

Current Trends in Occupational Employment
and Forecasts
for 2010 and 2020

Final Report to
The Expert Group on Future Skill Needs



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CURRENT TRENDS IN OCCUPATIONAL EMPLOYMENT AND FORECASTS FOR 2010 AND 2020.

Introduction

This report, which reviews current trends in occupational employment and contains forecasts for 2010 and 2020, represents, in effect, an extension of the forecasts shown in the joint FÁS/ESRI Manpower Forecasting Studies publication series.¹ All of the statistical material contained in this Report has been derived from the database associated with this series. The main objective of the FÁS/ESRI series has been to develop an information system which can be used to provide information on the changing pattern of occupations and to identify possible variations in skill requirements across broad occupational areas of the economy.

Heretofore, most of the published employment forecasts in this series have been of a medium-term nature, i.e. the time horizon covered did not normally extend more than about five years ahead. This report, however, involves longer-term forecasts: the projected data cover a fifteen-year time span from 2005 to 2020. In view of this, the forecasts presented are inevitably more tentative, and are of a more summary nature than would be the case with medium-term projections.

The Background Economic Context

The occupational forecasts contained in this report are based on sectoral employment projections derived from the most recent ESRI *Medium-Term Review* (MTR), in this case the Review published in December 2005.² While the main thrust of the MTR series is essentially medium-term (i.e. involving macroeconomic forecasts up to five years ahead), more indicative long-term projections are also usually compiled. These forecasts provide the basis for the current study and, in particular, determine the predicted level of employment for 2010 and 2020 and its disposition among broad sectors of the economy. In fact changes in the sectoral structure of employment have a significant impact on the forecast outcomes in terms of occupations. For example, employment in services (especially business services) is expected to continue to show significant growth, and it follows, therefore, that occupations associated with these sectors will be shown to assume greater importance.

The MTR economic forecasts are based on a range of assumptions relating to the World³ and domestic economies. Given the open nature of the Irish economy, the former exerts a significant influence. The recently published MTR sets out two growth scenarios for the Irish economy over the period covered. The first "High Growth" scenario assumes that the US economy can continue to expand at a rapid pace until about 2015, but with a gradual worsening in its external and government deficits. If realised, this would provide a very favourable backdrop for the Irish economy over such a time span. While this perspective may be plausible for some years yet, when looking beyond 2010 it is considered that an alternative "Low Growth" scenario is more realistic. This assumes that the US economy begins a gradual adjustment process to a more sustainable growth path prior to 2010 (possibly as early as 2007), resulting in slower growth, with knock-on affects on other World economies. Bearing these considerations in mind, the forecast employment total for 2010 used in this study is based on the "High Growth" scenario, but that for 2020 relates to the "Low Growth" perspective. Under such assumptions Irish GNP is forecast to grow by an annual average rate of almost 5 per cent between now and 2010, reducing to just over 3 per cent in the 2010-20 period. The corresponding annual rates for employment growth are 2.5 and 1 per cent respectively.

Outline of Methodology

The basic methodological approach involves the use, in the first instance, of employment forecasts for the target years (2010 and 2020) taken from the 2005 MTR. The macroeconomic model

¹ Eleven reports have been published to date in this series. The most recent (No.11) was "Occupational Employment Forecasts by Region for 2010".

² J. Fitz Gerald, *et al* (2005). *Medium-Term Review 2005-2012*. Dublin: The Economic and Social Research Institute. Dublin

³ From an Irish perspective, the most important regions are the EU, the US and the UK.

underlying this project is used to provide sectoral employment forecasts for eleven major groups, which for the purpose of compiling occupational projections, are further disaggregated on an estimated basis. The next step in the process involves the calculation of previous and projected occupational profiles within these sectors, which takes account of both past trends and expectations as to the likely development of occupations over the forecast period. The basic data used to analyse both industries and occupational shares within industries are taken from the 1991 and 1996 Censuses of Population and from the Quarterly National Household Surveys (QNHS) carried out between 1998 and 2005.

