and related services | 650, 651, 652, 659 |
| | 17.2 Care assistants | 640, 641, 642, 644, 950 |
| 18. Other Service & Protective Activities | 18.1 Army/Gardai/Prison Officers etc. | 153, 600, 601, 610, 611, 612 |
| | 18.2 Other security workers | 614, 615, 619, 672 |
| | 18.3 Catering occupations | 621, 953 |
| | 18.4 Other personal services | 386, 660, 661, 670, 671, 673, 690, 691, 699 |
| | 18.5 Occupation unstated | 000, 001, 004, 005, 006, 007, 008, 021, 999 |
| 19. Unskilled Manual | | 900, 910, 911, 912, 913, 919, 920, 921, 929, 930, 931, |
| | 19.1 Unskilled manual | 932, 933, 951, 952, 954, 955, 956, 957, 958, 990 |

In the occupational shares sub-model, the 43 occupational shares of employment within each of the 20 sectors were projected forward to the forecast year.⁷ These forecast trends were derived by extrapolating the best fitting linear or semi-log regression line to the past occupational shares within each of the sectors. However, there were a small number of cases for which the past trend in the occupational share within an industry was not discernible and thus neither of these methods was used. Instead, the value of the mean share was selected over the retrospective period. The outcome of this process was a series of matrices (43 occupations by 20 sectors) of forecast occupational shares for the year 2015. The estimated occupational shares were then applied to the projected sectoral employment and summed to give economy-wide employment for each occupation in 2015.

Shift-Share Analysis

An inherent feature of the method of analysis used is the fact that occupational employment forecasts are driven by three distinct factors:

- overall output or employment growth in the economy as a whole (scale effect)
- the relative growth of different industrial sectors to the national growth (industry effect)⁸
- changes in the occupational structure within sectors (occupational effect).

The decomposition of the change in employment into scale, industry and occupational effect is referred to as shift-share analysis and is presented for broad and individual occupations covered in the report.

Occupational Employment Forecasts by Gender

Given the sharp increase in labour force participation by females in Ireland, it was of interest to consider expected changes in the share of female employment. A gender sub-model provided projections of female employment in each of the 43 occupations in 2015. This involved the projection of past trends for the share of female/male employment in the different occupations using trend extrapolation. Total employment for each occupation by gender was derived by applying estimated female/male shares to the total employment for each occupation for 2015.

Occupational Employment Forecasts by Education

The educational profile of the Irish workforce has been changing – the proportion of those with third level qualifications has increased significantly in recent years. An educational sub-model was developed to provide projections of the educational distribution of the workforce for the 19 broad occupational groups and 43 more detailed occupations.

Historical data on educational attainment was taken from the QNHS for the period 1999⁹-2008. The highest level of educational attainment of the workforce for the different occupations was

⁷ It is assumed that the demographic composition of occupations will remain unchanged over the forecasting period.

⁸ The industry effect is positive if : a) employment in a sector increases faster than the national employment ; b) declines slower than the national employment or c) increases while the national employment declines.

⁹ The education variable became available in the 1999 QNHS.

examined in terms of three different broad categories: below upper secondary education; upper secondary/further education and training; and third level education.

As before, shifts in the educational distribution identified for each occupation over the period 1999-2008 were projected into the future using trend extrapolation. Estimated future shares were applied to the occupational employment to obtain the employment level for each educational category within each occupation.

Using trend extrapolation in projecting the educational composition of occupational employment is not an ideal methodology for a variety of reasons. The sectoral forecasts which are used as a base for occupational employment forecasting represent equilibrium projections in which demand equals supply. However, the future actual supply of skills will be determined by a number of factors including the capacity of the education system, education policy and student demand. Although at present, there is an excess supply of labour with third level education (originating from job losses at this level and continued graduate output), it is uncertain how education policy and migratory flows will affect the actual supply out to 2015.

The shift towards higher levels of education of persons in employment is likely to continue in the coming years, possibly for reasons different to those observed in the recent past. During the boom, the increase in the share of third level graduates was partly due to the inflow of skilled immigrants, the impact of which is likely to diminish in the coming years as migratory flows change to reflect lesser job opportunities in Ireland. Going forward, an inflation of qualifications in most occupations is expected to occur, as persons with lower educational attainment tend to be at greater risk of unemployment, particularly during recession, and face intensified competition for the jobs opportunities that arise in the upturn.

For these reasons, projections over the period 2008-2015 represent only a trend-based indication of the future educational composition of employment by occupation and ignore the complexities of the interactions between demand and supply at occupational level and other factors impacting on the supply of labour at this level of disaggregation.

Employment Definition: PES vs. ILO

This report uses principal economic status (PES) as the definition of employment. This is due to legacy (historically, labour force surveys and Censuses used this classification) and the fact that the ESRI HERMES model forecast output is given in PES terms.

In the survey procedure, the PES represents a respondent's own view of their employment status. More widely used is the International Labour Organisation (ILO) employment definition which defines a person as employed if they worked at least one hour for payment in a reference week. In general, the ILO definition is broader than the PES and gives higher employment figures. For

instance, the ILO-based employment estimate for 2008 is 2,107,800 - nearly 78,000 (or just under 4%) higher than the corresponding PES related total of 2,029,900.

Tables D1 and D2 (Appendix D) present a rough translation of the PES employment forecasts by sub-sector and broad occupational group into ILO defined employment.

Section 2: Economic Background

At the time of writing, the Irish economy was facing extremely challenging times. It was in a recession, unemployment and the deficit in the public finances was rising, building activity had contracted dramatically and the banking system was experiencing liquidity difficulties.

The employment forecasts presented in this report are based on the assumptions underpinning the economic forecasts for the Irish economy for the period 2009-2015, as set out in the ESRI report *World Recovery Scenarios for Ireland*, published in May 2009¹⁰. The ESRI's assumptions and macroeconomic model determine the overall employment level for 2015, and they also provide projected employment totals for different sectors. The focus is on the medium term trend, not on the short term fluctuations around it. The ESRI produced two scenarios: recovery and prolonged recession. However, this report focuses only on the recovery scenario as there is no major difference in terms of total employment between the two and there are some indications that the global recession may be ending.

The assumptions underlying the world recovery scenario concern the timing and strength of the future recovery in the world economy and the fiscal policy pursued by the Irish Government. In this scenario, it is assumed that most of the world's economies recover from recession from mid-2010 and grow at rates close to potential over the period 2011-2015. Table 2.1 shows the growth prospects for the international economy and Ireland's main trading partners over the medium term. Based on the assumptions about the global recovery, the demand for Irish exports is expected to recover from the current slowdown by 2011.

Table 2.1: Real GDP Growth (%) - World Recovery Scenario

| | 2007 | 2008 | 2009 | 2010 | 2011-2015 |
|-----------|------|------|------|------|-----------|
| USA | 2.0 | 1.3 | -4.0 | 0.0 | 3.0 |
| UK | 3.0 | 0.7 | -3.7 | -0.2 | 2.6 |
| Euro Area | 2.6 | 0.9 | -4.1 | -0.3 | 2.1 |
| World | 5.0 | 3.5 | -4.3 | -0.1 | 4.2 |

Source: ESRI, *World Recovery Scenarios for Ireland*

The key macroeconomic aggregates associated with the world recovery scenario are presented in Table 2.2¹¹. Weak domestic demand and the recession in the international economy in the short term are expected to give rise to a substantial decline in output in the manufacturing and market services sectors. Overall, GNP is expected to fall by 9% in 2009 and by almost 2% in 2010.

¹⁰ Bergin, A, T. Conefrey, J. Fitz Gerald, I. Kearney, 2009. *Recovery Scenarios for Ireland*, Research Series, Number 7, May, Dublin: The Economic and Social Research Institute.

¹¹ The published forecasts for the macroeconomic aggregates in this report are not identical to those published in *Recovery Scenarios for Ireland*. The figures in this report have been refined to take account of more recent developments in the economy – they have been roughly calibrated to the figures published in the ESRI *Quarterly Economic Commentary* (Summer 2009).

The increase in unemployment associated with the contraction in economic activity over the period 2008-2010 is expected to lead to significant wage moderation in both the public and private sectors. Forecasts of the turning point for 2011 are based on the assumption that between 2009 and 2011 the nominal wage rates in the economy as a whole will decline by 6.6%. It should be noted that delays in downward wage adjustments could delay the turning point for the economy. As a result of the world recovery and improvement in competitiveness, GNP growth is expected to resume, averaging 5.5% in the period 2010-2015.

The high degree of responsiveness of the Irish economy to changes in world activity may give rise to a strong recovery from 2011, assuming the economy regains competitiveness. However, this recovery would imply a restoration of only some of the losses sustained over the period 2008-2010. As a result of the recession, by 2015 output would be around 15% below where it would have been without the current crisis.

Following fiscal interventions introduced in the Supplementary Budget 2009 and Budget 2010, it is assumed that the fiscal policy beyond 2010 will be broadly neutral. The resumption of economic growth post 2011 is expected to result in an improvement in the Government deficit, which on the basis of the recovery scenario is forecast to fall to 3.9% of GDP in 2015. It is also assumed that the financial system is reformed and restructured so that it responds to the recovery in the economy in 2011/2012 by providing adequate credit and that there is an improvement in the Irish economy's competitiveness.

Table 2.2: World Recovery Scenario: Major Aggregates

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|-----------------------------|-------|-------|-------|-------|-------|-------|-------|
| GDP | -7.8% | -2.3% | 3.6% | 5.1% | 5.7% | 6.1% | 5.5% |
| GNP | -9.0% | -1.9% | 3.7% | 5.7% | 6.0% | 6.3% | 5.5% |
| Output, industry | -9.2% | -3.9% | 8.2% | 8.4% | 8.6% | 8.8% | 7.3% |
| Output, market services | -4.6% | -1.2% | 2.9% | 5.3% | 5.9% | 6.1% | 5.7% |
| Consumer prices | -1.0% | -0.2% | 1.8% | 2.4% | 2.8% | 2.8% | 2.7% |
| Non-agricultural wage rates | -3.2% | -1.8% | -1.6% | 1.5% | 4.4% | 5.6% | 5.6% |
| Total employment (000) | 1,807 | 1,703 | 1,733 | 1,795 | 1,861 | 1,907 | 1,953 |
| Total unemployment (000) | 332 | 407 | 365 | 311 | 251 | 223 | 198 |
| Labour Force (000) | 2,139 | 2,110 | 2,097 | 2,106 | 2,112 | 2,129 | 2,151 |
| Unemployment Rate (ILO) | 12.7% | 16.5% | 14.6% | 12.0% | 9.2% | 7.8% | 6.6% |
| Net migration (000) | -30 | -40 | -10 | -50 | -25 | -5 | 8 |

Source: ESRI

The total number of persons at work in the economy is predicted to contract from 2,030,000 in 2008 to 1,953,000 in 2015, representing a decline of 77,000 or annual average net jobs losses of 11,000. This is in sharp contrast to the strong growth in employment recorded in the previous seven year period. The total number of persons at work increased by 375,000 from 1,654,000 in 2001, equivalent to a net jobs expansion of 54,000 or annual average growth of 3%.

The slowdown in the economy is expected to lead to a dramatic rise in the level of unemployment and the unemployment rate in the years 2008-2010. Total employment is expected to decline by 9.2% in 2009 and by a further 5.8% in 2010. The unemployment rate is expected to continue to rise and reach around 13% in 2009 before peaking at 16.5% in 2010. In line with the anticipated recovery in economic activity from the year 2011, employment growth is expected to resume – averaging 2.8% annually over this period. Consequently, this is expected to result in some moderation in the unemployment rate, which is expected to fall to 6.6%.¹²

The economy is not expected to return to full employment under this scenario. The persistence of a high unemployment rate after the Irish economy has recovered would reflect a legacy of a structural unemployment problem resulting from the current recession and the re-adjustment of the construction sector to sustainable levels of activity.

As a result of the current recession, the anticipated cumulative level of net migration of -152,000 over the period 2009-2015 represents a significant reduction in the labour force. Negative net migration is assumed to peak at 50,000 in 2012. It must be borne in mind that the likely response of migration to the current recession is highly uncertain. If emigration were to be lower than that anticipated, this would raise unemployment above the level anticipated and result in a slower recovery in the Irish labour market.

Migration is assumed to be driven by movements in after-tax wage rates and the Irish unemployment rate relative to other EU labour markets. With a world-wide recession, the propensity to migrate for a given wage differential may fall. On the other hand, if the world recovery were to prove more robust, falling unemployment in competing labour markets could increase the numbers leaving Ireland.

Forecasts presented in this report have been produced in times of great uncertainty. All projections should be interpreted in the context of the assumptions outlined in this section, which concern the speed of the global economic recovery, the restoration of the financial sector, migratory flows, movements in nominal wage rates, the rate at which employment growth lags behind output and anticipated fiscal responses.

¹² As this report was being finalised for publication, the ESRI produced the winter 2009 edition of the Quarterly Economic Commentary (see Barrett A., Kearney I., Goggin J., Conefery T., QEC, Winter 2009). This contained revised short-term macroeconomic forecasts in which the unemployment rate for 2010 is predicted to be 13.8%, compared to the 16.5% forecast for this report. However, this short-term difference does not negate the medium-term predictions for 2015 upon which this report is based.

Section 3: Sectoral Employment Forecasts

The ESRI HERMES model produced employment forecast for 10 economic sectors for the period 2008-2015. These forecasts are further disaggregated into 20 sectors. The disaggregation is based on the projection of historical trends for sub-sector shares. The results are presented in Table 3.1.

Table 3.1: Sectoral Employment Forecasts (000s)

| | 2008 | 2015 | Change 2008-2015 |
|---------------------------------|-------|-------|---------------------|
| Agriculture | 117 | 87 | -30 |
| High Tech Manufacturing | 138 | 160 | 22 |
| Metals | 28 | 31 | 3 |
| Machinery & Equipment | 69 | 72 | 4 |
| Chemicals | 42 | 57 | 15 |
| Traditional manufacturing | 146 | 100 | -46 |
| Food, Drink, Tobacco | 50 | 47 | -3 |
| Clothing & Textiles | 9 | 3 | -6 |
| Other Manufacturing | 87 | 51 | -37 |
| Construction | 254 | 191 | -63 |
| Distribution | 281 | 262 | -19 |
| Wholesale | 63 | 62 | -1 |
| Motor Vehicles etc. | 46 | 42 | -4 |
| Retailing | 171 | 158 | -13 |
| Transport and Communication | 117 | 128 | 11 |
| Transport | 80 | 86 | 6 |
| Communications | 37 | 42 | 5 |
| Other Market Services (OMS) | 508 | 567 | 59 |
| Finance & Insurance | 93 | 101 | 8 |
| Other Business Services | 194 | 231 | 37 |
| Hotels & Restaurants | 112 | 107 | -5 |
| Other Market Services | 109 | 128 | 19 |
| Public Administration & Defence | 110 | 110 | 0 |
| Health and education | 359 | 348 | -11 |
| Education | 142 | 138 | -4 |
| Health & Social Work | 217 | 211 | -6 |
| Total | 2,030 | 1,953 | -77 |

Note: Pubs, religion and sectors not elsewhere classified are captured in the OMS sector; utilities are captured in the other manufacturing sector.

In 2008, there were 2.03 million persons in employment. By 2015, total employment is expected to be 77,000 lower than in 2008, recovering from a low of 1.7 million in 2010. In 2008, one quarter of

employment was in the market services sector (finance, business services, hotels and other), just under one fifth in health and education, 14% in distribution (retail, wholesale and motor) and 13% in construction. By 2015, the sectoral distribution of employment will change somewhat. Traditional manufacturing is expected to lose 2 percentage points of its share and account for 5% of total employment by 2015. Construction is expected to account for 10% of employment in 2015 compared to 13% in 2008; agriculture for 4% compared to 6%. An increase in share is expected to be observed in market services (4 percentage points), high tech manufacturing and transport and communications.

Agriculture

In 1990, almost 170,000 persons were employed in agricultural activities. By 2008, this number had declined to 117,000. Employment in agriculture is expected to continue to decline, with an expected net loss of jobs of just under 30,000 by 2015.

High Tech Manufacturing

In 1990, less than 90,000 persons were employed in high tech manufacturing compared to almost 140,000 in 2008. Employment in this sector is expected to fully recover following the recession and exceed pre-recession levels by 20,000 in 2015.

Growth paths of the sub-sectors within high tech manufacturing are expected to differ during the recession and recovery. The metals sector is expected to contract during the recession and recover beyond 2010, exceeding the pre-recession employment level by 3,000, although its share in the high tech sector is expected to remain at approximately 20%.

The share of machinery and equipment within high tech manufacturing has been declining (from 55% in 1990 to 49% in 2008) and this trend is expected to continue: by 2015 this sub-sector is expected to account for 45% of the high tech sector. In the short term, employment in machinery and equipment is expected to contract. This contraction is expected to be driven by the global recession and the move of some manufacturing operations out of Ireland (e.g. DELL closure). However, beyond the recession, this sector, particularly medical devices manufacturing, is expected to grow strongly. By 2015, employment in the machinery and equipment sector is expected to be almost 4,000 greater than before the recession.

The greatest increases in employment between 2008 and 2015 are expected in the chemicals sector. Employment growth in this sector is expected to be positive even in the short term. The share of chemicals within the high tech sector has been increasing (from 23% in 1990 to 30% in 2008) and by 2015 this sub sector is expected to account for 35% of high tech manufacturing. Employment in this sector increased by more than a quarter in the decade to 2008 and this sector has been showing resilience during the recession, with output holding up regardless of the global downturn.

Traditional Manufacturing

In 2008, there were 146,000 persons employed in traditional manufacturing (including utilities) compared to 162,000 a decade previously. Employment in this sector is expected to contract sharply during the recession and to continue on a negative trajectory beyond that, with employment declining to 100,000 by 2015. Most of this decline, particularly after the recession, will be a result of a move of manufacturing activities to lower cost locations.

The greatest losses are expected in 'other manufacturing' which comprises traditional manufacturing such as the manufacturing of paper/print, wood, furniture, transport equipment, mining, etc. This sector is expected to account for 43% of traditional manufacturing by 2015 compared to over half at the turn of the century.