The occupational classification used in this report is based on that currently used by the Central Statistics Office both in the Censuses and in the QNHS. It is compatible with the International Labour Office (ILO) ISCO (88) International Standard Classification of Occupations and the UK Standard Occupational Classification (SOC).

The employment concept used in this analysis is based on the ILO definition, which relates to the volume of work (in terms of hours) done in a recent reference week.⁴ This definition is used by the CSO in the ongoing QNHS series.

The Content of this Report

The first two tables in this Report contain employment forecasts classified by broad sectoral groups, which are provided to give an overview of the of the expected background scenario. Tables 3 and 4 contain information on occupational employment trends, both in current terms, as well as forecasts covering the period up to 2020. Eighteen occupational categories are distinguished. Tables 5 and 6 contain forecast data not only on net employment changes (expansion demand), but also on gross labour force outflows, i.e. the “replacement” component. However, as indicated below, these estimates are tentative (especially for 2020) and should be used with caution. The final Table 7 which is concerned with educational attainment basically reflects the likely changes in the educational profile of those in employment consequent on the occupational forecasts previously referred to.

Estimates of Employment Flows, Replacement and Expansion Demand.

It is necessary to enter some qualifications regarding the forecasts presented in Tables 5 and 6 which contain estimates of replacement demand and expansion demand up to 2010 and 2020. Expansion demand, i.e. the net difference between employment stocks in the base year and the chosen forecast year, represents a fairly simple concept and is straightforward to estimate. However, replacement demand, which involves estimating gross outflows (or attrition) over a specified period for a given base-year employment cohort, is more problematic, both conceptually and in compiling estimates. As a result, few such estimates have been produced, either in this country or elsewhere. Notwithstanding our reservations, replacement demand is important and the evidence available suggests that the magnitudes involved are significant. Moreover, replacement demand would assume greater importance in periods of sluggish economic growth when the expansion element would be small.

The replacement demand estimates shown in Tables 5 and 6 are based on estimated occupational attrition ratios taken from Report No. 9 in the FAS/ESRI Manpower Forecasting Series.⁵ These ratios were based on data related to “recall” questions in the annual Labour Force Surveys from 1990 to 1997.⁶ The attrition ratios are first compiled on an annual average basis and then, in a forecasting context, applied in a compound fashion to base year occupational stock totals over the chosen forecast period. The ratios are compiled in such a way as to be all-inclusive in order to reflect exits from the labour force due to retirement and other reasons, emigration, deaths etc., as well as inter-occupational movements. The above-mentioned report should be consulted for a more detailed description of the methodology involved.

⁴ With this approach the criterion used in determining whether a survey respondent is in employment requires that work done for payment or profit in the reference week (usually the week prior to the survey) be in excess of one hour, which includes work in family businesses or on farms. Persons who had a job but were not at work because of illness, holidays etc. in the week in question are also included.

⁵ Sexton J., G. Hughes, B. McCormick, C. Finn (2001), *Estimating Labour Force Flows, Job Openings and Human Resource Requirements 1990-2005*. FAS/ESRI Manpower Forecasting Studies, Report No.9, Dublin.

⁶ These questions involved not only obtaining information on each respondent’s current economic situation, but also that at a point twelve months earlier, thus enabling information on changes in status and residence to be identified.

Apart from the fact that the information used is now somewhat dated, it is not altogether appropriate to assume that these ratios remain constant over time. For example, as a cohort ages overall exits would increase progressively, even though inter-occupational changes would tend to diminish. While these and other effects would probably not have a significant impact over a relatively short period (for example between 2005 and 2010), the application of the ratios over a fifteen year time span (i.e. up to 2020) is much more questionable. In summary, the replacement demand estimates for this period, which are likely to be understated, must be treated with considerable caution, and should be regarded as indicative in a general sense.

The annual average attrition ratios referred to above are shown in Appendix Table A1. It should be noted that for a small number of occupations (e.g. managers, transport occupations) the ratios are greater than unity. This is because recruits for these occupations are primarily drawn from persons in other occupational groups, rather than from outside the labour force.