Textile and clothing manufacturing is expected to experience the greatest relative number of net job losses over the forecasting period, with this sector expected to be reduced to less than 3,000 persons by 2015.

Food, drink and tobacco manufacturing is expected to experience the smallest relative number of net job losses, with employment contracting by 3,000 between 2008 and 2015; more than a half of this loss is expected to occur during the recession.

Construction

More than a third of the total expected employment decline over the forecasting period is expected to be in construction. The sector is expected to lose a net 120,000 jobs by 2010. Recovery is expected beyond 2010; however, at 190,000, employment in 2015 is expected to be 60,000 lower than in 2008. This, however, may prove to be an optimistic projection if the housing market remains subdued.

Distribution

The distribution sector is expected to contract sharply between 2008 and 2010 and to recover thereafter. However, employment in this sector is not expected to reach pre-recession levels by 2015.

Employment in both the retail and motor vehicle sectors is expected to contract by a quarter during the recession and to recover afterwards. Employment is, however, not expected to recover to levels recorded in 2008 by the end of the forecasting period. As a result of the credit crunch, employment in the retail sector is expected to be 13,000 lower in 2015 compared to 2008 and 4,000 lower in the motor vehicle trade.

Driven by the expected lesser decline and faster recovery of the export sector, wholesale employment is expected to almost recover to the pre-recession levels by 2015.

Transport and Communications

Employment in transport and communications is expected to decline somewhat during the recession and to recover beyond 2010, exceeding the level recorded in 2008 by over 10,000 by 2015.

Transport, which accounts for 66% of the sector, is expected to be worse affected during the recession with expected net job losses of 2,000 by 2010 (e.g job losses in Bus Eireann, Aer Lingus, etc.). By contrast, employment in the communication sector is expected to hold up during the recession. Employment in both sectors is expected to grow beyond 2010, each exceeding 2008 levels by over 5,000 by 2015.

Other Market Services

Although employment is expected to contract by 75,000 between 2008 and 2010, the market services sector is expected to grow strongly afterwards, with employment recovering to exceed the 2008 level by 60,000 by 2015.

Within the market services sector, hotels and restaurants are expected to be worse affected in the recession in relative and absolute terms, with an estimated net loss of over 25,000 jobs between 2008 and 2010. As a result, this sector is expected to lose some of its share and account for 19% of the market services sector compared to 22% at the peak of the boom. Employment is expected to grow strongly in the recovery period; however, it is unlikely to reach pre-recession levels by 2015.

The strongest growth in absolute and relative terms is expected for business services. These include activities such as accounting, legal advice, ICT consultancy (software, hardware, database), HR, marketing/advertising, renting (property, machinery, equipment), real estate, etc. Although segments related to the construction industry (real estate and architectural services) are expected to lag behind other segments of the market services sector in terms of speed of recovery, the sector as a whole is expected to be associated with significant job creation in the recovery, with employment in 2015 expected to exceed the 2008 level by 37,000.

The financial sector (comprising banking, insurance and other financial services) is expected to experience a significant employment decline during the recession (15,000 net job losses up to 2010), with the domestic and international financial sectors suffering the consequences of the global financial crisis and the domestic sector suffering from its exposure to the property market collapse. The period ahead is expected to be characterised by re-structuring and consolidation and tightening of the regulatory environment globally and domestically. Beyond 2010, this sector is expected to resume growth and recover fully by 2015, exceeding the employment levels recorded in 2008 by 2015.

Employment in the rest of the services sector (comprising a variety of services ranging from personal services to art, recreation and entertainment) is expected to follow the general economic trajectory, with a significant loss of jobs during the recession and a strong recovery beyond 2010. Overall, this sector is expected to fully recover and exceed the pre-recession employment levels by 2015.

Public Sectors

While, on balance, some employment gains are expected to be recorded in 2009¹³, employment in health, education and public administration and defence is expected to decline in 2010 and remain relatively unchanged for the rest of the forecasting period. Employment in health and education is expected to be 3% lower in 2015 compared to 2008 and 0.5% lower in public administration and defence.

As it is unclear how public funds will be prioritised between education and health, it is assumed that employment will continue to be distributed 40:60 between the two sub-sectors.

¹³ the comparison is with quarter 2 in 2009, whereas an average of all quarters in 2009 is expected to show a decline on 2008

Section 4: Occupational Employment Forecasts

Employment Forecasts for Broad Occupational Groups

Table 4.1 presents employment by broad occupational groups for the period 1996-2015, focusing on the change between the pre-recession peak and 2015. Between 1996 and 2008 employment increased resulting in net job creation of over 700,000 for the period. With the exception of agriculture, employment increased for all occupational groups during this period.

Since 2008, employment has been contracting and, although a recovery is expected in the latter part of the forecasting period, the overall employment level is not expected to reach the pre-recession level by 2015. By the end of the forecasting period employment is expected to be 1.953 million which amounts to 77,000 fewer employed than at the peak.

Experiences, however, are likely to vary across occupational groups. Despite an expected short term decline in employment across the board, by 2015 employment in a number of occupations is expected to recover and for some even surpass the pre-recession levels. These include managerial, professional and associate professional occupations (excluding those relating to the health and education sectors).

The employment level of science and engineering professional and associate professional occupations is expected to be 20,000 higher in 2015 compared to 2008. This is the most significant increase in relative terms compared to other occupational groups (Figure 4.1). The increase is expected to be linked to the expected strong performance of the high tech manufacturing sector (which includes chemicals and machinery and equipment production), particularly in the latter part of the forecasting period.

Driven by the expected growth of the business services sector (which includes IT services, accountancy, legal services, research including natural sciences and engineering, advertising, etc.), the number of employed business professionals in 2015 is expected to exceed the 2008 employment level by over 10,000.

Driven by the expected growth of the other services sector, service occupations (which include personal services such as beauticians, hairdressers, domestics, security, etc.) are expected to recover after the recession and exceed pre-recession levels by 2015.

The most significant decline in absolute and relative terms is expected for agricultural occupations which are expected to contract by more than a quarter. This is a continuation of a trend observed for a number of years previously and is mostly due to the expected decline in the share of the agricultural sector in the overall economy.

Employment of skilled manual workers is also expected to be lower by 2015, driven primarily by the dramatic decline in the construction sector observed in the downturn, but also by the expected contraction of the traditional manufacturing sector - a trend observed even before the recession. None of the skilled manual workers categories are expected to reach the pre-recession levels by 2015; all are expected to be at least 15% below the peak level by the end of the forecasting period, suggesting that the combined employment in these occupational groups (skilled building, skilled maintenance and other skilled manual) may be up to 50,000 lower than in 2008.

Table 4.1: Employment by Occupation

| | 1996 ¹⁴ | 2001 | 2008 | 2015 | Change 2008-2015 | |
|---|--------------------|---------|---------|---------|------------------|-------|
| | | | | | 000s | % |
| Agricultural Occupations | 115.0 | 105.5 | 106.5 | 78.1 | -28.5 | -26.7 |
| Managers | 116.8 | 164.5 | 212.4 | 219.4 | 7.0 | 3.3 |
| Proprietors | 41.0 | 51.0 | 32.6 | 25.1 | -7.6 | -23.1 |
| Health & Education Professionals | 75.4 | 83.6 | 107.8 | 107.3 | -0.5 | -0.4 |
| Science & Engineering Professionals | 23.1 | 44.7 | 61.3 | 72.2 | 11.0 | 17.9 |
| Business, Legal & Other Professionals | 39.0 | 61.0 | 100.2 | 111.7 | 11.6 | 11.5 |
| Health Associate Professionals | 43.0 | 53.0 | 75.2 | 74.2 | -1.0 | -1.4 |
| Science & Engineering Associate Professionals | 24.7 | 38.4 | 42.5 | 51.6 | 9.1 | 21.5 |
| Other Associate Professionals | 33.7 | 52.7 | 70.1 | 72.4 | 2.4 | 3.4 |
| Clerical | 177.7 | 210.5 | 251.3 | 245.4 | -5.9 | -2.4 |
| Skilled Building Workers | 27.8 | 60.7 | 83.1 | 69.6 | -13.6 | -16.3 |
| Skilled Maintenance Workers | 52.8 | 66.2 | 75.8 | 62.9 | -12.9 | -17.0 |
| Other Skilled Manual | 56.2 | 70.4 | 87.1 | 65.3 | -21.9 | -25.1 |
| Operatives | 111.1 | 159.3 | 118.7 | 98.8 | -19.8 | -16.7 |
| Transport Occupations | 54.9 | 76.5 | 94.3 | 94.7 | 0.4 | 0.4 |
| Sales Occupations | 99.1 | 132.5 | 175.2 | 168.6 | -6.7 | -3.8 |
| Caring Professions | 27.0 | 40.0 | 84.0 | 83.9 | 0.0 | 0.0 |
| Other Service & Protective Activities | 79.0 | 96.9 | 122.6 | 131.0 | 8.4 | 6.8 |
| Unskilled Manual | 99.8 | 86.2 | 129.2 | 120.4 | -8.8 | -6.8 |
| Total | 1,297.2 | 1,653.5 | 2,029.9 | 1,952.7 | -77.3 | -3.8 |

The employment level in the operatives and unskilled manual group is also expected to fail to reach the pre-recession level in the recovery to 2015. The employment level for these two categories combined is expected to be almost 30,000 lower compared to 2008. The negative impact on employment growth in these occupations is expected to be driven by two factors:

- the expected slow recovery of construction and traditional manufacturing, which is unlikely to be off-set by the positive developments in other sectors which employ these occupations
- the expected move up the value chain in expanding sectors, which is expected to result in a decline in the presence of these occupations (especially operatives) in the sectoral skill mix.

¹⁴ Historical data on occupational employment as classified in this report (based on CSO Quarterly National Household Survey) is not available prior to 1998; we use Census 1996 as a starting point for historical comparisons instead, which is a reason for the anomaly of the one 5-year period and two subsequent 7-year periods.

Another occupational group not expected to recover over the medium term in respect of employment levels relates to proprietors. In 2015, the number of proprietors is expected to be below the 2008 level by more than 7,000. This is driven by two factors:

- a slower recovery in the hotel and the retail sector
- a continuation of the trend in the expansion for the large chain business sector at the expense of the small business sector, particularly in the hotel and retail sector (e.g. B&Bs, boutiques, etc.).

Figure 4.1 shows the ordered employment growth rates for 19 occupational groups for the period 2008-2015. The figure illustrates the expected variation in the employment change across occupational groups over the medium term. It highlights the fact that the recovery is not expected to be uniform across occupational groups and is likely to create greater employment opportunities for high skilled. Lower skilled persons and craftpersons, who have been particularly badly hit by the downturn and the sharp contraction of the construction sector, are expected to gain a lesser share of the employment growth in the recovery.

Figure 4.1: Change in Employment (%) by 19 Occupations, 2008-2015

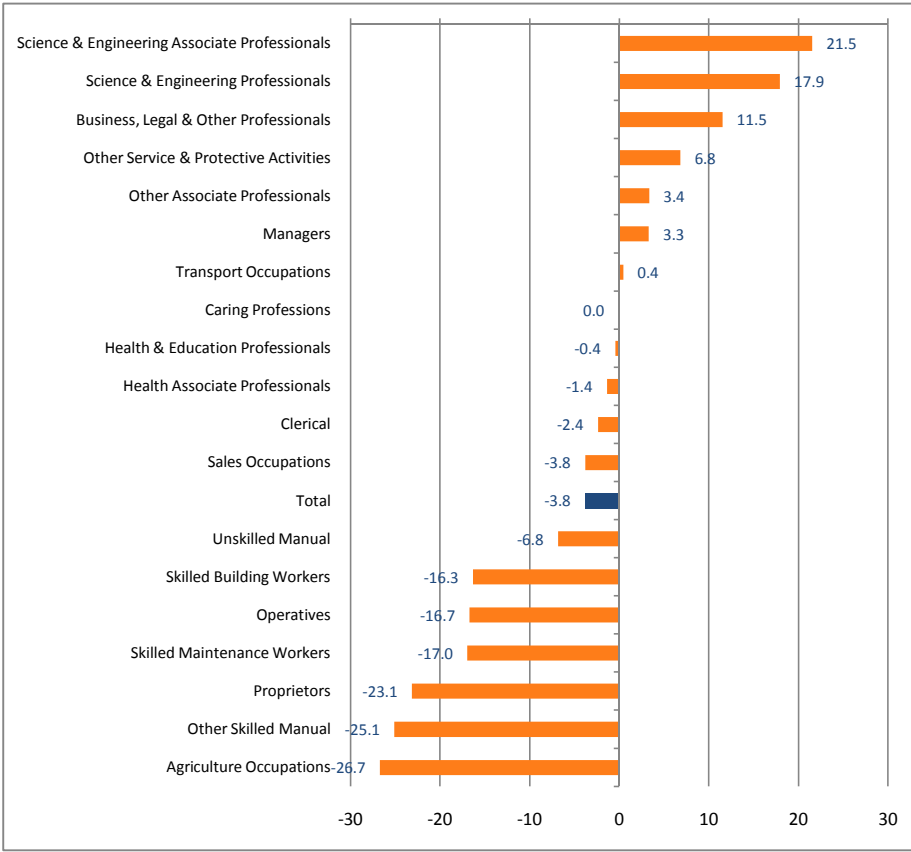


Table 4.2 shows the absolute and relative changes in employment for three consecutive time periods. With very few exceptions, employment increased for all occupations in the two historical periods prior to the downturn in 2008. During these periods, employment in general grew continuously. By contrast, during the period 2008-2015 the employment path recorded previously is broken, with a decline forecast for the first two years of the forecasting period and a recovery beyond. During this period, employment in most occupations declines in the short term, recovering in the latter part of the forecasting period, forming a U-shaped curve. Therefore, the change over the period indicates the level of recovery by 2015: a positive employment change indicates a full recovery with the employment level exceeding the 2008 peak; a negative employment change indicates a failure to reach the pre-recession level by the end of the forecasting period.

For instance, the number of skilled building workers more than doubled over the period 1996-2001 and increased by a further 37% over the following seven years. This growth had been driven by the expansion of the construction sector and has been sharply reversed in the downturn. Employment is not expected to recover to the peak levels in the medium term.

Table 4.2: Employment Growth by Occupation

| | 1996-2001 | 2001-2008 | 2008-2015 | 1996-2001 | 2001-2008 | 2008-2015 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| | 000s | | | % | | |
| Agricultural Occupations | -9.5 | 1.1 | -28.5 | -8.3 | 1.0 | -26.7 |
| Managers | 47.7 | 47.9 | 7.0 | 40.8 | 29.1 | 3.3 |
| Proprietors | 10.0 | -18.4 | -7.6 | 24.4 | -36.0 | -23.1 |
| Health & Education Professionals | 8.2 | 24.1 | -0.5 | 10.9 | 28.8 | -0.4 |
| Science & Engineering Professionals | 21.7 | 16.5 | 11.0 | 94.0 | 37.0 | 17.9 |
| Business, Legal & Other Professionals | 22.0 | 39.2 | 11.6 | 56.3 | 64.2 | 11.5 |
| Health Associate Professionals | 10.0 | 22.2 | -1.0 | 23.2 | 41.8 | -1.4 |
| Science & Engineering Associate Professionals | 13.7 | 4.1 | 9.1 | 55.6 | 10.6 | 21.5 |
| Other Associate Professionals | 18.9 | 17.4 | 2.4 | 56.2 | 33.1 | 3.4 |
| Clerical | 32.8 | 40.8 | -5.9 | 18.4 | 19.4 | -2.4 |
| Skilled Building Workers | 32.9 | 22.5 | -13.6 | 118.4 | 37.0 | -16.3 |
| Skilled Maintenance Workers | 13.4 | 9.6 | -12.9 | 25.3 | 14.5 | -17.0 |
| Other Skilled Manual | 14.2 | 16.8 | -21.9 | 25.3 | 23.8 | -25.1 |
| Operatives | 48.2 | -40.6 | -19.8 | 43.4 | -25.5 | -16.7 |
| Transport Occupations | 21.7 | 17.8 | 0.4 | 39.5 | 23.3 | 0.4 |
| Sales Occupations | 33.4 | 42.7 | -6.7 | 33.7 | 32.2 | -3.8 |
| Caring Occupations | 12.9 | 44.0 | 0.0 | 47.8 | 110.1 | 0.0 |
| Other Service & Protective Activities | 17.9 | 25.7 | 8.4 | 22.7 | 26.5 | 6.8 |
| Unskilled Manual | -13.6 | 43.0 | -8.8 | -13.6 | 49.8 | -6.8 |
| Total | 356.4 | 376.4 | -77.3 | 27.5 | 22.8 | -3.8 |
| Professionals | 51.8 | 79.8 | 22.1 | 37.7 | 42.2 | 8.2 |
| Associate Professionals | 42.7 | 43.7 | 10.5 | 42.1 | 30.3 | 5.6 |
| Non-Professionals (Excl. Managers/Agricultural Occupations) | 213.7 | 222.3 | -80.8 | 27.2 | 22.2 | -6.6 |

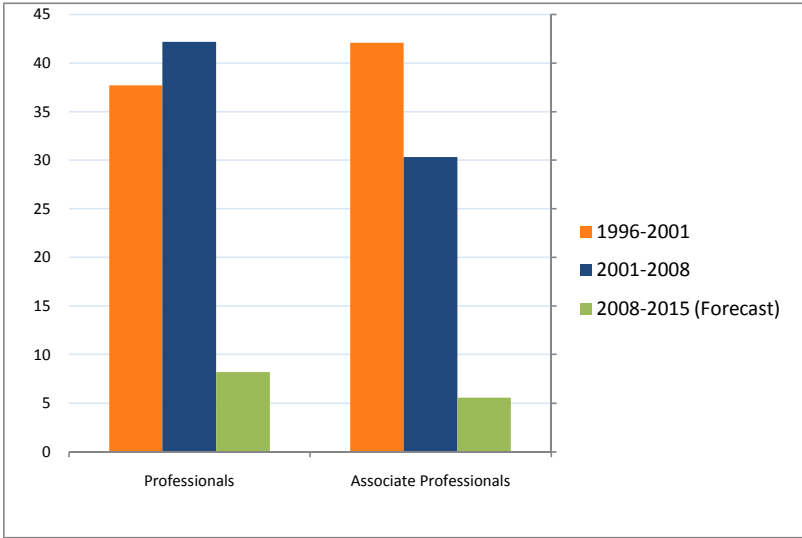
The pace of strong employment growth observed previously for the science and engineering and business professionals has also been adversely affected by the downturn. However, employment is

expected to grow strongly during the recovery and exceed the levels recorded in 2008 by the end of the forecasting period.

The number of health and care workers increased significantly during the two preceding periods. The number is forecast to remain relatively unchanged by the end of the forecasting period, primarily due to uncertainty regarding the amount of public spending on healthcare and education in the coming years and prioritisation in terms of the skill mix.

Although employment growth in professional and associate professional occupations is expected to be significantly lower compared with the preceding periods (Figure 4.2), a positive employment change between 2008 and 2015 indicates that these occupational groups are, unlike many lower skilled ones, expected to fully recover after the recession and even reach employment levels higher than those recorded at the peak. As a result of the recession, employment levels in these occupations are likely to be lower than the levels which would have been observed in 2015 had the growth followed the pre-recession trajectory. The overall growth rate is dampened by the job losses projected for the first part of the forecasting period.

Figure 4.2: Employment Growth: Professional and Associate Professional Occupations (%)



Due to the variation in employment growth rates, the occupational composition of employment has been changing. This is presented in Table 4.3. Some compositional shifts observed in the preceding periods are forecast to continue out to 2015, such as the increase in the share of managers, professionals (science, engineering and business) and associate professionals and the decline in the share of proprietors, agricultural and skilled manual workers. Skilled building workers are expected to lose some of the share gained during the boom years.

Table 4.3: Distribution of Employment by Occupation (%), 1996-2015

| Occupational Group | 1996 | 2001 | 2008 | 2015 |
|---|--------------|--------------|--------------|--------------|
| Agricultural Occupations | 8.9 | 6.4 | 5.2 | 4.0 |
| Managers | 9.0 | 9.9 | 10.5 | 11.2 |
| Proprietors | 3.2 | 3.1 | 1.6 | 1.3 |
| Health & Education Professionals | 5.8 | 5.1 | 5.3 | 5.5 |
| Science & Engineering Professionals | 1.8 | 2.7 | 3.0 | 3.7 |
| Business, Legal & Other Professionals | 3.0 | 3.7 | 4.9 | 5.7 |
| Health Associate Professionals | 3.3 | 3.2 | 3.7 | 3.8 |
| Science & Engineering Associate Professionals | 1.9 | 2.3 | 2.1 | 2.6 |
| Other Associate Professionals | 2.6 | 3.2 | 3.5 | 3.7 |
| Clerical | 13.7 | 12.7 | 12.4 | 12.6 |
| Skilled Building Workers | 2.1 | 3.7 | 4.1 | 3.6 |
| Skilled Maintenance Workers | 4.1 | 4.0 | 3.7 | 3.2 |
| Other Skilled Manual | 4.3 | 4.3 | 4.3 | 3.3 |
| Operatives | 8.6 | 9.6 | 5.8 | 5.1 |
| Transport Occupations | 4.2 | 4.6 | 4.6 | 4.9 |
| Sales Occupations | 7.6 | 8.0 | 8.6 | 8.6 |
| Caring Occupations | 2.1 | 2.4 | 4.1 | 4.3 |
| Other Service & Protective Activities | 6.1 | 5.9 | 6.0 | 6.7 |
| Unskilled Manual | 7.7 | 5.2 | 6.4 | 6.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Combined managers, professionals and associate professionals are expected to account for 36% of the total employment in 2015 compared to 27% in 1996. When combined with clerical, the forecasts suggest that almost one in two jobs in 2015 will be in these occupational categories.

Employment Forecasts by Detailed Occupation

Table 4.4 outlines historical data on employment by occupation covering three historical points, the projections for 2015, and the employment change in absolute and relative terms. The analysis of the drivers of change in each occupation is covered in Section 5 of the report.

Although an employment decline of 77,000 is projected over the period 2008-2015, the experiences of individual occupations will vary. While employment in virtually all occupations is expected to contract in the short term, beyond 2010 all will resume at least some level of growth. The extent to which they recover relative to the 2008 peak is given in the fifth column of Table 4.4. Occupations for which a positive employment change is reported are those which are expected to fully recover and for which employment is expected to exceed that recorded in 2008. Those for which the change in employment is close to zero are expected to fully recover by 2015, while those with a negative employment change are projected not to recover by the end of the forecasting period.

Table 4.4: Employment by 43 Detailed Occupations

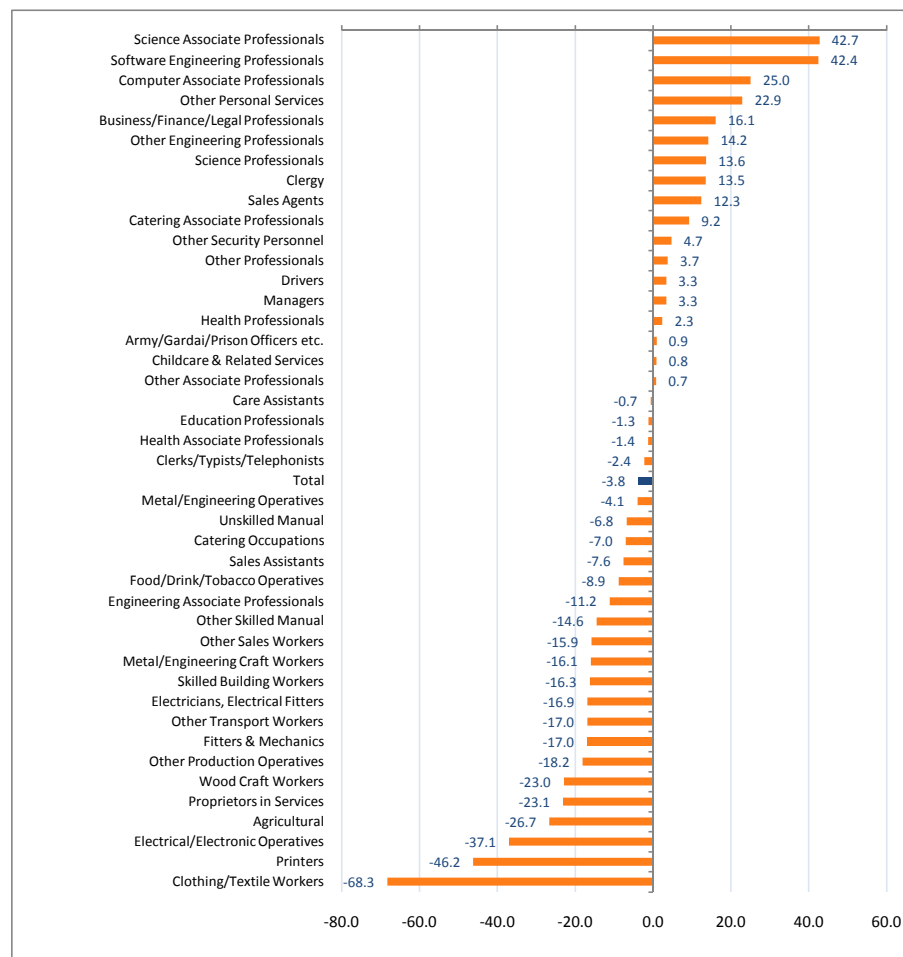
| | 1996 | 2001 | 2008 | 2015 | Change 2008-2015 | |
|--------------------------------------|---------|---------|---------|---------|------------------|-------|
| | | 000s | | | 000s | % |
| Agricultural | 115.0 | 105.5 | 106.5 | 78.1 | -28.5 | -26.7 |
| Managers | 116.8 | 164.5 | 212.4 | 219.4 | 7.0 | 3.3 |
| Proprietors in Services | 41.0 | 51.0 | 32.6 | 25.1 | -7.6 | -23.1 |
| Health Professionals | 9.9 | 11.9 | 15.2 | 15.6 | 0.4 | 2.3 |
| Education Professionals | 61.0 | 68.0 | 90.0 | 88.9 | -1.2 | -1.3 |
| Clergy | 4.5 | 3.7 | 2.5 | 2.8 | 0.3 | 13.5 |
| Science Professionals | 4.0 | 6.8 | 8.7 | 9.9 | 1.2 | 13.6 |
| Software Engineering Professionals | 3.3 | 8.0 | 8.3 | 11.8 | 3.5 | 42.4 |
| Other Engineering Professionals | 15.7 | 29.9 | 44.3 | 50.5 | 6.3 | 14.2 |
| Business/Finance/Legal Professionals | 25.6 | 39.5 | 63.5 | 73.7 | 10.2 | 16.1 |
| Other Professionals | 13.4 | 21.5 | 36.7 | 38.1 | 1.4 | 3.7 |
| Health Associate Professionals | 43.0 | 53.0 | 75.2 | 74.2 | -1.0 | -1.4 |
| Science Associate Professionals | 7.5 | 11.3 | 15.5 | 22.1 | 6.6 | 42.7 |
| Computer Associate Professionals | 7.8 | 14.0 | 15.4 | 19.2 | 3.8 | 25.0 |
| Engineering Associate Professionals | 9.4 | 13.1 | 11.6 | 10.3 | -1.3 | -11.2 |
| Catering Associate Professionals | 11.7 | 17.4 | 21.7 | 23.7 | 2.0 | 9.2 |
| Other Associate Professionals | 22.0 | 35.2 | 48.4 | 48.7 | 0.4 | 0.7 |
| Clerks/Typists/Telephonists | 177.7 | 210.5 | 251.3 | 245.4 | -5.9 | -2.4 |
| Skilled Building Workers | 27.8 | 60.7 | 83.1 | 69.6 | -13.6 | -16.3 |
| Electricians, Electrical Fitters | 18.5 | 28.6 | 36.6 | 30.4 | -6.2 | -16.9 |
| Fitters & Mechanics | 34.4 | 37.6 | 39.2 | 32.5 | -6.7 | -17.0 |
| Metal/Engineering Craft Workers | 12.1 | 17.7 | 25.2 | 21.1 | -4.0 | -16.1 |
| Wood Craft Workers | 19.2 | 32.9 | 45.0 | 34.7 | -10.3 | -23.0 |
| Clothing/Textile Workers | 11.0 | 7.0 | 4.7 | 1.5 | -3.2 | -68.3 |
| Printers | 8.9 | 8.0 | 7.9 | 4.2 | -3.6 | -46.2 |
| Other Skilled Workers | 5.0 | 4.8 | 4.3 | 3.7 | -0.6 | -14.6 |
| Electrical/Electronic Operatives | 15.4 | 27.3 | 12.9 | 8.1 | -4.8 | -37.1 |
| Metal/Engineering Operatives | 14.7 | 15.8 | 14.5 | 13.9 | -0.6 | -4.1 |
| Food/Drink/Tobacco Operatives | 23.6 | 26.8 | 22.9 | 20.9 | -2.0 | -8.9 |
| Other Production Operatives | 57.4 | 89.3 | 68.4 | 55.9 | -12.4 | -18.2 |
| Drivers | 40.5 | 60.9 | 80.9 | 83.6 | 2.7 | 3.3 |
| Other Transport Workers | 14.4 | 15.6 | 13.4 | 11.1 | -2.3 | -17.0 |
| Sales Agents | 27.7 | 33.1 | 38.0 | 42.7 | 4.7 | 12.3 |
| Sales Assistants | 63.2 | 88.3 | 126.5 | 116.9 | -9.6 | -7.6 |
| Other Sales Workers | 8.3 | 11.2 | 10.7 | 9.0 | -1.7 | -15.9 |
| Childcare & Related Services | 9.8 | 13.7 | 36.5 | 36.8 | 0.3 | 0.8 |
| Care Assistants | 17.2 | 26.3 | 47.4 | 47.1 | -0.3 | -0.7 |
| Army/Gardai/Prison Officers etc. | 22.1 | 20.9 | 23.6 | 23.8 | 0.2 | 0.9 |
| Other Security Personnel | 14.5 | 17.6 | 23.3 | 24.4 | 1.1 | 4.7 |
| Catering Occupations | 16.8 | 22.4 | 30.9 | 28.7 | -2.2 | -7.0 |
| Other Personal Services | 15.3 | 24.7 | 34.2 | 42.1 | 7.8 | 22.9 |
| Occupation Unstated | 10.3 | 11.3 | 10.6 | 12.0 | 1.4 | 13.5 |
| Unskilled Manual | 99.8 | 86.2 | 129.2 | 120.4 | -8.8 | -6.8 |
| Total | 1,297.2 | 1,653.5 | 2,029.9 | 1,952.7 | -77.3 | -3.8 |

The greatest absolute net employment gains for the forthcoming seven-year period are expected for business professionals, providers of personal services, managers, engineering professionals and science associate professionals, sales agents, IT professionals and associate professionals - each reaching an employment level which is at least 3,000 greater than the 2008 peak by 2015. Those expected to result in employment levels lower than the peak include agricultural workers (down by 28,000), skilled building workers (down by 14,000), operatives (clothing, production, wood, electrical), unskilled manual, proprietors, clerks and sales assistants.

The occupational distribution of employment in 2015 is not projected to vary significantly from the preceding years. For instance, clerks are expected to continue to account for more than 10% of the total national employment. One in ten is expected to be employed as a manager; more than 5% to be sales assistants; 5% to be unskilled manual workers. Nonetheless, when compared to 1996, some shifts are expected to occur. The contraction in employment share is expected to be most pronounced for agricultural workers (5 percentage points lower); clerks, operatives and unskilled manual, 2 percentage points each. The greatest share gains relative to 1996 are expected for managers and business professionals (2 percentage points each).

Figure 4.3 shows the distribution of net employment gains/losses in relative terms. The highest gains are expected in professional and associate professional occupations in the areas of science, business and IT. The greatest declines are expected for operatives and skilled manual workers. Occupations forecast to remain relatively unchanged compared to 2008 are mostly those associated with the public sector (health, education and public administration - for which employment is set to remain unchanged beyond 2009 following some net gains in 2009, as mentioned previously).

Figure 4.3: Change in Employment (%) by 43 Occupations, 2008-2015



Section 5: Drivers of Employment Growth (Shift-Share Analysis)

Tables 5.1 and 5.2 present the shift-share analysis for the 19 broad occupational groups for the period 2001-2008 and 2008-2015 respectively. During the period 2001-2008, total employment increased by 376,000 or by 22.8%. Although broad occupational groups did not grow uniformly in line with this rate, all (with the exception of proprietors and operatives) ended with a higher employment level at the end of the period, although the actual change was a combination of the scale, industry and occupational effect which varied across occupational groups.

Table 5.1: Shift-Share Analysis of Employment Growth by 19 Occupations, 2001-2008

| | Scale | | Industry | | Occupation | | Residual | | Total | |
|---------------------------------------|--------------|------------|----------|----------|------------|----------|----------|----------|--------------|------------|
| | 000s | % | 000s | % | 000s | % | 000s | % | 000s | % |
| Agricultural Occupations | 24.0 | 23% | -20.5 | -19% | -1.8 | -2% | -0.6 | -1% | 1.1 | 1% |
| Managers | 37.4 | 23% | -2.3 | -1% | 12.5 | 8% | 0.3 | 0% | 47.9 | 29% |
| Proprietors | 11.6 | 23% | 0.4 | 1% | -24.7 | -48% | -5.6 | -11% | -18.4 | -36% |
| Health & Education Professionals | 19.0 | 23% | 12.7 | 15% | -5.4 | -6% | -2.2 | -3% | 24.1 | 29% |
| Science & Engineering Professionals | 10.2 | 23% | -1.6 | -3% | 7.6 | 17% | 0.3 | 1% | 16.5 | 37% |
| Business, Legal & Other Professionals | 13.9 | 23% | 4.3 | 7% | 15.9 | 26% | 5.1 | 8% | 39.2 | 64% |
| Health Associate Professionals | 12.1 | 23% | 15.9 | 30% | -3.3 | -6% | -2.5 | -5% | 22.2 | 42% |
| Science & Engineering Associate Prof | 8.7 | 23% | -1.4 | -4% | -1.9 | -5% | -1.3 | -4% | 4.1 | 11% |
| Other Associate Professionals | 12.0 | 23% | 4.2 | 8% | 1.6 | 3% | -0.4 | -1% | 17.4 | 33% |
| Clerical | 47.9 | 23% | 6.5 | 3% | -11.0 | -5% | -2.6 | -1% | 40.8 | 19% |
| Skilled Building Workers | 13.8 | 23% | 9.6 | 16% | 0.6 | 1% | -1.6 | -3% | 22.5 | 37% |
| Skilled Maintenance Workers | 15.1 | 23% | -4.6 | -7% | -1.4 | -2% | 0.5 | 1% | 9.6 | 14% |
| Other Skilled Manual | 16.0 | 23% | -3.4 | -5% | 3.6 | 5% | 0.5 | 1% | 16.8 | 24% |
| Operatives | 36.3 | 23% | -35.2 | -22% | -44.3 | -28% | 2.6 | 2% | -40.6 | -25% |
| Transport Occupations | 17.4 | 23% | -8.8 | -11% | 8.6 | 11% | 0.6 | 1% | 17.8 | 23% |
| Sales Occupations | 30.2 | 23% | 3.0 | 2% | 7.2 | 5% | 2.3 | 2% | 42.7 | 32% |
| Caring Occupations | 9.1 | 23% | 10.3 | 26% | 17.4 | 44% | 7.2 | 18% | 44.0 | 110% |
| Other Service & Protective Activities | 22.1 | 23% | 5.9 | 6% | -1.5 | -2% | -0.7 | -1% | 25.7 | 27% |
| Unskilled Manual | 19.6 | 23% | 4.9 | 6% | 20.1 | 23% | -1.6 | -2% | 43.0 | 50% |
| Total | 376.4 | 23% | 0 | 0 | 0 | 0 | 0 | 0 | 376.4 | 23% |

Compared to the previous seven years, the medium term occupational forecasts are much less positive. The employment level in 2015 is expected to be lower than in 2008 by 77,000 or 3.8%. If all sectors declined by the same rate and there were no changes in the occupational distribution of the sectors, the change in employment would be equivalent to the scale effect (the second column in Table 5.2). In this case, the decline in employment would not exceed 10,000 in any of the occupational groups.