Educational Attainment

An important issue in relation to the occupational forecasts concerns the question of the educational levels that will be required in the Irish workforce in 2010 and 2020. To address this question, past educational profiles for the period from 1999 to 2005 for occupational groups were analysed and projected to the forecast years, mainly on the basis of linear or logarithmic forecasting methods. For this purpose, the occupational groups were subdivided into five educational categories - primary; lower secondary (including transition year); higher secondary, PLCs and other non third level; third level diplomas and certificates; third level degree and higher. The projected shares were then applied to the forecast numbers employed in each occupational group for 2010 and 2020, thus providing an educational profile for each occupation in the forecast years.

In this analysis, as it involves the superimposition of one set of forecasts on another, the results must be viewed with a greater degree of uncertainty, especially those for 2020. Bearing this in mind, the number of occupational categories has been reduced from eighteen to ten. This involved grouping different subcategories for professionals, associate professionals, skilled manual workers and a number of service activities.

In summary, the forecast changes in the educational profile of the working population are influenced by movements in the relative importance of different occupational sub-groups in total employment, and by changes in the shares for different levels of education within each occupational group. Table 7 presents the educational profile for the ten occupational groups in question for the years 2000, 2005, 2010 and 2020.

Table 1. Employment by Sector, 2000 to 2020 (*ILO basis*)

Sector	2000	2005	2010	2020
			(000)	
Agriculture	132.8	113.7	97.0	73.3
Manufacturing of Machinery, Equipment, Chemicals	117.0	116.5	119.9	99.7
Other Industry	192.4	177.7	178.8	141.6
Building	166.1	242.4	260.5	286.7
Distribution	235.1	266.9	303.2	324.8
Transport & Communications	101.3	118.2	123.2	141.7
Finance & Business Services	208.4	254.0	328.3	424.2
Other Market Services	197.8	220.8	251.4	301.1
Public Admin., Education & Health	319.8	419.0	493.4	543.8
Total	1670.7	1929.2	2155.6	2336.8

Table 2. Annual Average Net Changes in Employment by Sector for Periods between 2000 and 2020 (*ILO basis*)

Sector	Annual Average Net Changes					
	2000/05	2005/10	2010/20	2000/05	2005/10	2010/20
		(000)			%	
Agriculture	-3.8	-3.3	-2.4	-3.1	-3.1	-2.8
Manufacturing of Machinery, Equipment, Chemicals	-0.1	0.7	-2.0	-0.1	0.6	-1.8
Other Industry	-3.0	0.2	-3.7	-1.6	0.1	-2.3
Building	15.3	3.6	2.6	7.9	1.5	1.0
Distribution	6.4	7.3	2.2	2.6	2.6	0.7
Transport & Communications	3.4	1.0	1.8	3.1	0.8	1.4
Finance & Business Services	9.1	14.8	9.6	4.0	5.3	2.6
Other Market Services	4.6	6.1	5.0	2.2	2.6	1.8
Public Admin., Education & Health	19.8	14.9	5.0	5.6	3.3	1.0
Total	51.7	45.3	18.1	2.9	2.2	0.8

Table 3. Employment by Occupational Group, 2000 to 2020 (*ILO basis*)

Occupational Group	2000	2005	2010	2020
			(000)	
Agricultural Occupations	114.7	101.0	85.7	64.3
Managers & Proprietors	206.4	231.1	271.9	301.2
Health & Education Professionals	87.7	103.0	118.5	122.1
Science & Engineering Professionals	40.1	55.7	67.0	82.9
Business, Legal & Other Professionals	55.5	81.6	107.5	142.8
Health Associate Professionals	50.3	67.7	82.2	95.2
Science & Engineering Associate Profs.	36.3	42.3	51.5	59.6
Other Associate Professionals	51.4	59.0	75.8	88.4
Clerical	209.7	242.7	266.8	277.5
Skilled building workers	55.3	85.3	95.4	109.4
Skilled Maintenance Workers	69.5	74.5	80.7	80.9
Other skilled manual	69.9	80.8	86.1	85.9
Operatives	152.4	126.4	138.3	121.1
Transport Occupations	69.9	84.0	86.7	96.0
Sales Occupations	157.9	184.9	204.1	229.3
Carers	38.1	64.0	80.4	97.2
Other Service & Protective Activities	108.2	121.2	134.6	155.3
Unskilled Manual	97.2	123.7	122.4	127.6
Total	1670.7	1929.2	2155.6	2336.8

Table 4. Annual Average Net Changes in Employment by Occupation for Periods between 2000 and 2020
(ILO basis)

Occupational Group	Annual Average Net Changes					
	2000/05	2005/10	2010/20	2000/05	2005/10	2010/20
	(000)			%		
Agricultural Occupations	-2.7	-3.1	-2.1	-2.5	-3.2	-2.8
Managers & Proprietors	4.9	8.1	2.9	2.3	3.3	1.0
Health & Education Professionals	3.1	3.1	0.4	3.3	2.9	0.3
Science & Engineering Professionals	3.1	2.2	1.6	6.8	3.7	2.2
Business, Legal & Other Professionals	5.2	5.2	3.5	8.0	5.7	2.9
Health Associate Professionals	3.5	2.9	1.3	6.1	3.9	1.5
Science & Engineering Associate Profs.	1.2	1.9	0.8	3.1	4.0	1.5
Other Associate Professionals	1.5	3.3	1.3	2.8	5.1	1.5
Clerical	6.6	4.8	1.1	3.0	1.9	0.4
Skilled building workers	6.0	2.0	1.4	9.0	2.3	1.4
Skilled Maintenance Workers	1.0	1.2	0.0	1.4	1.6	0.0
Other skilled manual	2.2	1.1	0.0	2.9	1.3	0.0
Operatives	-5.2	2.4	-1.7	-3.7	1.8	-1.3
Transport Occupations	2.8	0.5	0.9	3.8	0.6	1.0
Sales Occupations	5.4	3.8	2.5	3.2	2.0	1.2
Carers	5.2	3.3	1.7	10.9	4.7	1.9
Other Service & Protective Activities	2.6	2.7	2.1	2.3	2.1	1.4
Unskilled Manual	5.3	-0.3	0.5	4.9	-0.2	0.4
Total	51.7	45.3	18.1	2.9	2.2	0.8

Table 5. Components of Gross Employment Demand, 2005-2010

Occupational Group	2005	2010	Replacement Demand	Expansion Demand	Gross Demand	Gross Demand as % of 2010 Employment
			(000)			%
Agricultural Occupations	101	86	15	-15	-1	-0.7
Managers & Proprietors	231	272	-18	41	23	8.4
Health & Education Professionals	103	119	14	16	29	24.6
Science & Engineering Professionals	56	67	7	11	19	27.8
Business, Legal & Other Professionals	82	107	11	26	37	34.1
Health Associate Professionals	68	82	8	14	23	27.8
Science & Engineering Associate Profs.	42	52	5	9	14	28.1
Other Associate Professionals	59	76	7	17	24	31.7
Clerical	243	267	40	24	64	23.9
Skilled building workers	85	95	11	10	21	22.0
Skilled Maintenance Workers	75	81	8	6	14	16.9
Other skilled manual	81	86	10	5	16	18.2
Operatives	126	138	9	12	21	15.2
Transport Occupations	84	87	-5	3	-2	-2.9
Sales Occupations	185	204	37	19	56	27.6
Carers	64	80	12	16	28	34.7
Other Service & Protective Activities	121	135	22	13	35	26.2
Unskilled Manual	124	122	25	-1	24	19.7
Total	1929	2156	218	226	444	20.6