However, differences in the performance across sectors are expected, which will impact on the employment change in the occupational groups, depending on their prevalence in a particular sector. A negative industry effect is expected for occupational groups predominantly employed in agriculture (agricultural occupations), construction (e.g. skilled building workers) and traditional

manufacturing (e.g. operatives). This is because these sectors are expected to perform worse than the overall economy. A positive industry effect is expected for occupational groups predominantly employed in the high tech manufacturing (e.g. science and engineering professionals) and services sectors (e.g. business professionals, clerks, service workers).

The occupational effect shows the gain/loss for an occupation arising from changes in the occupational distribution within a sector. For instance, due to increases in automation and computerisation, the share of clerks in most sectors has been declining over time. This has been creating a negative occupational effect in this occupational group, so that in the period 2001-2008 11,000 clerical posts were lost (although many were created through the scale and industry effects, leading to employment growth on balance); similarly, a net loss due to the occupational effect of 9,000 is estimated by 2015.

Table 5.2: Shift-Share Analysis of Forecast Employment Growth, 2008-2015

| | Scale | | Industry | | Occupation | | Residual | | Total | |
|---------------------------------------|--------------|--------------|------------|----------|------------|----------|------------|----------|--------------|-------------|
| | 000s | % | 000s | % | 000s | % | 000s | % | 000s | % |
| Agricultural Occupations | -4.1 | -3.8% | -20.2 | -19% | -4.9 | -5% | 0.7 | 0.6% | -28.5 | -26.7 |
| Managers | -8.1 | -3.8% | 6.5 | 3% | 9.3 | 4% | -0.7 | -0.3% | 7.0 | 3.3 |
| Proprietors | -1.2 | -3.8% | -0.1 | 0% | -6.4 | -20% | 0.2 | 0.6% | -7.6 | -23.1 |
| Health & Education Professionals | -4.1 | -3.8% | 1.6 | 2% | 1.8 | 2% | 0.2 | 0.2% | -0.5 | -0.4 |
| Science & Engineering Professionals | -2.3 | -3.8% | 4.2 | 7% | 9.1 | 15% | 0.1 | 0.1% | 11.0 | 17.9 |
| Business, Legal & Other Professionals | -3.8 | -3.8% | 13.2 | 13% | 2.8 | 3% | -0.6 | -0.6% | 11.6 | 11.5 |
| Health Associate Professionals | -2.9 | -3.8% | 0.8 | 1% | 1.1 | 1% | 0.0 | 0.0% | -1.0 | -1.4 |
| Science & Engineering Associate Prof | -1.6 | -3.8% | 3.9 | 9% | 6.4 | 15% | 0.5 | 1.2% | 9.1 | 21.5 |
| Other Associate Professionals | -2.7 | -3.8% | 3.7 | 5% | 1.9 | 3% | -0.6 | -0.8% | 2.4 | 3.4 |
| Clerical | -9.6 | -3.8% | 15.1 | 6% | -9.1 | -4% | -2.3 | -0.9% | -5.9 | -2.4 |
| Skilled Building Workers | -3.2 | -3.8% | -15.1 | -18% | 5.7 | 7% | -1.0 | -1.2% | -13.6 | -16.3 |
| Skilled Maintenance Workers | -2.9 | -3.8% | -4.9 | -6% | -5.2 | -7% | 0.1 | 0.1% | -12.9 | -17.0 |
| Other Skilled Manual | -3.3 | -3.8% | -18.6 | -21% | -1.0 | -1% | 1.0 | 1.2% | -21.9 | -25.1 |
| Operatives | -4.5 | -3.8% | -2.3 | -2% | -14.3 | -12% | 1.3 | 1.1% | -19.8 | -16.7 |
| Transport Occupations | -3.6 | -3.8% | 4.3 | 5% | 0.8 | 1% | -1.1 | -1.1% | 0.4 | 0.4 |
| Sales Occupations | -6.7 | -3.8% | -1.5 | -1% | 1.5 | 1% | 0.0 | 0.0% | -6.7 | -3.8 |
| Caring Occupations | -3.2 | -3.8% | 2.1 | 3% | 1.0 | 1% | 0.1 | 0.1% | 0.0 | 0.0 |
| Other Service & Protective Activities | -4.7 | -3.8% | 10.3 | 8% | 2.6 | 2% | 0.1 | 0.1% | 8.4 | 6.8 |
| Unskilled Manual | -4.9 | -3.8% | -3.2 | -2% | -2.7 | -2% | 2.1 | 1.6% | -8.8 | -6.8 |
| Total | -77.3 | -3.8% | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | -77.3 | -3.8 |

The shift share analysis for detailed occupations for the period 2001-2008 and 2008-2015 is presented in Tables 5.3 and 5.4.

Table 5.3: Shift-Share Analysis of Employment Growth by 43 Detailed Occupations, 2001-2008

| | Scale | | Industry | | Occupation | | Residual | | Total | |
|--------------------------------------|-------|------|----------|-------|------------|-------|----------|-------|-------|-------|
| | 000s | % | 000s | % | 000s | % | 000s | % | 000s | % |
| Agricultural | 24.0 | 22.8 | -20.5 | -19.5 | -1.8 | -1.7 | -0.6 | -0.6 | 1.1 | 1.0 |
| Managers | 37.4 | 22.8 | -2.3 | -1.4 | 12.5 | 7.6 | 0.3 | 0.2 | 47.9 | 29.1 |
| Proprietors in Services | 11.6 | 22.8 | 0.4 | 0.7 | -24.7 | -48.4 | -5.7 | -11.1 | -18.4 | -36.0 |
| Health Professionals | 2.7 | 22.8 | 2.9 | 24.5 | -1.4 | -11.8 | -0.9 | -7.9 | 3.3 | 27.6 |
| Education Professionals | 15.5 | 22.8 | 9.6 | 14.1 | -2.3 | -3.4 | -0.7 | -1.1 | 22.0 | 32.3 |
| Clergy | 0.8 | 22.8 | 0.2 | 4.9 | -1.7 | -45.4 | -0.5 | -14.4 | -1.2 | -32.1 |
| Science Professionals | 1.6 | 22.8 | 0.3 | 3.7 | 0.3 | 4.7 | -0.3 | -4.0 | 1.9 | 27.2 |
| Software Engineering Professionals | 1.8 | 22.8 | 0.1 | 1.9 | -1.1 | -14.4 | -0.5 | -6.2 | 0.3 | 4.0 |
| Other Engineering Professionals | 6.8 | 22.8 | -2.0 | -6.6 | 8.5 | 28.3 | 1.1 | 3.5 | 14.4 | 48.1 |
| Business/Finance/Legal Professionals | 9.0 | 22.8 | 2.8 | 7.1 | 9.7 | 24.6 | 2.5 | 6.3 | 24.0 | 60.8 |
| Other Professionals | 4.9 | 22.8 | 1.5 | 7.0 | 6.2 | 29.0 | 2.5 | 11.8 | 15.2 | 70.5 |
| Health Associate Professionals | 12.1 | 22.8 | 15.9 | 29.9 | -3.3 | -6.3 | -2.4 | -4.6 | 22.2 | 41.8 |
| Science Associate Professionals | 2.6 | 22.8 | -0.8 | -7.3 | 3.2 | 28.1 | -0.8 | -7.1 | 4.1 | 36.4 |
| Computer Associate Professionals | 3.2 | 22.8 | 0.4 | 2.9 | -1.6 | -11.4 | -0.6 | -4.1 | 1.4 | 10.1 |
| Engineering Associate Professionals | 3.0 | 22.8 | -1.0 | -7.6 | -3.5 | -26.3 | 0.0 | 0.0 | -1.5 | -11.2 |
| Catering Associate Professionals | 4.0 | 22.8 | 1.1 | 6.3 | -0.5 | -3.0 | -0.3 | -1.5 | 4.3 | 24.6 |
| Other Associate Professionals | 8.0 | 22.8 | 3.1 | 8.9 | 2.1 | 6.0 | -0.1 | -0.3 | 13.2 | 37.3 |
| Clerks/Typists/Telephonists | 47.9 | 22.8 | 6.5 | 3.1 | -11.0 | -5.2 | -2.6 | -1.3 | 40.8 | 19.4 |
| Skilled Building Workers | 13.8 | 22.8 | 9.6 | 15.8 | 0.6 | 1.0 | -1.6 | -2.6 | 22.5 | 37.0 |
| Electricians, Electrical Fitters | 6.5 | 22.8 | 0.0 | 0.0 | 1.3 | 4.5 | 0.3 | 0.9 | 8.0 | 28.1 |
| Fitters & Mechanics | 8.6 | 22.8 | -4.6 | -12.2 | -2.7 | -7.1 | 0.3 | 0.7 | 1.6 | 4.1 |
| Metal/Engineering Craft Workers | 4.0 | 22.8 | 0.8 | 4.5 | 2.3 | 13.2 | 0.3 | 1.9 | 7.5 | 42.4 |
| Wood Craft Workers | 7.5 | 22.8 | 2.2 | 6.7 | 2.1 | 6.3 | 0.4 | 1.2 | 12.2 | 37.0 |
| Clothing/Textile Workers | 1.6 | 22.8 | -3.3 | -46.5 | -0.8 | -11.3 | 0.2 | 2.3 | -2.3 | -32.7 |
| Printers | 1.8 | 22.8 | -2.2 | -27.9 | 0.3 | 4.2 | -0.1 | -0.8 | -0.1 | -1.7 |
| Other Skilled Workers | 1.1 | 22.8 | -0.9 | -18.6 | -0.4 | -7.6 | -0.3 | -5.8 | -0.4 | -9.2 |
| Electrical/Electronic Operatives | 6.2 | 22.8 | -8.3 | -30.5 | -13.5 | -49.4 | 1.2 | 4.4 | -14.4 | -52.8 |
| Metal/Engineering Operatives | 3.6 | 22.8 | -3.5 | -22.3 | -2.0 | -12.9 | 0.7 | 4.3 | -1.3 | -8.1 |
| Food/Drink/Tobacco Operatives | 6.1 | 22.8 | -5.6 | -20.9 | -3.7 | -13.8 | -0.7 | -2.7 | -3.9 | -14.6 |
| Other Production Operatives | 20.3 | 22.8 | -17.7 | -19.8 | -25.1 | -28.1 | 1.4 | 1.6 | -21.0 | -23.5 |
| Drivers | 13.9 | 22.8 | -6.5 | -10.7 | 11.7 | 19.1 | 1.0 | 1.7 | 20.0 | 32.9 |
| Other Transport Workers | 3.6 | 22.8 | -2.3 | -14.4 | -3.0 | -19.5 | -0.5 | -3.0 | -2.2 | -14.1 |
| Sales Agents | 7.5 | 22.8 | -0.5 | -1.6 | -1.9 | -5.7 | -0.2 | -0.7 | 4.9 | 14.7 |
| Sales Assistants | 20.1 | 22.8 | 3.7 | 4.2 | 11.4 | 12.9 | 3.2 | 3.6 | 38.3 | 43.4 |
| Other Sales Workers | 2.5 | 22.8 | -0.1 | -1.1 | -2.2 | -20.1 | -0.6 | -5.3 | -0.4 | -3.8 |
| Childcare & Related Services | 3.1 | 22.8 | 2.7 | 19.6 | 12.2 | 89.3 | 4.9 | 35.9 | 22.9 | 167.5 |
| Care Assistants | 6.0 | 22.8 | 7.7 | 29.2 | 5.2 | 19.9 | 2.2 | 8.5 | 21.1 | 80.3 |
| Army/Gardai/Prison Officers etc. | 4.8 | 22.8 | 1.7 | 7.9 | -2.8 | -13.6 | -0.9 | -4.1 | 2.7 | 13.0 |
| Other Security Personnel | 4.0 | 22.8 | 1.5 | 8.5 | 0.3 | 2.0 | -0.1 | -0.8 | 5.7 | 32.4 |
| Catering Occupations | 5.1 | 22.8 | 1.0 | 4.5 | 1.9 | 8.3 | 0.6 | 2.5 | 8.5 | 38.0 |
| Other Personal Services | 5.6 | 22.8 | 1.3 | 5.3 | 2.1 | 8.3 | 0.5 | 2.0 | 9.5 | 38.4 |
| Occupation Unstated | 2.6 | 22.8 | 0.4 | 3.7 | -2.9 | -25.7 | -0.8 | -7.1 | -0.7 | -6.3 |
| Unskilled Manual | 19.6 | 22.8 | 4.9 | 5.6 | 20.1 | 23.3 | -1.6 | -1.9 | 43.0 | 49.8 |
| Total | 376.4 | 22.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 376.4 | 22.8 |

Agricultural Workers

The number of agricultural workers is expected to decline by almost 30,000 over the forecasting period. In fact, this occupation is expected to be one of the very few not to resume recovery beyond 2010.

If employment in agricultural occupations were to contract in line with the overall employment decline of 3.8%, the number of agricultural workers would decline by 4,100 by the year 2015. However, because employment in the agricultural sector, where more than 80% of agricultural workers are employed, is expected to contract more sharply than that in the overall economy, the decline is expected to be greater by an additional 20,000. This is in line with the industry effect observed in the previous seven-year period.

In addition, due to technological and other changes, the share of agricultural workers in all sectors is expected to decline relative to other occupations, adding 4,900 to the loss. Hence, the combined effect of these changes is a net employment decline of almost 30,000 over the period 2008-2015.

Managers

The number of managers - which includes higher managers such as financial, marketing or bank managers, senior civil servants and other managers such as stores or garage managers - almost doubled between 1996 and 2008 rising from 117,000 to 212,000. Employment in this occupational group is expected to grow strongly during the recovery period and to exceed the 2008 level by 7,000 by the year 2015.

Employment growth, which is expected to resume in 2011, is expected to be further enhanced by the above average growth projected for the high tech manufacturing and market services sectors (industry effect), where a significant number of managers are employed. In addition, managers are expected to continue to gain share in the occupational distribution of many sectors, which will add to employment growth through a positive occupational effect. For instance, in the retail, wholesale and hotel sectors the share of managers has been increasing, while the share of proprietors has been declining. This is likely to be a result of consolidation within these sectors, with some small businesses being replaced by large, in some cases multinational, chains (e.g. supermarkets).

Proprietors

The number of proprietors - which includes owners of pubs, garages, restaurants, B&Bs etc. - declined by almost 20,000 between 2001 and 2008. This trend is expected to continue so that by 2015 the number of proprietors is expected to be 25,000.

Proprietors are expected to suffer from all three employment drivers: the overall economic performance (negative scale effect), a greater than average decline in the retail and hotel sectors where almost 60% of proprietors have businesses (negative industry effect), and a loss of share in

the occupational distribution which mirrors the increase in the share of managers for the reasons outlined above (negative occupational effect).

Professionals

The number of employed scientists, engineers, business and IT professionals grew strongly in recent years, with employment in each category at least doubling between 1996 and 2008. The outlook for these occupations is positive as employment growth in these occupations during the recovery is expected to outpace the average, with employment levels expected to exceed those recorded in 2008 by 2015.

Although all professional occupations are expected to be negatively affected by the overall economic downturn, particularly in the short term, this negative effect is expected to be more than off-set by the positive industry effect. These occupations are typically employed in sectors which are expected to recover strongly beyond 2010: one in two scientists is employed either in the high tech sector (chemicals in particular) or market services (research and consultancy); almost three in four software engineers are employed in market services (IT consultancy and finance); three in four business professionals are employed in the market services sector (accountancy, finance, legal etc.). The least positive industry effect is expected for engineering professionals (mechanical/electronic/civil engineers, technologists, architects and surveyors) because a sizable share of them have been employed in the construction sector and construction related activities within the services sector (consultancy) which are expected not to recover to the levels recorded at the peak. The negative industry effect created by the downturn in the construction sector reduces the positive effect of the strong recovery in other sectors (high tech manufacturing and services (research and consultancy)) where these occupations are employed.

The occupational effect for professionals is expected to be positive, which is broadly in line with the preceding seven-year period. Due to the move up the value chain in relation to the type of goods and services produced in most sectors which employ professionals, the share of professionals has been increasing relative to lower skilled occupations. For instance, there has been an expansion in R&D, quality control, testing and prototyping activities in the high tech manufacturing sector. Similarly, there has been an expansion in areas which require expertise in the area of regulation, HR, project management, marketing, risk etc. in the business and finance sector. As the entire economy becomes ICT enabled, the implementation, development and maintenance of IT systems is becoming a growing part of all economic sectors, with the share of IT professionals increasing in each sector. This trend is expected to continue into the future and add to the employment growth in these occupations by increasing their share in the overall sector employment growth. Loose labour market conditions are also likely to contribute to the greater share of professionals in these sectors as employers are expected to have higher skilled candidates available for recruitment in general so that jobs created after the recession are likely to be filled with higher skilled candidates relative to the boom period.

There are several occupations for which the occupational effect observed for the period 2001-2008 differs in its direction to that forecast for the period 2008-2015 (e.g. software professionals, computer associate professionals, health associate professionals). First, the projections of the occupational shares are based on a time series which includes observations before 2001 (i.e. the period 1998-2008), capturing a longer trend than that implied in the 2001-2008 change. Second, historical points used in the shift-share analysis do not fall directly on the estimated trend line sometimes resulting in a counterintuitive result (e.g. the start point is below the trend line while the end point is above the trend line which suggests a positive occupational effect although the trend actually slopes downwards). Finally, some of the compositional changes observed in the period 2001-2008 are associated with the latter part of the boom period when the share of construction related occupations stood significantly above the long term trends. For instance, during 2001-2008 the share of IT professionals in business services declined relative to other engineering professionals including architects and civil engineers.¹⁵

Associate Professionals

The number of science and computer associate professionals, which includes laboratory technicians and computer programmers, doubled between 1996 and 2008. These occupations are expected to resume strong growth after recession. By 2015, there are expected to be 22,000 laboratory technician and 19,000 programmers employed in Ireland which exceeds levels recorded at the peak of the boom. Employment growth in these occupations is expected to be driven by factors similar to those driving employment growth for professional occupations in these fields.