Table 6. Components of Gross Employment Demand, 2005-2020

Occupational Group	2005	2020	Replacement Demand	Expansion Demand	Gross Demand	Gross Demand as % of 2010 Employment
			(000)			%
Agricultural Occupations	101	64	38	-37	1	2.1
Managers & Proprietors	231	301	-58	70	12	4.0
Health & Education Professionals	103	122	36	19	55	44.9
Science & Engineering Professionals	56	83	19	27	47	56.1
Business, Legal & Other Professionals	82	143	28	61	89	62.7
Health Associate Professionals	68	95	22	28	50	52.1
Science & Engineering Associate Profs.	42	60	14	17	31	52.2
Other Associate Professionals	59	88	19	29	49	55.0
Clerical	243	278	100	35	135	48.7
Skilled building workers	85	109	29	24	53	48.3
Skilled Maintenance Workers	75	81	20	6	27	33.0
Other skilled manual	81	86	27	5	32	37.6
Operatives	126	121	26	-5	20	16.7
Transport Occupations	84	96	-16	12	-4	-4.7
Sales Occupations	185	229	91	44	135	58.9
Carers	64	97	29	33	62	63.7
Other Service & Protective Activities	121	155	54	34	89	57.0
Unskilled Manual	124	128	62	4	66	51.4
Total	1929	2337	540	408	948	40.6

Table 7: Employment by Occupational Group and Education, 2000, 2005, 2010 and 2020

	2000	2005	2010	2020	2000	2005	2010	2020
	000's				%			
Agricultural Occupations								
Primary	45.2	38.7	27.2	15.0	39	38	32	23
Lower Secondary	26.9	23.4	20.7	15.9	23	23	24	25
Higher Secondary, PLCs and other non-third level	38.1	30.7	26.9	19.5	33	30	31	30
Third Level Diplomas and Certificates	2.3	5.5	7.5	10.0	2	5	9	16
Third Level Degree and higher	2.2	2.6	3.4	3.9	2	3	4	6
Total	114.7	101.0	85.7	64.3	100	100	100	100
Managers & Proprietors								
Primary	13.0	12.4	3.4	0.0	6	5	1	0
Lower Secondary	25.9	27.8	31.0	29.3	13	12	11	10
Higher Secondary, PLCs and other non-third level	94.8	88.6	101.1	97.5	46	38	37	32
Third Level Diplomas and Certificates	26.4	36.8	46.7	52.0	13	16	17	17
Third Level Degree and higher	46.3	65.5	89.8	122.4	22	28	33	41
Total	206.4	231.1	271.9	301.2	100	100	100	100
Professionals								
Primary	2.1	1.8	0.0	0.0	1	1	0	0
Lower Secondary	3.5	3.9	1.9	0.0	2	2	1	0
Higher Secondary, PLCs and other non-third level	21.6	26.2	28.0	25.9	12	11	10	7
Third Level Diplomas and Certificates	21.1	24.5	29.6	31.5	11	10	10	9
Third Level Degree and higher	135.1	184.0	233.5	290.4	74	77	80	84
Total	183.3	240.3	293.0	347.8	100	100	100	100
Associate Professionals								
Primary	4.0	3.9	4.3	0.2	3	2	2	0
Lower Secondary	8.7	8.8	8.8	8.5	6	5	4	3
Higher Secondary, PLCs and other non-third level	44.3	43.5	50.7	51.3	32	26	24	21
Third Level Diplomas and Certificates	45.9	53.4	68.1	78.2	33	32	33	32
Third Level Degree and higher	35.2	59.4	77.6	104.9	26	35	37	43
Total	138.0	169.0	209.5	243.1	100	100	100	100
Clerical								
Primary	8.0	7.8	8.9	8.5	4	3	3	3
Lower Secondary	22.1	25.2	26.2	26.1	11	10	10	9
Higher Secondary, PLCs and other non-third level	139.8	144.1	157.5	157.4	67	59	59	57
Third Level Diplomas and Certificates	22.5	33.8	40.2	46.2	11	14	15	17
Third Level Degree and higher	17.4	31.7	34.0	39.4	8	13	13	14
Total	209.7	242.7	266.8	277.5	100	100	100	100

Table 7: Employment by Occupational Group and Education, 2000, 2005, 2010 and 2020
continued