The number of engineering associate professionals (engineering technicians, civil engineering technicians, draughtspersons, building inspectors and quantity surveyors) is expected to be lower in 2015 compared to 2008. The industry effect is flat because almost one in two engineering associate professionals is employed in the construction sector (either directly or through architectural, surveying etc. services) which is not expected to recover to the pre-recession levels of activity in the medium term. The occupational effect is also expected to be negative, as the share of technicians is expected to continue to decline compared to other occupations, particularly engineering professionals, to reflect a move to higher skilled activities within sectors employing engineering technicians (e.g. high tech manufacturing, construction etc.).

The number of catering associate professionals (chefs) doubled between 1996 and 2008 to 22,000 and is expected to further increase to just fewer than 24,000 by 2015. Employment is expected to be driven by the general economic performance and the performance of the hotel and restaurant sector where three quarters of chefs are employed. This sector is expected to move broadly in line with the overall economy creating a relatively neutral industry effect. A positive influence on employment is expected to come from an expected change in the occupational distribution of the

¹⁵ Following several years of strong growth, the number of IT professionals and associate professionals hovered at the 24,000 mark during the period 2002-2007 (broadly mirroring the employment path of the ICT sector as a whole); the lack of growth during this period is partly a consequence of the dotcom bubble burst and possibly an employment overhang from the surge in demand caused by the millennium bug and the introduction of the euro before the turn of the century; strong growth has resumed recently with employment for the two occupations combined in q2 2009 being 14% higher than in q2 2008 (derived by the SLMRU using the CSO QNHS data).

hotel and restaurant sector, which would include a rise in the share of qualified chefs compared to other lower skilled catering and other occupations.

Table 5.4: Shift-Share Analysis of Employment Growth, 2008-2015

| | Scale | | Industry | | Occupation | | Residual | | Total | |
|--------------------------------------|--------------|-------------|------------|------------|------------|------------|------------|------------|--------------|-------------|
| | 000s | % | 000s | % | 000s | % | 000s | % | 000s | % |
| Agricultural | -4.1 | -3.8 | -20.2 | -18.9 | -4.9 | -4.6 | 0.7 | 0.6 | -28.5 | -26.7 |
| Managers | -8.1 | -3.8 | 6.5 | 3.1 | 9.3 | 4.4 | -0.7 | -0.3 | 7.0 | 3.3 |
| Proprietors in Services | -1.2 | -3.8 | -0.1 | -0.4 | -6.4 | -19.5 | 0.2 | 0.6 | -7.6 | -23.1 |
| Health Professionals | -0.6 | -3.8 | 0.2 | 1.1 | 0.7 | 4.3 | 0.1 | 0.7 | 0.4 | 2.3 |
| Education Professionals | -3.4 | -3.8 | 1.0 | 1.1 | 1.1 | 1.2 | 0.1 | 0.2 | -1.2 | -1.3 |
| Clergy | -0.1 | -3.8 | 0.4 | 18.0 | 0.0 | 0.0 | 0.0 | -0.6 | 0.3 | 13.5 |
| Science Professionals | -0.3 | -3.8 | 1.0 | 11.2 | 0.3 | 3.7 | 0.2 | 2.5 | 1.2 | 13.6 |
| Software Engineering Professionals | -0.3 | -3.8 | 1.5 | 17.5 | 2.1 | 25.5 | 0.3 | 3.2 | 3.5 | 42.4 |
| Other Engineering Professionals | -1.7 | -3.8 | 1.8 | 4.0 | 6.6 | 14.9 | -0.4 | -0.9 | 6.3 | 14.2 |
| Business/Finance/Legal Professionals | -2.4 | -3.8 | 9.9 | 15.6 | 3.5 | 5.5 | -0.8 | -1.2 | 10.2 | 16.1 |
| Other Professionals | -1.4 | -3.8 | 3.3 | 9.1 | -0.7 | -2.0 | 0.1 | 0.4 | 1.4 | 3.7 |
| Health Associate Professionals | -2.9 | -3.8 | 0.8 | 1.1 | 1.1 | 1.4 | 0.0 | 0.0 | -1.0 | -1.4 |
| Science Associate Professionals | -0.6 | -3.8 | 1.5 | 9.7 | 5.4 | 34.7 | 0.3 | 2.1 | 6.6 | 42.7 |
| Computer Associate Professionals | -0.6 | -3.8 | 2.4 | 15.5 | 2.1 | 13.3 | 0.0 | 0.0 | 3.8 | 25.0 |
| Engineering Associate Professionals | -0.4 | -3.8 | 0.0 | 0.1 | -1.1 | -9.0 | 0.2 | 1.6 | -1.3 | -11.2 |
| Catering Associate Professionals | -0.8 | -3.8 | 0.2 | 0.8 | 2.8 | 12.9 | -0.2 | -0.7 | 2.0 | 9.2 |
| Other Associate Professionals | -1.8 | -3.8 | 3.5 | 7.3 | -0.9 | -1.9 | -0.4 | -0.8 | 0.4 | 0.7 |
| Clerks/Typists/Telephonists | -9.6 | -3.8 | 15.1 | 6.0 | -9.1 | -3.6 | -2.3 | -0.9 | -5.9 | -2.4 |
| Skilled Building Workers | -3.2 | -3.8 | -15.1 | -18.1 | 5.7 | 6.8 | -1.0 | -1.2 | -13.6 | -16.3 |
| Electricians, Electrical Fitters | -1.4 | -3.8 | -3.2 | -8.8 | -1.1 | -3.0 | -0.5 | -1.3 | -6.2 | -16.9 |
| Fitters & Mechanics | -1.5 | -3.8 | -1.7 | -4.3 | -4.1 | -10.4 | 0.6 | 1.5 | -6.7 | -17.0 |
| Metal/Engineering Craft Workers | -1.0 | -3.8 | -3.4 | -13.3 | 0.2 | 0.8 | 0.1 | 0.3 | -4.0 | -16.1 |
| Wood Craft Workers | -1.7 | -3.8 | -10.3 | -22.9 | 2.5 | 5.6 | -0.9 | -1.9 | -10.3 | -23.0 |
| Clothing/Textile Workers | -0.2 | -3.8 | -2.0 | -42.3 | -2.1 | -43.7 | 1.0 | 21.5 | -3.2 | -68.3 |
| Printers | -0.3 | -3.8 | -2.0 | -25.0 | -1.8 | -23.1 | 0.4 | 5.7 | -3.6 | -46.2 |
| Other Skilled Workers | -0.2 | -3.8 | -1.0 | -22.0 | 0.1 | 2.2 | 0.4 | 9.1 | -0.6 | -14.6 |
| Electrical/Electronic Operatives | -0.5 | -3.8 | 0.7 | 5.4 | -4.9 | -38.0 | -0.1 | -0.6 | -4.8 | -37.1 |
| Metal/Engineering Operatives | -0.6 | -3.8 | 0.4 | 2.4 | -0.2 | -1.3 | -0.2 | -1.4 | -0.6 | -4.1 |
| Food/Drink/Tobacco Operatives | -0.9 | -3.8 | -0.5 | -2.3 | -0.8 | -3.3 | 0.1 | 0.6 | -2.0 | -8.9 |
| Other Production Operatives | -2.6 | -3.8 | -2.8 | -4.1 | -8.5 | -12.4 | 1.4 | 2.1 | -12.4 | -18.2 |
| Drivers | -3.1 | -3.8 | 2.6 | 3.2 | 3.9 | 4.8 | -0.7 | -0.8 | 2.7 | 3.3 |
| Other Transport Workers | -0.5 | -3.8 | 1.7 | 13.0 | -3.1 | -23.3 | -0.4 | -2.9 | -2.3 | -17.0 |
| Sales Agents | -1.4 | -3.8 | 2.0 | 5.3 | 4.5 | 11.7 | -0.3 | -0.9 | 4.7 | 12.3 |
| Sales Assistants | -4.8 | -3.8 | -3.7 | -2.9 | -1.5 | -1.2 | 0.4 | 0.3 | -9.6 | -7.6 |
| Other Sales Workers | -0.4 | -3.8 | 0.2 | 2.1 | -1.5 | -13.5 | -0.1 | -0.7 | -1.7 | -15.9 |
| Childcare & Related Services | -1.4 | -3.8 | 1.2 | 3.2 | 0.4 | 1.0 | 0.1 | 0.4 | 0.3 | 0.8 |
| Care Assistants | -1.8 | -3.8 | 0.9 | 2.0 | 0.6 | 1.3 | -0.1 | -0.2 | -0.3 | -0.7 |
| Army/Gardai/Prison Officers etc. | -0.9 | -3.8 | 0.9 | 3.8 | 0.3 | 1.3 | -0.1 | -0.4 | 0.2 | 0.9 |
| Other Security Personnel | -0.9 | -3.8 | 2.4 | 10.1 | -0.4 | -1.8 | 0.0 | 0.1 | 1.1 | 4.7 |
| Catering Occupations | -1.2 | -3.8 | 0.0 | -0.2 | -1.1 | -3.5 | 0.1 | 0.4 | -2.2 | -7.0 |
| Other Personal Services | -1.3 | -3.8 | 5.7 | 16.6 | 3.2 | 9.4 | 0.2 | 0.7 | 7.8 | 22.9 |
| Occupation Unstated | -0.4 | -3.8 | 1.4 | 13.6 | 0.6 | 5.3 | -0.2 | -1.6 | 1.4 | 13.5 |
| Unskilled Manual | -4.9 | -3.8 | -3.2 | -2.5 | -2.7 | -2.1 | 2.1 | 1.6 | -8.8 | -6.8 |
| Total | -77.3 | -3.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -77.3 | -3.8 |

Education, Health and Care Occupations

The number of education professionals (teachers, lecturers etc.), health professionals (doctors, dentists, pharmacists) and care workers (childcare workers, care assistants) increased significantly between 1996 and 2008, with the number of care workers increasing threefold and the number of childcare workers quadrupling over that period.

A significant majority (at least three quarters) of employment in each of these occupations is located in the health and education sectors, which are heavily dependant on public sector spending. Given the severity of the current crisis and the uncertainty regarding the availability of public funds for health, education and care, it was difficult to predict employment in these occupations.

Following an increase in 2009, employment is expected to contract somewhat in 2010, but is kept flat afterward. This leads to a small positive industry effect for most occupations arising from the expected growth in other sectors where these occupations are employed (e.g. some pharmacists and health professionals are employed in the chemicals and medical devices sectors, 15% of childcare workers are employed in the services sector - private crèches).

The fashion in which the funds allocated for health, education and care will be prioritised in terms of sectoral skill mix is unknown. For that reason, one could not confidently assume that past trends (which among other things included a significant increase in the share of care and childcare workers compared to other occupations in the health and education sectors) will continue into the future. Instead, it is assumed that no significant shifts in the occupational distribution in these sectors will occur resulting in a broadly neutral occupational effect for these occupations.

Clerical

The number of clerks increased from 178,000 in 1996 to 250,000 in 2008, while in 2015 it is expected to be 245,000. At almost 10,000, the negative scale effect for clerks is particularly large reflecting the fact that, in employment terms, this is the largest occupational group. A third of clerical employment is concentrated in the business and financial sectors, which are anticipated to grow strongly after recession, leading to the positive industry effect. However, the occupational effect for clerks is expected to continue to be negative as process automation and information technology replace some clerical tasks and clerks lose their share in the sectoral skill mixes. This trend was observed prior to the recession and is expected to continue over the medium term across virtually all sectors, preventing a full recovery in this occupational group by 2015.

Skilled Building Workers¹⁶

The number of skilled building workers increased from under 30,000 in 1996 to over 80,000 in 2008. This growth was primarily driven by the construction sector boom, given that over 80% of skilled building workers are employed in this sector.

¹⁶ Carpenters are not included in this occupational group

Over the medium term, the construction sector is not expected to recover to the levels recorded at the peak of the boom and employment in 2015 is expected to be a quarter lower than in 2008. As a result, the industry effect for skilled building workers is negative and in absolute terms the second greatest (after agricultural) compared to other occupations.

The negative impact of scale and industry factors are expected to be somewhat offset by the gains through the occupational effect. The skill mix of the construction sector is expected to change in favour of qualified craftspersons (skilled building workers), with their share increasing relative to lower skilled or unskilled building workers.

Skilled Maintenance Workers

The number of electricians doubled between 1996 and 2008 to 37,000. Employment levels in this occupation are not expected to recover to the 2008 level in the medium term. This is because one in two electricians in 2008 was employed in the construction sector, which is expected to fare worse than most other sectors over the coming seven years. Growth in communications, business and high tech manufacturing, which also employ electricians, will not be sufficient to offset this decline, leading to a negative industry effect on balance. In addition, a negative impact on employment is expected to result from a decline in the share of electricians in the skill mix within the communications and business services (primarily IT services) sectors, as the share of engineering and software professionals increases.

The number of fitters (metal working production and maintenance fitters and motor mechanics) in 2008 was just under 40,000. Employment in this occupation is expected to be 6,000 lower by 2015. The industry effect is expected to be negative due to the anticipated lower than average performance in the motor vehicle and traditional manufacturing sectors which combined employ half of all mechanics and fitters. The strong recovery expected in high tech manufacturing, which employs one fifth of fitters, is unlikely to compensate fully for this decline. In addition, employment is expected to be negatively affected through the occupational effect: in high tech and traditional manufacturing, the share of skilled manual workers is expected to decline relative to the share of engineers; in the motor sector, the share of mechanics relative to the share of sales agents is expected to decline.

Other Skilled Manual

The employment of other skilled manual workers, who are predominantly employed in the construction sector (metal and wood manual workers (carpenters)) increased significantly during the boom years. Over the next seven years, employment in these occupations is expected to decline in the short term and to slowly recover beyond 2010, but fail to reach pre-recession levels by 2015. As the construction industry is expected to recover more slowly than most other sectors of the economy, the industry effect for these occupations is negative. Some gains are expected for

carpenters through the occupational effect, as the skill mix in the construction sector is expected to continue to change in favour of skilled craftspersons relative to operatives and unskilled workers.

The employment of skilled manual workers, who are predominantly employed in traditional manufacturing (textile workers, printers etc.), had been contracting prior to the recession due to the move of some manufacturing operations out of Ireland to lower cost locations. This trend is expected to continue into the future and this is reflected in the negative industry effect for these occupations. Operations remaining in Ireland are likely to be in the area of design and research and require a higher skill mix (professionals, associate professionals etc.), which is reflected in a negative occupational effect for medium and lower skilled occupations.

Operatives

Operatives are employed in all sectors of the economy, although predominantly concentrated in the manufacturing sector (electrical and metal), construction sector (metal) and food sector (food operatives). While high tech sector growth is expected to create a positive industry effect on employment, particularly after 2010, traditional manufacturing and construction will counteract it and the balance varies per occupation depending on its prevalence in a particular sector. Occupational effects for operatives are negative as most sectors are expected to exhibit a shift in relation to the skill mix, with the share of operatives decreasing relative to the share of professional (engineers) and associate professional (technicians) occupations. Employment for each operative category is expected to be lower in 2015 compared to 2008, even lower than the levels recorded in 1996.

Transport Occupations

The number of drivers doubled to 80,000 over the period 1996-2008. Although the number is expected to decline in the short term, by 2015 it is projected to recover and exceed the levels recorded in 2008. One in two drivers is employed in the transport sector. Although the expected performance of the construction and traditional manufacturing sectors will contribute negatively to the employment growth in this category, the transport sector is expected to recover somewhat faster than the overall economy and record net job gains by 2015. On balance, the industry effect for drivers is expected to be positive, although not sufficiently so as to offset the overall economy performance (scale effect). However, a positive occupational effect, resulting from an increase in the share of drivers particularly in the transport sector relative to other transport workers (e.g. signalmen, ticket collectors etc.) or clerks, is likely to add to the overall positive outlook in the medium term.

Sales Occupations

The number of sales agents (technical sales representatives, insurance agents, etc.) had been increasing over the period 1996-2008 and this trend is expected to continue beyond 2010. In 2015, at 43,000, employment is expected to be greater than the level recorded in 2008. Sales agents are employed across many sectors, mostly in the manufacturing and distribution sectors, as well as

business services (insurance agents). As the business sector, high tech manufacturing and wholesale are expected to recover strongly beyond 2010, the industry effect for sales agents is positive. In addition, an increase in the share of technical sales representatives in the wholesale and other sectors (e.g. services) compared to other sales occupations (e.g. street vendors, roundsmen/women etc.) is expected to create a positive occupational effect. On balance employment is expected to exceed 2008 level by 2015.

Sales assistants are primarily employed in the retail sector (70% of the total). Following the credit crunch, the retail sector is not expected to recover to the pre-recession level in the medium term. As a result, the industry effect for sales assistants is negative, as the recovery in the primary sector of employment for sales assistants lags behind the overall economy. In addition, within the retail sector, the share of sales assistants is expected to decline relative to other occupations (e.g. managers, sales agents) resulting in a negative occupation effect. Overall employment for sales assistants is not expected to recover to the pre-recession levels by 2015.

Other Services and Protective Activities

The number of security workers (security guards, watchmen etc.) is expected to recover to pre-recession levels by 2015 when it is expected to reach almost 25,000. Almost half of security workers are employed in the business sector which is expected to grow strongly beyond 2010 resulting in a positive industry effect for this occupation. Although the occupational effect on this occupation is slightly negative (possibly as a result of technological advances in security), the overall employment outlook for 2015 is positive.

The number of service workers (e.g. hairdressers, photographers, cleaners, etc.) increased significantly during the boom years reaching 34,000 in 2008. The employment outlook for this occupational group is positive as the service sector is expected to grow faster than average after the recession. In addition, the occupational effect is expected to be positive as the share of service workers within the service sector increases relative to some other occupations (e.g. clerks, construction related professionals etc.).

The impact of all employment drivers on the number of army, gardaí and prison officers is forecast as broadly neutral, in line with other public sector employment.

Unskilled Manual

Between 2001 and 2008, the number of unskilled workers increased by 43,000. Unskilled workers are employed in all sectors of the economy. On balance, the industry effect is positive, suggesting that the growth in the high tech manufacturing and service sectors will outweigh declines in agriculture, construction and traditional manufacturing. However, the occupational effect for unskilled workers is negative: as the skill mix changes in favour of high skilled workers (e.g. professionals and managers), the share of unskilled workers declines.

Interestingly, in some sectors (e.g. chemicals and retail) there appears to be a hollowing in the middle of the occupational distribution with the share of operatives, clerks and skilled manual decreasing, and the share of professional/associate professional and unskilled workers increasing. The polarisation of the skill mix is typically associated with:

- the skill-biased technological change¹⁷ which leads to the substitution of medium level skills by high level skills and
- the demand for low skilled manual workers who conduct operations which cannot be easily automated (e.g. cleaning).

On balance, the employment level of unskilled workers is not expected to recover to the level recorded in 2008 by 2015.

After the Recession

The recession is expected to bottom out in 2010, with growth resuming thereafter. Between 2010 and 2015 employment is expected to grow, with net job creation estimated at almost 250,000. In absolute terms, the greatest net job creation between the low point of 2010 and 2015 is expected for occupations which employ over 100,000 persons: managers, clerks, sales assistants and unskilled manual. In relative terms, the greatest gains are expected for craftspersons (skilled building workers, including carpenters) as they climb from the furthest dip, although still failing to reach pre-recession levels by 2015. Net job creation is also expected to be significantly above average for professionals/associate professionals (business, finance, software, engineering, science) and service providers (e.g. personal services, security, catering etc.). Occupations for which job losses are expected to exceed job creation even after the recession include agricultural workers and various types of operatives (e.g. food, textile, printers).

¹⁷ McGuinness, S., F. McGinnity and P.J. O'Connell. "Changing Returns to Education During a Boom? The Case of Ireland". LABOUR: Review of Labour Economics and Industrial Relations, 2009, Vol. 23, pp. 197-221.

Section 6: Occupational Employment Forecasts by Gender

This section provides an overview of the expected changes in the gender composition of employment over the period 2008-2015. Table 6.1 shows the past and expected future composition of total employment. Between 2001 and 2008, the share of females increased from 40% to 43% and this trend is expected to continue, resulting in a further 3 percentage point gain by 2015. This means that in absolute terms, the number of females in employment is expected to recover faster beyond 2010, and exceed its pre-recession level, while male employment is not expected to fully recover to the pre-recession level by 2015.

Table 6.1: Forecast Employment by Gender for 2015

| | 2001 | 2008 | 2015 |
|--------------------------|---------|---------|---------|
| Female employment (000s) | 662.7 | 878.2 | 900.2 |
| Female share (%) | 40.1 | 43.3 | 46.1 |
| Male employment (000s) | 991 | 1152 | 1,050.5 |
| Male share (%) | 59.9 | 56.7 | 53.9 |
| Total | 1,653.5 | 2,029.9 | 1,952.7 |

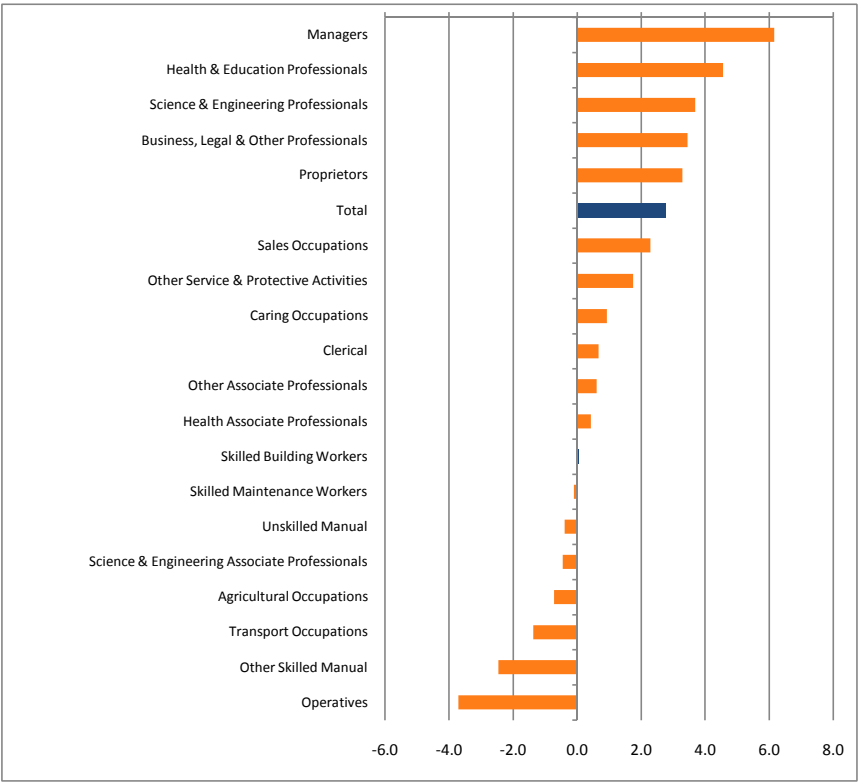
Table 6.2 shows the female employment share across broad occupational groups. Females have been predominant in health, education, care, clerical and sales occupations, with gains in shares observed in most occupations since 2001. The share of females is smallest amongst skilled building, maintenance and transport workers.

Table 6.2: Female Share of Employment, 2001-2015

| | 2001 | 2008 | 2015 | Change 2008-2015 (%-points) |
|---------------------------------------|------|------|------|-----------------------------------|
| | | % | | |
| Agricultural Occupations | 6.8 | 8.6 | 7.9 | -0.7 |
| Managers | 37.5 | 42.0 | 48.1 | 6.2 |
| Proprietors | 28.0 | 31.0 | 34.3 | 3.3 |
| Health & Education Professionals | 62.1 | 66.1 | 70.7 | 4.6 |
| Science & Engineering Professionals | 17.4 | 21.9 | 25.6 | 3.7 |
| Business, Legal & Other Professionals | 41.5 | 50.3 | 53.7 | 3.5 |
| Health Associate Professionals | 87.7 | 88.6 | 89.1 | 0.4 |
| Science & Engineering Associate Prof | 26.3 | 25.0 | 24.5 | -0.5 |
| Other Associate Professionals | 48.6 | 50.6 | 51.2 | 0.6 |
| Clerical | 75.6 | 75.9 | 76.6 | 0.7 |
| Skilled Building Workers | 1.7 | 1.5 | 1.5 | 0.0 |
| Skilled Maintenance Workers | 2.8 | 1.8 | 1.7 | -0.1 |
| Other Skilled Manual | 11.1 | 7.1 | 4.7 | -2.5 |
| Operatives | 28.6 | 20.2 | 16.5 | -3.7 |
| Transport Occupations | 9.3 | 7.2 | 5.8 | -1.4 |
| Sales Occupations | 57.6 | 59.1 | 61.4 | 2.3 |
| Caring Occupations | 85.9 | 88.0 | 88.9 | 0.9 |
| Other Service & Protective Activities | 50.3 | 51.7 | 53.4 | 1.7 |
| Unskilled Manual | 35.3 | 39.3 | 38.9 | -0.4 |
| Total | 40.1 | 43.3 | 46.0 | 2.8 |

Trends observed between 2001 and 2008 are expected to continue into the future, with the female share increasing in most occupations. Figure 6.1 shows the change in the female share by occupational groups over the period 2008-2015. Females are gaining share in high skilled occupations. By 2015, females are expected to account for almost a half of all managers (a 10 percentage point gain compared to 2001); 54% of business professionals (a 12 percentage point gain relative to 2001). At the same time, the female presence amongst operatives is expected to decline by 12 percentage points relative to 2001.

Figure 6.1: Forecast Change in Female Employment Share (%-points), 2008-2015



In 2015, females are expected to continue to dominate in health, clerical, care and sales occupations (Figure 6.2). They are also expected to account for over one half of business professionals, service workers and some associate professionals (designers, technical inspectors etc.).

Figure 6.2: Forecast Female Employment Share (%) in 2015

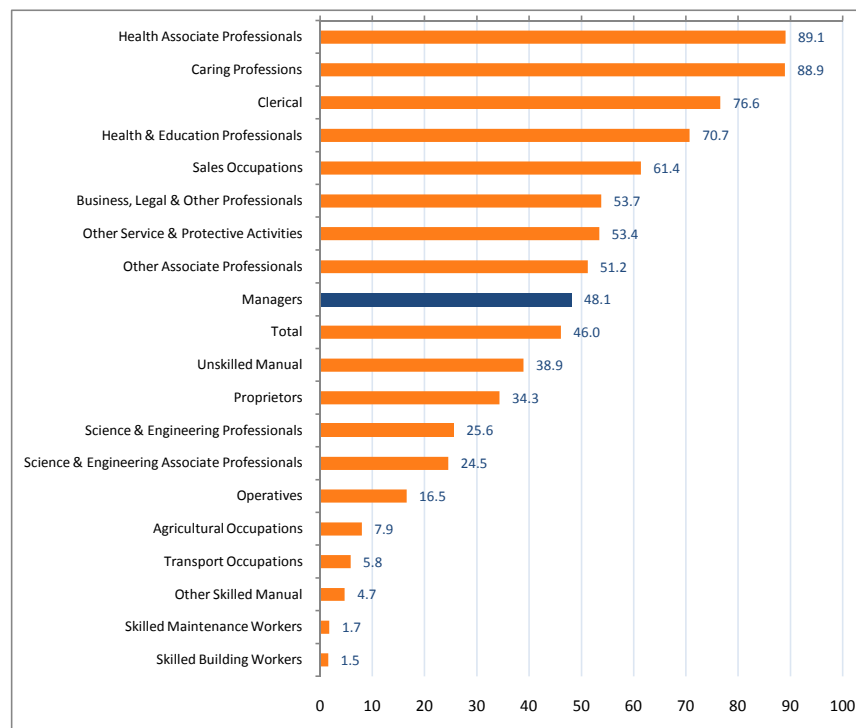


Table 6.3 shows the female share of employment across detailed occupations. By 2015, the female share is expected to increase in more than half of the occupations examined. The most significant increases by 2015 are expected for the following occupations: science professionals (to exceed 50% of the total), other professionals (e.g. psychologists, social workers, journalists, etc.) - to account for almost two thirds of all other professionals; sales workers (sales agents and other); managers (to account for just under a half of all managers).

The female share is expected to decline in a number of occupations including various operatives (electrical, production, metal), catering and transport workers. While females accounted for over 45% of science associate professionals in 1998, their share decreased to 36% by 2008. If this trend continues, the female share of laboratory and science technicians will decrease to less than a third by 2015.

Table 6.4 shows the distribution of employment by occupational group for males and females for three points in time. Female employment is concentrated in clerical and sales occupations (accounting for one third of total female employment in 2008). More than a third of males are employed as skilled or unskilled manual workers or operatives.

Table 6.3: Female Share of Employment, 2001-2015

| | 2001 | 2008 | 2015 | Change 2008-2015 (%-points) |
|--------------------------------------|-------------|-------------|-------------|--------------------------------|
| Agricultural | 6.8 | 8.6 | 7.9 | -0.7 |
| Managers | 37.5 | 42.0 | 48.1 | 6.2 |
| Proprietors in Services | 28.0 | 31.0 | 34.3 | 3.3 |
| Health Professionals | 43.5 | 47.6 | 51.8 | 4.3 |
| Education Professionals | 68.0 | 70.6 | 75.7 | 5.1 |
| Clergy | 14.0 | 20.2 | 17.9 | -2.2 |
| Science Professionals | 32.7 | 45.4 | 53.9 | 8.5 |
| Software Engineering Professionals | 23.4 | 21.0 | 19.2 | -1.8 |
| Other Engineering Professionals | 9.8 | 12.9 | 13.5 | 0.6 |
| Business/Finance/Legal Professionals | 36.9 | 46.4 | 48.3 | 2.0 |
| Other Professionals | 50.0 | 57.0 | 64.2 | 7.2 |
| Health Associate Professionals | 87.7 | 88.6 | 89.1 | 0.4 |
| Science Associate Professionals | 36.0 | 35.8 | 31.3 | -4.6 |
| Computer Associate Professionals | 30.9 | 23.1 | 23.1 | 0.0 |
| Engineering Associate Professionals | 13.0 | 12.9 | 12.7 | -0.2 |
| Catering Associate Professionals | 51.2 | 44.3 | 37.5 | -6.7 |
| Other Associate Professionals | 47.3 | 53.4 | 57.8 | 4.4 |
| Clerks/Typists/Telephonists | 75.6 | 75.9 | 76.6 | 0.7 |
| Skilled Building Workers | 1.7 | 1.5 | 1.5 | 0.0 |
| Electricians, Electrical Fitters | 4.4 | 2.3 | 2.6 | 0.3 |
| Fitters & Mechanics | 1.6 | 1.4 | 1.0 | -0.5 |
| Metal/Engineering Craft Workers | 2.5 | 1.5 | 0.4 | -1.1 |
| Wood Craft Workers | 1.3 | 0.6 | 0.1 | -0.5 |
| Clothing/Textile Workers | 64.0 | 55.4 | 47.7 | -7.7 |
| Printers | 16.8 | 24.4 | 31.6 | 7.2 |
| Other Skilled Workers | 23.6 | 23.8 | 23.8 | 0.0 |
| Electrical/Electronic Operatives | 41.5 | 29.3 | 24.5 | -4.8 |
| Metal/Engineering Operatives | 5.3 | 2.8 | 0.1 | -2.7 |
| Food/Drink/Tobacco Operatives | 22.4 | 23.4 | 24.2 | 0.9 |
| Other Production Operatives | 30.7 | 21.2 | 16.0 | -5.2 |
| Drivers | 2.5 | 3.0 | 2.7 | -0.3 |
| Other Transport Workers | 35.6 | 32.1 | 29.2 | -3.0 |
| Sales Agents | 31.1 | 31.8 | 36.7 | 4.8 |
| Sales Assistants | 68.9 | 69.4 | 72.0 | 2.6 |
| Other Sales Workers | 47.1 | 33.7 | 40.5 | 6.8 |
| Childcare & Related Services | 97.0 | 97.9 | 98.3 | 0.4 |
| Care Assistants | 80.1 | 80.4 | 81.6 | 1.2 |
| Army/Gardai/Prison Officers etc. | 8.4 | 10.6 | 15.5 | 4.9 |
| Other Security Personnel | 16.8 | 12.8 | 13.7 | 0.9 |
| Catering Occupations | 83.2 | 81.9 | 78.2 | -3.7 |
| Other Personal Services | 77.9 | 81.8 | 84.7 | 2.9 |
| Occupation Unstated | 53.9 | 42.8 | 40.3 | -2.5 |
| Unskilled Manual | 35.3 | 39.3 | 38.9 | -0.4 |
| Total | 40.1 | 43.3 | 46.0 | 2.8 |

Changes in the employment distribution are expected for both genders. By 2015, the share of females working as clerks is expected to decline to one fifth; the share working as operatives to less than 2%. At the same time, the share working as managers is expected to increase, as is the share working as business and science/engineering professionals. Moves up the skill scale are expected for males too: the share of males working as science/engineering and business professionals is expected to increase, the share of skilled manual and operatives to decline.

By 2015, females are expected to occupy a greater share of higher skilled jobs (professional, managerial and associate professional) relative to males: 43% of all jobs occupied by females are expected to be in these categories, compared to a third for males.

Table 6.4: Distribution of Female and Male Employment (% shares)

| | Female | | | Male | | |
|---|--------------|--------------|--------------|--------------|--------------|--------------|
| | 2001 | 2008 | 2015 | 2001 | 2008 | 2015 |
| Agricultural Occupations | 1.1 | 1.0 | 0.7 | 9.9 | 8.5 | 6.8 |
| Managers | 9.3 | 10.2 | 11.7 | 10.4 | 10.7 | 10.8 |
| Proprietors | 2.2 | 1.2 | 1.0 | 3.7 | 2.0 | 1.6 |
| Health & Education Professionals | 7.8 | 8.1 | 8.4 | 3.2 | 3.2 | 3.0 |
| Science & Engineering Professionals | 1.2 | 1.5 | 2.1 | 3.7 | 4.2 | 5.1 |
| Business, Legal & Other Professionals | 3.8 | 5.7 | 6.7 | 3.6 | 4.3 | 4.9 |
| Health Associate Professionals | 7.0 | 7.6 | 7.4 | 0.7 | 0.7 | 0.8 |
| Science & Engineering Associate Professionals | 1.5 | 1.2 | 1.4 | 2.9 | 2.8 | 3.7 |
| Other Associate Professionals | 3.9 | 4.0 | 4.1 | 2.7 | 3.0 | 3.4 |
| Clerical | 24.0 | 21.7 | 20.9 | 5.2 | 5.3 | 5.5 |
| Skilled Building Workers | 0.2 | 0.1 | 0.1 | 6.0 | 7.1 | 6.5 |
| Skilled Maintenance Workers | 0.3 | 0.2 | 0.1 | 6.5 | 6.5 | 5.9 |
| Other Skilled Manual | 1.2 | 0.7 | 0.3 | 6.3 | 7.0 | 5.9 |
| Operatives | 6.9 | 2.7 | 1.7 | 11.5 | 8.2 | 8.0 |
| Transport Occupations | 1.1 | 0.8 | 0.6 | 7.0 | 7.6 | 8.5 |
| Sales Occupations | 11.5 | 11.8 | 11.5 | 5.7 | 6.2 | 6.2 |
| Caring Occupations | 5.2 | 8.4 | 8.3 | 0.6 | 0.9 | 0.9 |
| Other Service & Protective Activities | 7.4 | 7.2 | 7.8 | 4.9 | 5.1 | 5.8 |
| Unskilled Manual | 4.6 | 5.8 | 5.2 | 5.6 | 6.8 | 7.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Professionals | 13.2 | 15.4 | 17.2 | 10.5 | 11.6 | 13.0 |
| Associate Professionals | 11.9 | 12.8 | 12.9 | 6.2 | 6.5 | 7.8 |
| Non-Professionals | 63.0 | 59.4 | 56.6 | 59.2 | 60.7 | 60.0 |
| Agricultural Occupations | 1.4 | 1.0 | 0.7 | 9.9 | 8.5 | 6.8 |
| Managers & Proprietors | 10.5 | 11.3 | 12.7 | 14.1 | 12.7 | 12.4 |
| Totals | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Section 7: Occupational Employment Forecasts by Education

This section adds the educational dimension to the occupational forecasts. As outlined in the methodology, one should treat these forecasts as tentative and be cognisant of the limitations of the methodology used when interpreting them.