	2000	2005	2010	2020	2000	2005	2010	2020
	000's				%			
Skilled Manual								
Primary	26.0	23.4	17.2	2.4	13	10	7	1
Lower Secondary	53.2	60.2	63.9	61.9	27	25	24	22
Higher Secondary, PLCs and other non-third level	104.1	133.4	143.2	150.9	53	55	55	55
Third Level Diplomas and Certificates	6.5	16.1	28.4	48.9	3	7	11	18
Third Level Degree and higher	5.0	7.6	9.5	12.3	3	3	4	4
Total	194.8	240.7	262.2	276.3	100	100	100	100
Operatives								
Primary	27.4	22.6	21.9	15.9	18	18	16	13
Lower Secondary	46.3	33.3	36.6	30.2	30	26	26	25
Higher Secondary, PLCs and other non-third level	67.7	56.7	61.5	54.0	44	45	44	45
Third Level Diplomas and Certificates	7.4	8.8	11.3	14.0	5	7	8	12
Third Level Degree and higher	3.7	5.2	7.1	7.1	2	4	5	6
Total	152.4	126.4	138.3	121.1	100	100	100	100
Sales								
Primary	13.9	15.7	8.3	0.0	9	9	4	0
Lower Secondary	42.0	40.1	42.9	42.9	27	22	21	19
Higher Secondary, PLCs and other non-third level	84.1	97.2	107.2	115.0	53	53	52	50
Third Level Diplomas and Certificates	9.3	15.8	21.8	32.6	6	9	11	14
Third Level Degree and higher	8.6	16.2	24.0	38.9	5	9	12	17
Total	157.9	184.9	204.1	229.3	100	100	100	100
Other Services Workers								
Primary	49.7	48.3	41.0	10.9	23	18	14	3
Lower Secondary	60.7	67.1	72.1	72.3	28	25	24	21
Higher Secondary, PLCs and other non-third level	83.4	114.1	130.0	164.5	39	42	43	47
Third Level Diplomas and Certificates	15.6	24.0	31.0	45.9	7	9	10	13
Third Level Degree and higher	6.9	15.8	27.5	54.9	3	6	9	16
Total	216.2	269.3	301.7	348.5	100	100	100	100
Unskilled Manual								
Primary	39.2	38.8	31.2	14.5	40	31	26	11
Lower Secondary	31.8	36.4	35.6	35.8	33	29	29	28
Higher Secondary, PLCs and other non-third level	24.4	39.2	43.3	57.8	25	32	35	45
Third Level Diplomas and Certificates	1.4	4.4	7.0	12.6	1	4	6	10
Third Level Degree and higher	0.4	5.0	5.3	7.0	0	4	4	5
Total	97.2	123.7	122.4	127.6	100	100	100	100
Total								
Primary	228.5	213.4	163.4	67.4	14	11	8	3
Lower Secondary	321.0	326.1	339.6	322.8	19	17	16	14
Higher Secondary, PLCs and other non-third level	702.2	773.6	849.3	893.6	42	40	39	38
Third Level Diplomas and Certificates	158.2	223.1	291.7	371.8	9	12	14	16
Third Level Degree and higher	260.8	393.0	511.7	681.2	16	20	24	29

Total	1670.7	1929.2	2155.6	2336.8	100	100	100	100
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APPENDIX

Table A1. Labour Force Attrition Ratios. Annual Averages 1990-1997

Occupational Group	<i>Ratio</i>
Agricultural Occupations	0.969
Managers & Proprietors	1.015
Health & Education Professionals	0.972
Science & Engineering Professionals	0.972
Business, Legal & Other Professionals	0.972
Health Associate Professionals	0.974
Science & Engineering Associate Profs.	0.974
Other Associate Professionals	0.974
Clerical	0.965
Skilled building workers	0.973
Skilled Maintenance Workers	0.979
Other skilled manual	0.973
Operatives	0.985
Transport Occupations	1.012
Sales Occupations	0.956
Carers	0.961
Other Service & Protective Activities	0.961
Unskilled Manual	0.955

Source. Sexton J., G. Hughes, B. McCormick, C. Finn (2001). *Estimating Labour Force Flows, Job Openings and Human Resource Requirements 1990-2005*. FAS/ESRI Manpower Forecasting Studies, Report No.9. Dublin.

Note. These ratios are based on the total labour force. They have been applied to employment totals in the main analysis, but it is not considered that this has a significant effect on the outcomes.