The educational composition of the workforce has been changing for the better: in 1999 one in four persons in employment held a third level qualification (certificate, ordinary/honours degree, masters or PhD), which increased to well over a third by 2008 (Table 7.1). This trend is expected to continue and by 2015, over 45% of persons in employment are expected to be third level graduates. A corollary of this is that the share of early school leavers is expected to decline from one in three in 1999 to one in five in 2015.

Table 7.1: Employment by Educational Attainment (%)

| | 1999 | 2008 | 2015 |
|-----------------------|-------|-------|-------|
| Below Upper Secondary | 34.2 | 24.3 | 19.0 |
| Upper Secondary/FET | 40.8 | 38.7 | 35.0 |
| Third Level | 25.0 | 37.0 | 46.0 |
| Total | 100.0 | 100.0 | 100.0 |

During the period 1999-2008, improvements in the education profile have been observed in all broad occupational groups, with the share of third level graduates increasing in each category (Table 7.2 and Figure 7.1).

Table 7.2: Third-Level Graduates by Occupational Group (% share), 1999-2015

| Occupation | 1999 | 2001 | 2008 | 2015 |
|---|-------------|-------------|-------------|-------------|
| Agricultural Occupations | 4.0 | 4.5 | 9.6 | 14.4 |
| Managers | 37.9 | 44.1 | 52.9 | 63.9 |
| Proprietors | 18.3 | 22.0 | 28.7 | 33.8 |
| Health & Education Professionals | 94.1 | 93.3 | 95.7 | 96.2 |
| Science & Engineering Professionals | 80.2 | 83.7 | 90.7 | 95.9 |
| Business, Legal & Other Professionals | 75.8 | 78.0 | 83.8 | 90.6 |
| Health Associate Professionals | 65.0 | 72.2 | 85.1 | 91.4 |
| Science & Engineering Associate Professionals | 64.6 | 66.0 | 71.8 | 79.7 |
| Other Associate Professionals | 39.2 | 45.2 | 55.8 | 69.1 |
| Clerical | 18.4 | 20.1 | 33.1 | 45.2 |
| Skilled Building Workers | 3.3 | 3.6 | 8.2 | 12.0 |
| Skilled Maintenance Workers | 13.1 | 12.0 | 17.8 | 24.4 |
| Other Skilled Manual | 3.8 | 4.4 | 12.6 | 17.1 |
| Operatives | 6.3 | 7.7 | 14.3 | 15.9 |
| Transport Occupations | 4.4 | 4.2 | 8.7 | 11.0 |
| Sales Occupations | 13.4 | 15.5 | 23.1 | 30.9 |
| Caring Occupations | 13.7 | 14.8 | 26.7 | 33.9 |
| Other Service & Protective Activities | 12.4 | 14.4 | 24.1 | 30.9 |
| Unskilled Manual | 2.8 | 2.4 | 8.5 | 10.2 |
| Total | 25.0 | 27.4 | 37.0 | 46.0 |
| Professionals | 85.5 | 86.1 | 90.1 | 94.0 |
| Associate Professionals | 55.0 | 60.7 | 71.2 | 80.2 |
| Non-Professionals | 10.4 | 11.4 | 19.9 | 26.8 |
| Agricultural Occupations | 4.0 | 4.5 | 9.6 | 14.4 |
| Managers & Proprietors | 33.2 | 38.9 | 49.7 | 60.8 |
| Total | 25.0 | 27.4 | 37.0 | 46.0 |

As expected, the highest share of third level graduates is found in professional and associate professional occupations. By 2015, over 90% of all professionals are expected to hold a third level qualification. In fact, by 2015 even low skilled occupations, such as unskilled manual, are expected to have at least 10% of employment at this level of educational attainment.

The greatest increase in the share of graduates has been observed in the associate professional and managerial category and if this trend continues 64% of all managers and at least 70% of all associate professional workers will be third level graduates.

Improvements in the educational profile of the workforce are expected to be driven by a number of factors:

- continuation of the trend in increased participation in the third level education
- up-skilling through higher education activation schemes undertaken by some unemployed persons during the recession
- longer stay in education of new Leaving Certificate graduates due to the lack of employment opportunities during the recession

- higher exits from employment at the lower end of the education scale during the recession as those with lower than secondary education face greater risk of unemployment.

Figure 7.1: Share of Third-Level Graduates by Occupational Group

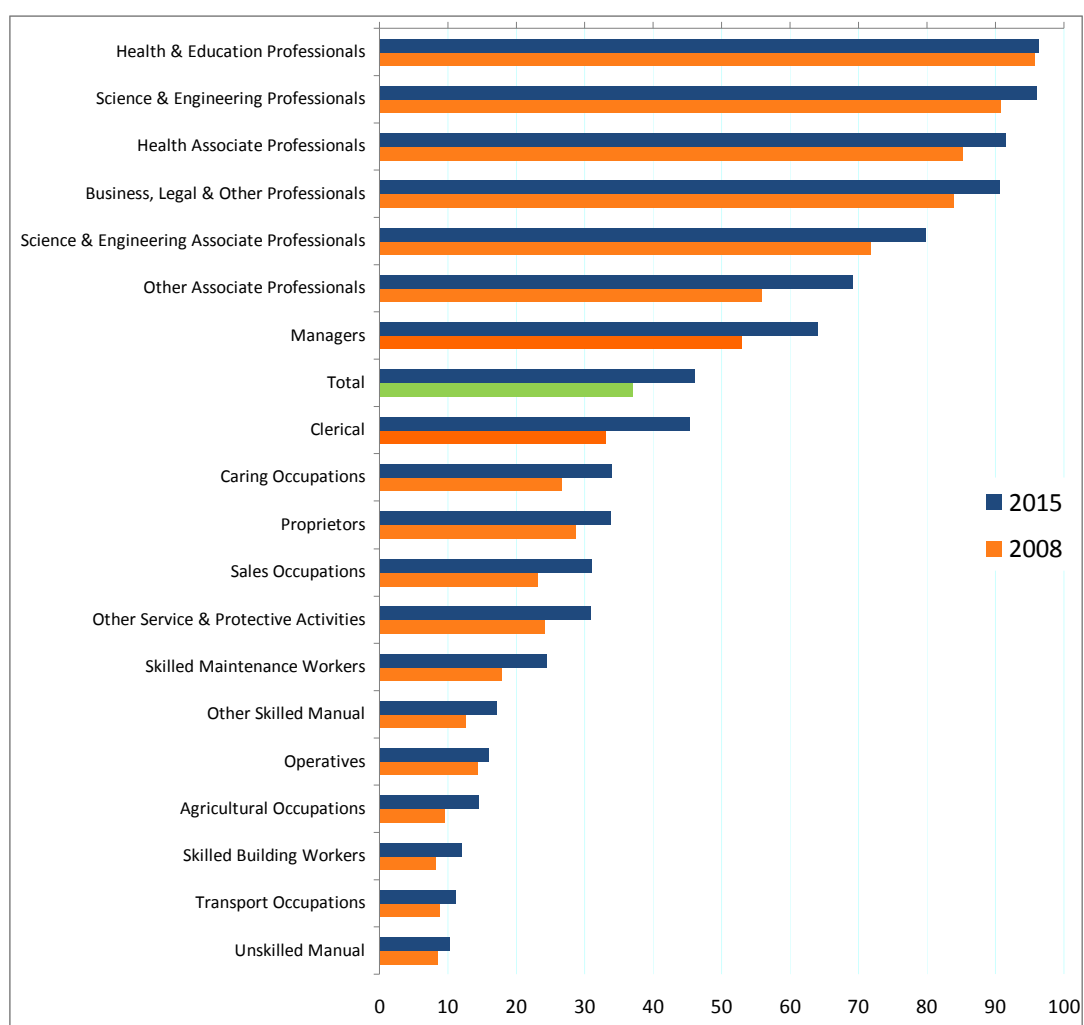


Table 7.3 presents the share of third level graduates for individual occupations. As with broad occupational groups, the profile of all individual occupational groups improved over the period 1999-2008 with the share of third level graduates increasing and this trend is expected to continue.

Table 7.3: Share of Third-Level Graduates by Occupation (%), 1999-2015

| Occupation | 1999 | 2008 | 2015 |
|--------------------------------------|------|------|------|
| Agricultural | 4.0 | 9.6 | 14.4 |
| Managers | 37.9 | 52.9 | 63.9 |
| Proprietors in Services | 18.3 | 28.7 | 33.8 |
| Health Professionals | 94.0 | 94.5 | 97.5 |
| Education Professionals | 94.5 | 95.9 | 96.1 |
| Clergy | 86.4 | 94.2 | 94.2 |
| Science Professionals | 91.2 | 98.2 | 99.8 |
| Software Engineering Professionals | 77.1 | 90.2 | 98.5 |
| Other Engineering Professionals | 78.6 | 89.3 | 94.6 |
| Business/Finance/Legal Professionals | 85.1 | 89.9 | 95.2 |
| Other Professionals | 59.6 | 73.2 | 81.6 |
| Health Associate Professionals | 65.0 | 85.1 | 91.4 |
| Science Associate Professionals | 63.5 | 64.1 | 69.1 |
| Computer Associate Professionals | 68.3 | 84.1 | 92.6 |
| Engineering Associate Professionals | 61.2 | 65.9 | 78.5 |
| Catering Associate Professionals | 20.2 | 36.8 | 48.9 |
| Other Associate Professionals | 48.4 | 64.4 | 78.9 |
| Clerks/Typists/Telephonists | 18.4 | 33.1 | 45.2 |
| Skilled Building Workers | 3.3 | 8.2 | 12.0 |
| Electricians, Electrical Fitters | 17.4 | 22.3 | 29.9 |
| Fitters & Mechanics | 10.5 | 13.6 | 19.3 |
| Metal/Engineering Craft Workers | 4.3 | 11.2 | 16.3 |
| Wood Craft Workers | 2.7 | 10.0 | 14.1 |
| Clothing/Textile Workers | 1.7 | 10.8 | 15.0 |
| Printers | 5.4 | 24.9 | 30.3 |
| Other Skilled Workers | 13.4 | 26.7 | 36.1 |
| Electrical/Electronic Operatives | 10.0 | 31.4 | 47.0 |
| Metal/Engineering Operatives | 5.5 | 11.8 | 15.8 |
| Food/Drink/Tobacco Operatives | 3.9 | 13.4 | 12.3 |
| Other Production Operatives | 6.0 | 12.0 | 12.8 |
| Drivers | 2.9 | 7.6 | 10.3 |
| Other Transport Workers | 10.5 | 15.2 | 16.5 |
| Sales Agents | 31.1 | 38.4 | 46.2 |
| Sales Assistants | 6.7 | 18.7 | 25.8 |
| Other Sales Workers | 12.5 | 20.3 | 25.5 |
| Childcare & Related Services | 22.3 | 35.4 | 40.2 |
| Care Assistants | 9.2 | 20.0 | 29.0 |
| Army/Gardai/Prison Officers etc. | 26.3 | 41.2 | 51.2 |
| Other Security Personnel | 5.0 | 17.8 | 22.5 |
| Catering Occupations | 6.2 | 15.9 | 19.1 |
| Other Personal Services | 8.2 | 21.7 | 32.0 |
| Occupation Unstated | 13.8 | 31.8 | 31.8 |
| Unskilled Manual | 2.8 | 8.5 | 10.2 |
| Total | 25.0 | 37.0 | 46.0 |

Appendix A: FÁS/ESRI Manpower Forecasting Studies Series

Report No. 1. *Manpower Forecasting. A Review of Methods and Practice in Some OECD Countries.* G. Hughes. November, 1991.

Report No. 2. *A Review of Trends in the Occupational Pattern of Employment in Ireland, 1971-90.* T. Corcoran, J.J. Sexton, D. O'Donoghue. July, 1992.

Report No. 3. *Occupational Employment Forecasts, 1996.* T. Corcoran, G. Hughes, J. J. Sexton. March, 1993.

Report No. 4. *Occupational Employment Forecasts, 1998.* A. Canny, G. Hughes, J.J. Sexton. March, 1995.

Report No. 5. *Changing Profiles in Occupations and Educational Attainment.* J.J. Sexton, A. Canny, G. Hughes. November, 1996.

Report No. 6. *Occupational Employment Forecasts, 2003.* D. Duggan, G. Hughes, J. J. Sexton. November, 1997.

Report No. 7. *Aspects of Occupational Change in the Irish Economy - Recent Trends and Future Prospects.* J.J. Sexton, D. Frost, G. Hughes. December, 1998.

Report No. 8. *Occupational Employment Forecasts, 2005.* G. Hughes, B. McCormick, J.J. Sexton. April, 2000.

Report No. 9. *Estimating Labour Force Flows, Job Openings and Human Resource Requirements.* J.J. Sexton, G. Hughes, B. McCormick, C. Finn. April, 2001.

Report No.10. *Occupational Employment Forecasts 2015.* J.J. Sexton, G. Hughes, C. Finn, March, 2002.

Report No.11. *Regional Occupational Employment Forecasts for 2010.* J.J. Sexton, G. Hughes, B. Casey, C. Finn, E. Morgenroth. January 2004.

Report No.12. *Occupational Employment Forecasts 2012.* P. Lunn, N. Doyle, G. Hughes. July, 2007.

Appendix B: Occupations and Job Titles

| | |
|---|--|
| 1. Agricultural Occupations | |
| 1.1 Agriculture | Farmers; farmers' relatives assisting; other agric/horticultural workers; foresters and forestry labourers; fishermen (excludes agricultural labourers and farm managers). |
| 2. Managers & Proprietors | |
| 2.1 Managers | Senior government and local authority officials; directors; marketing/purchasing/personnel managers and company secretaries; commissioned officers in the armed forces; farm managers; managers in retail/wholesale establishments; (including garages and filling stations); managers in public houses, bars, hotels and restaurants; clerks of work (building) and transport inspectors. |
| 3. Proprietors in Services | |
| | Proprietors in retailing/wholesaling, (including garages and filling stations), public houses and bars, hotels and restaurants; hairdressing; entertainment/sports |
| 4. Health & Education Professionals | |
| 4.1 Health Professionals | Doctors, dentists, pharmacists |
| 4.2 Education Professionals | Primary and secondary school teachers; professors and lecturers. |
| 4.3 Clergy | Clergymen and nuns; other religious |
| 5. Science and Engineering Professionals | |
| 5.1 Science Professionals | Chemists; physicists; biological scientists. |
| 5.2 Software Engineering Professionals | Software engineers. |
| 5.3 Other Engineering Professionals | Civil/mining/mechanical/electronic engineers; other engineers and technologists n. e. s.; architects; town planners, building and land surveyors. |
| 6. Business, Legal & Other Professionals | |
| 6.1 Business/Finance/Legal Professionals | Accountants; judges and lawyers; business consultants; insurance brokers and stockbrokers; economists and statisticians. |
| 6.2 Other Professions | Veterinarians; authors and journalists; psychologists; social workers; artists; actors; sports people; information officers; professional workers n.e.s. |
| 7. Health Associate Professionals | |
| 7.1 Health Associate Professionals | Nurses; dental, orthopaedic, optical etc., technicians; optician; other medical and health related workers. |
| 8. Science & Engineering Associate Professionals | |
| 8.1 Science Associate Professionals | Laboratory technicians; other scientific technicians n.e.s. |
| 8.2 Computer Associate Professionals | Computer analyst/programmers. |
| 8.3 Engineering Associate Professionals | Engineering/electronic technicians; building and civil engineering technicians; draughtsperson; building inspectors and quantity surveyors. |
| 9. Other Associate Professionals | |
| 9.1 Catering Associate Professionals | Chefs and cooks. |
| 9.2 Other Associate Professionals | Airline pilots; ships' officers; interior designers, industrial designers, technical inspectors n.e.s; technical workers n.e.s. |
| 10. Clerical | |
| | Government executive officials (up to rank of Executive Officer); bookkeepers; computer operators; other clerical workers, telephonists; typists and key-entry operators. |
| 11. Skilled Building Workers | |
| 11.1 Skilled Building Workers | Building contractors; bricklayers; masons and stonecutters; plasterers; roofers; glaziers; painters and decorators; rail and road construction; other skilled building workers. |
| 12. Skilled Maintenance Workers | |
| 12.1 Electricians, Electrical Fitters | Electricians; electrical fitters; telecommunications technicians; telephone installers and repairers; computer engineers (installation and maintenance). |
| 12.2 Fitters and Mechanics | Motor mechanics; other fitters and mechanics; toolmakers; metal working production and maintenance fitters. |

| | |
|--|---|
| 13. Other Skilled Manual | |
| 13.1 Metal/Engineering Craft Workers | Vehicle builders and assemblers; plumbers and gas fitters; sheet metal workers; precision instrument makers; goldsmiths, etc. |
| 13.2 Wood Craft Workers | Carpenters, joiners and cabinet-makers. |
| 13.3 Clothing and Textile Workers | Spinners and winders; weavers; knitters; tailors and dress-makers; cutters; sewers and embroiderers; upholsterers; shoemakers. |
| 13.4 Printers | Printers; compositors; bookbinders; print finishers. |
| 13.5 Other Skilled Workers | Glass/ceramic workers; other craftsmen |
| 14. Operatives | |
| 14.1 Electrical/Electronics Operatives | Linesmen and cable-jointers; RTV mechanics; other electrical and electronic workers. |
| 14.2 Metals/Engineering Operatives | Structural metalworkers; welders and cutters; electroplaters and galvanisers; machine tool operators; other engineering workers; other metalworkers. |
| 14.3 Foods and Drink Operatives | Millers; bakers; fishmongers; sugar and confectionery workers; dairy workers; butchers; beverage workers; tobacco workers; other food and drink (incl. brewing) process operatives. |
| 14.4 Other Plant and Operatives | Mine and quarry workers; turf workers; wood-working machinists; other wood-workers; paper and paper-product makers; printing-press operators; other paper and printing workers; chemicals workers; rubber workers; plastics workers; other production workers; crane operators; excavator drivers; stationary engine operators; packers; packing machinists; balers; labellers; checkers. |
| 15. Transport Occupations | |
| 15.1 Drivers | Train drivers; goods vehicle drivers; bus drivers and conductors; other drivers of road passenger vehicles. |
| 15.2 Other Transport Workers | Bus and road transport inspectors; postmen and sorters; driver's mates; signalmen; porters and ticket collectors; seafarers; other transport workers. |
| 16. Sales Occupations | |
| 16.1 Sales Agents | Technical and wholesale sales representatives; insurance agents; auctioneers, valuers and other sales representatives. |
| 16.2 Retail/Sales Assistants | Shop assistants in retail and wholesale establishments; bar staff. |
| 16.3 Other Sales Workers | Roundsmen/women; street vendors; merchandisers; window dressers. |
| 17. Carers | |
| 17.1 Childcare and Related Services | Childminders; nursery nurses and playgroup leaders. |
| 17.2 Care Assistants | Nurses' aids and ambulance staff; care assistants and attendants. |
| 18. Other Service & Protective Activities | |
| 18.1 Army/Gardai | Gardai and soldiers (sergeant and below); fire and prison service officers. |
| 18.2 Other Security Workers | Caretakers; watchmen; security guards and related occupations. |
| 18.3 Catering Occupations | Waiters and waitresses; counterhands and catering assistants. |
| 18.4 Other Personal Service Workers | Housekeepers (domestic and non-domestic); barbers and hairdressers; laundry workers; undertakers and bookmakers; photographers; other service workers n.e.s. |
| 18.5 Occupation Unstated | Occupation unstated |
| 19. Unskilled Manual | |
| 19.1 Unskilled Manual | Agricultural and farm labourers; unskilled manual workers; dock labourers; refuse collectors; window cleaners; car park attendants; hotel porters; cleaners. |

Appendix C: Occupational Project Codes

Occupational Project Codes

| | | | |
|------|---|------|---|
| 1000 | Senior managers in national government | 2330 | Secondary and vocational education teachers |
| 1010 | General managers in large companies | 2340 | Primary and nursery education teachers |
| 1020 | Local government officers | 2390 | Other teaching professionals n.e.s. |
| 1030 | General administrators in national government | 2400 | Judges |
| 1100 | Production and works managers | 2420 | Barristers and solicitors |
| 1110 | Building managers | 2500 | Chartered and certified management accountants (incl. taxation experts) |
| 1200 | Company financial managers | 2520 | Actuaries, economists, statisticians, management consultants , business analysts |
| 1210 | Marketing managers | 2600 | Architects, town planners and land and building surveyors |
| 1220 | Purchasing managers | 2700 | Librarians, archivists and curators |
| 1240 | Personnel managers | 2900 | Psychologists and other social/behavioural scientists |
| 1260 | Computer systems managers | 2920 | Clergy |
| 1300 | Credit controllers | 2930 | Social workers and probation officers |
| 1310 | Bank and building society managers | 3000 | Laboratory technicians |
| 1320 | Civil Service executive officers | 3010 | Engineering technicians |
| 1390 | Other financial managers n.e.s. | 3020 | Electrical and electronic technicians |
| 1400 | Transport managers | 3030 | Architectural, town planning, building and civil engineering technicians |
| 1410 | Stores and warehousing managers | 3090 | Other scientific technicians n.e.s. |
| 1500 | Commissioned officers in armed forces | 3100 | Draughtspersons |
| 1520 | Senior police and prison officers | 3120 | Building inspectors and quantity surveyors |
| 1600 | Farm managers (employees) | 3130 | Marine, insurance, etc. surveyors |
| 1601 | Farm owners (self-employed) | 3200 | Computer analyst/programmers |
| 1710 | Garage managers | 3310 | Aircraft officers, traffic planners and controllers |
| 1711 | Garage proprietors (self-employed) | 3320 | Ship and hovercraft officers |
| 1720 | Hairdressers and barbers (employees) | 3400 | Nurses and midwives |
| 1721 | Hairdressers and barbers managers (self-employed) | 3420 | Medical radiographers |
| 1730 | Hotel and accommodation managers | 3430 | Physiotherapists and chiropodists |
| 1731 | Hotel and accommodation proprietors (self-employed) | 3460 | Medical technicians, dental auxiliaries and dental nurses |
| 1740 | Restaurant and catering managers | 3470 | Occupational and speech therapists, psychotherapists and other therapists |
| 1741 | Restaurant and catering proprietors (self-employed) | 3490 | Other health associate professionals n.e.s. |
| 1750 | Public House and club managers | 3500 | Legal service and related occupations |
| 1751 | Publicans and club proprietors (self-employed) | 3610 | Underwriters, claims assessors, brokers and investment analysts |
| 1760 | Entertainment and sport managers | 3630 | Personnel, industrial relations and work study officers |
| 1761 | Entertainment and sport managers (self-employed) | 3710 | Matrons, houseparents, welfare, community and youth workers |
| 1770 | Travel agency managers | 3800 | Authors, writers and journalists |
| 1771 | Travel agency proprietors (self-employed) | 3810 | Artists, commercial/industrial artists, graphic and clothing designers |
| 1780 | Butcher managers | 3840 | Actors, musicians, entertainers, stage managers, producers and directors |
| 1781 | Butchers proprietors (self-employed) | 3860 | Photographers, camera, sound and video equipment operators |
| 1790 | Managers of shops | 3870 | Professional athletes and sport officials |
| 1791 | Proprietors of shops (self-employed) | 3900 | Information officers, careers advisers and vocational guidance specialists |
| 1910 | Administrators of schools and colleges | 3910 | Vocational, industrial trainers and driving instructors |
| 1990 | Other managers n.e.s. | 3940 | Inspectors of factories, trading standards and other statutory inspectors |
| 1991 | Other proprietors n.e.s. | 3960 | Environmental health workers, occupational hygienists and safety officers |
| 2000 | Chemists | 3990 | Other associate professional and technical occupations n.e.s. |
| 2010 | Biological scientists | 4000 | Civil Service clerical officers and assistants |
| 2020 | Physicists | 4010 | Local government clerical officers and assistants |
| 2090 | Other natural scientists n.e.s. | 4100 | Accounts and wages clerks, book-keepers and other financial clerks |
| 2100 | Civil and mining engineers | 4110 | Cashiers, bank and counter clerks |
| 2110 | Mechanical engineers | 4120 | Debt, rent and other cash collectors |
| 2120 | Electrical and electronic engineers | 4300 | Filing, computer, library and other clerks n.e.s. |
| 2140 | Software engineers | 4410 | Storekeepers, warehousemen/women, despatch and production control clerks |
| 2150 | Chemical, production, planning and quality control engineers | 4590 | Secretaries, medical, legal, personal assistants, typists ,word processor operators |
| 2160 | Design and development engineers | 4600 | Receptionists and receptionist-telephonists |
| 2190 | Other engineers and technologists n.e.s. | 4620 | Telephone, telegraph and other office communication system operators |
| 2200 | Medical practitioners | 4900 | Computer , data processing and other office machine operators |
| 2210 | Pharmacists, pharmacologists, ophthalmic and dispensing opticians | 5000 | Bricklayers and masons |
| 2230 | Dental practitioners | 5010 | Roofers, slaters, tilers, sheeters and cladders |
| 2240 | Veterinarians | 5020 | Plasterers |
| 2300 | University, IT and higher education teachers | 5030 | Glaziers |
| 5040 | Builders and building contractors | 8020 | Tobacco process operatives |

| | | | |
|------|--|------|--|
| 5060 | Floorers, floor coverers, carpet fitters and planners, floor and wall tilers | 8090 | Other food and drink process operatives |
| 5070 | Painters and decorators | 8100 | Tannery production operatives |
| 5090 | Scaffolders, riggers, steeplejacks and other construction trades n.e.s. | 8120 | Spinners, doublers, twisters, winders and reelers |
| 5150 | Toolmakers | 8140 | Other textiles processing operatives |
| 5160 | Metal working production and maintenance fitters | 8200 | Chemical, gas and petroleum process plant operatives |
| 5170 | Precision instrument makers, goldsmiths, silversmiths and precious stone workers | 8210 | Paper, wood and related process plant operatives |
| 5190 | Other machine tool setters and CNC setter-operators n.e.s. | 8240 | Rubber process operatives, moulding machine operatives and tyre builders |
| 5210 | Electricians and electrical maintenance fitters | 8250 | Plastics process operatives, moulders and extruders |
| 5230 | Telephone fitters | 8290 | Synthetic fibre and other chemical, paper, plastics and related operatives |
| 5240 | Cable jointers and lines repairers | 8300 | Moulders and furnace operatives (metal) |
| 5250 | Radio, TV and video engineers | 8340 | Electroplaters, galvanisers and colour coaters |
| 5260 | Computer engineers (installation and maintenance) | 8390 | Other metal making and treating process operatives |
| 5290 | Other electrical and electronic trades n.e.s. | 8400 | Machine tool operatives |
| 5300 | Smiths, forge/metal plate workers and shipwrights | 8410 | Other automatic machine workers, metal polishers |
| 5320 | Plumbers, heating and ventilating engineers | 8500 | Assemblers and lineworkers (electronic goods) |
| 5330 | Sheet metal workers | 8510 | Assemblers and lineworkers (metal and other goods) |
| 5370 | Welders and steel erectors | 8600 | Inspectors, viewers and laboratory testers |
| 5400 | Motor mechanics, auto electricians, tyre and exhaust fitters | 8620 | Packers, bottlers, canners, fillers, weighers, graders |
| 5410 | Vehicle body repairers, panel beaters and spray painters | 8710 | Bus and road transport depot inspectors |
| 5500 | Weavers, knitters, warp preparers, bleachers, dyers and finishers | 8720 | Drivers of road goods vehicles |
| 5530 | Sewing machinists, menders, darners and embroiderers | 8730 | Bus conductors and coach drivers |
| 5540 | Coach trimmers, upholsterers and mattress makers | 8740 | Taxi/cab drivers, chauffeurs and couriers |
| 5550 | Shoe repairers and other leather makers | 8800 | Seafarers (merchant navy), barge and boat operatives |
| 5560 | Tailors, dressmakers, clothing cutters, milliners and furriers | 8810 | Railway station workers, supervisors and guards |
| 5590 | Other textiles, garments and related trades n.e.s. | 8820 | Rail engine drivers and other railway line operatives |
| 5610 | Printers, originators and compositors | 8850 | Mechanical plant drivers/operatives and crane drivers |
| 5690 | Bookbinders, print finishers and other printing trades | 8870 | Fork lift truck drivers |
| 5700 | Carpenters and joiners | 8890 | Other transport and machinery operatives n.e.s. |
| 5710 | Cabinet makers | 8920 | Water and sewerage plant attendants |
| 5790 | Other woodworking trades n.e.s. | 8930 | Electrical, energy, boiler and related plant operatives and attendants |
| 5800 | Bakers and flour confectioners | 8950 | Construction and related workers |
| 5810 | Butchers and meat cutters | 8970 | Woodworking machine operatives |
| 5820 | Fishmongers and poultry dressers | 8980 | Mine (excluding coal) and quarry workers |
| 5900 | Glass product and ceramics makers and finishers | 8990 | Other plant, machine and process operatives n.e.s. |
| 5940 | Gardeners and groundsman/women | 9000 | Farm workers |
| 5950 | Horticultural trades | 9010 | Agricultural machinery drivers and other farming occupations |
| 5990 | Other craft and related occupations | 9030 | Fishing and related workers |
| 6000 | Soldiers (sergeant and below) | 9040 | Forestry workers |
| 6100 | Gardai (sergeant and below) | 9130 | Mates to metal, electrical and related fitters |
| 6110 | Fire service officers | 9190 | Labourers in engineering and other making/processing industries |
| 6120 | Prison service officers | 9220 | Rail construction and maintenance workers |
| 6150 | Security guards and related occupations | 9230 | Road construction workers etc. |
| 6190 | Other security and protective service occupations | 9290 | Other building and civil engineering labourers |
| 6210 | Waiters and waitresses | 9300 | Stevedores and dockers |
| 6220 | Bar staff | 9310 | Goods porters |
| 6300 | Travel and flight attendants | 9330 | Refuse and salvage collectors |
| 6400 | Nurses' aids and ambulance staff | 9340 | Drivers mates |
| 6440 | Care assistants and attendants | 9400 | Postal workers and mail sorters |
| 6500 | Childminders, nursery nurses and playgroup leaders | 9510 | Hotel porters and kitchen porters |
| 6520 | Educational assistants | 9530 | Counterhands and catering assistants |
| 6600 | Hairdressers, barbers and beauticians | 9550 | Window cleaners and car park attendants |
| 6700 | Housekeepers (domestic and non-domestic) | 9580 | Cleaners and domestics |
| 6720 | Caretakers | 9590 | Other occupations in sales and services n.e.s. |
| 6730 | Launderers, dry cleaners and pressers | 9900 | All other labourers and related workers |
| 6900 | Undertakers, bookmakers and other personal service workers n.e.s. | 9980 | Gainfully occupied but occupation not stated |
| 7000 | Buyers and purchasing officers | 9990 | All other gainful occupations n.e.s. |
| 7020 | Importers, exporters, commodity and shipping brokers | | |
| 7100 | Technical and wholesale sales representatives | | |
| 7190 | Auctioneers, estimators, valuers and other sales representatives n.e.s. | | |
| 7200 | Sales assistants, check out operators and petrol pump attendants | | |
| 7310 | Roundsmen/women and van salespersons | | |
| 7320 | Market/street traders and scrap dealers | | |
| 7900 | Merchandisers, window dressers, floral arrangers and telephone salespersons | | |
| 8000 | Bakery and confectionery process operatives | | |

Appendix D: Conversion to ILO Definition

Table D1: Sectoral Employment Forecasts for PES and ILO Definitions of Employment Status (000)

| | 2008 | 2015 | 2008 | 2015 |
|---------------------------------|--------|--------|--------|--------|
| | PES | | ILO | |
| Agriculture | 116.7 | 87.1 | 121.5 | 89.3 |
| Metals | 28.0 | 30.9 | 28.5 | 31.4 |
| Machinery & Equipment | 68.5 | 72.3 | 68.8 | 73.1 |
| Chemicals | 41.9 | 57.2 | 42.3 | 58.4 |
| Food, Drink, Tobacco | 50.4 | 47.3 | 50.9 | 48.0 |
| Clothing & Textiles | 8.8 | 2.5 | 8.8 | 2.6 |
| Other Manufacturing | 87.2 | 50.6 | 87.8 | 51.4 |
| Construction | 253.8 | 190.8 | 255.7 | 194.0 |
| Wholesale | 63.1 | 61.6 | 63.9 | 62.9 |
| Motor Vehicles etc. | 46.4 | 42.1 | 49.0 | 42.9 |
| Retailing | 171.4 | 158.1 | 198.4 | 184.9 |
| Transport | 79.7 | 85.7 | 81.5 | 87.8 |
| Communications | 37.5 | 42.5 | 37.9 | 43.7 |
| Finance & Insurance | 92.9 | 100.7 | 94.1 | 102.8 |
| Other Business Services | 194.1 | 231.3 | 199.4 | 239.0 |
| Hotels & Restaurants | 111.9 | 106.9 | 128.9 | 120.2 |
| Other Market Services | 109.1 | 127.7 | 114.4 | 130.6 |
| Public Administration & Defence | 110.0 | 109.5 | 111.1 | 111.7 |
| Education | 141.8 | 137.6 | 145.6 | 142.5 |
| Health & Social Work | 216.9 | 210.5 | 224.3 | 217.8 |
| Total | 2029.9 | 1952.7 | 2112.8 | 2035.0 |

Table D2: Occupational Employment Forecasts, PES and ILO Definitions of Employment Status (000)

| | 2008 | 2015 | 2008 | 2015 |
|---------------------------------------|--------|--------|--------|-------|
| | PES | | ILO | |
| Agricultural Occupations | 106.5 | 78.1 | 117.5 | 86.8 |
| Managers & Proprietors | 245.0 | 244.5 | 232.5 | 240.8 |
| Health & Education Professionals | 107.8 | 107.3 | 36.0 | 28.2 |
| Science & Engineering Professionals | 61.3 | 72.2 | 116.9 | 117.4 |
| Business, Legal & Other Professionals | 100.2 | 111.7 | 67.7 | 80.8 |
| Health Associate Professionals | 75.2 | 74.2 | 109.3 | 122.8 |
| Science & Engineering Associate Prof | 42.5 | 51.6 | 81.9 | 81.5 |
| Other Associate Professionals | 70.1 | 72.4 | 47.2 | 57.1 |
| Clerical | 251.3 | 245.4 | 77.9 | 81.4 |
| Skilled Building Workers | 83.1 | 69.6 | 270.8 | 268.4 |
| Skilled Maintenance Workers | 75.8 | 62.9 | 90.4 | 76.5 |
| Other Skilled Manual | 87.1 | 65.3 | 82.2 | 69.1 |
| Operatives | 118.7 | 98.8 | 95.1 | 71.3 |
| Transport Occupations | 94.3 | 94.7 | 130.2 | 109.2 |
| Sales Occupations | 175.2 | 168.6 | 121.6 | 122.6 |
| Caring Occupations | 84.0 | 83.9 | 199.5 | 184.7 |
| Other Service & Protective Activities | 122.6 | 131.0 | 98.2 | 98.1 |
| Unskilled Manual | 129.2 | 120.4 | 138.1 | 138.5 |
| Total | 2029.9 | 1952.7 | 2112.8 | 2035 |

Appendix E Project Steering Group

Ms. Patricia Curtin, Chair, FÁS

Mr. Pádraig O’Conaill, Department of Enterprise, Trade and Employment

Dr. P. Lunn, ESRI

Prof. Philip O’Connell, ESRI

Mr. R. Fox, FÁS

Jasmina Behan is a Senior Research Officer with FÁS.
Caroline Shally is an Assistant Researcher with FÁS.

Copies of the report can be downloaded from
www.fas.ie
or obtained from
The Skills and Labour Market Research Unit,
Planning and Research Department, FÁS,
27-33 Upper Baggot Street, Dublin 4.