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Skills Deepening or Credentialism? Education Qualifications and Occupational Outcomes, 1996-2011

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Abstract

We look at the changes to the 'quality' of jobs obtained by persons with particular qualifications over the period 1996 to 2011, where quality is based on an index which ranks 400 or so occupations by the level of qualifications in the occupation, average income of those who are full-time employed or occupational status. The occupational structure has changed in a way to favour the 'better jobs', but this has been swamped by the expansion in educational qualifications with the result that the average quality of the job obtained by a person with a particular qualification is lower in 2011 than in 1996. The census data allow a detailed characterisation of qualifications with four levels – higher degrees, degrees, diplomas and certificates III/IV – and nine fields of study. The groups most affected by the decline in the quality of jobs obtained are those with a higher degree (particularly business and administration) and diploma (particularly education and health).

Keywords: Human capital, Skills; Occupational choice, Labor productivity

JEL classification: J21, J24

1. Introduction

The lynch-pin of public education policy over the last 50 years (or longer) has been ever increasing education levels. This policy direction is firmly entrenched (see, for example, Australian Workplace Productivity Agency, 2013) and has been based on demonstrable returns to education. For example, Coelli and Wilkins (2008) provide a comprehensive set of estimates of average returns for Australia and show that the labour market has remained pretty friendly to (university) graduates. Karmel (2013) also shows that relative hourly wage rates for individuals with varying educational qualifications have been quite stable for the period 1997-2009, despite the substantial

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increase in the proportion of the workforce with qualifications. However, logically at least, an expansion will eventually lead to a decrease in the return to education for some people – if everyone has a PhD then inevitably some will end up driving taxis. Concerns that the expansion of education can lead to a surplus of graduates were aired 40 years ago with Freeman (1976) arguing that there were too many graduates in the Unites States in the 1960s, and the production of too many graduates would lead to underutilisation of graduates' skills. More recently, the concept of credentialism – by which is meant the acquisition of credentials not needed for a job- has received attention (for example, Dockery and Miller, 2012).

The purpose of this paper is to explore further one particular aspect of the pay-off to education – the type of job an individual with a particular level of education is likely to get. The general idea has been presented earlier (Karmel, 2011). We use occupations as a device to rank jobs and then compare the distributions of jobs across time for individuals with particular education levels. In that paper, for example, we found that between 1996 and 2006, individuals with a diploma became considerably less likely to have a job in the top two deciles of skilled jobs (based on an index which ranked occupations depending on their qualification profile).

This way of looking at the pay-off to education is related to the concept of over education (see, Mavromaras and McGuinness (2007) for an overview). Graduates are said to be overeducated if they are in jobs which typically do not require that level of education. Similarly, graduates are mismatched if they are in a job which does not require the particular level of education. Typically, it has been found that overeducation is associated with poorer labour market outcomes such as lower wages and job satisfaction. Miller (2007) found that in Australia around a half of workers with university degrees could be categorised as overeducated and argued that this was of some concern because of the high cost of the acquisition of a degree. Sloane (2007) points to over education increasing in the United Kingdom with the extent of overeducation rising to 30 per cent in 2006. Mavromaras and McGuinness point to over education being an issue in numerous countries, including the United States, Denmark, France, Ireland, Italy, Spain, Greece, Portugal and Australia.

In our analysis we focus on how the job distribution has changed for a given level of education rather than a change in the proportion of graduates who are over educated. There will be a relationship between the two – if the distribution of persons with a certain qualification shifts toward less desirable jobs then we can expect the proportion of over educated persons to have increased. The distributional approach we have adopted has the advantage of not requiring a definition of specific education requirements for an occupation, noting that education requirements for an occupation tend to change over time.

The extension in this paper is four fold. First, the data are updated to 2011, taking advantage of the Census of that year.[1] Second, the analysis considers two

[1] In using the 1996 and 2011 Census data we had to contend with the Australian Standard Classification of Education (ASCED) replacing the ABS Classification of Qualifications (ABSCQ) and ANZSCO replacing the earlier occupational standard ASCO. Details of the methodology handling these changes can be found in Karmel, Stanwick and Moore (forthcoming).

additional alternative indexes, with occupations ranked on the basis of income and also by socioeconomic status, as well by the qualifications profile. Third, changes in the occupational structure of the labour market are isolated, by using the 1996 distribution of jobs as the benchmark. Finally, the analysis is undertaken at a broad field of study, to emphasise the point that averages mask considerable variation in people's experiences. We also note that the Census allows a fine grained approach with the occupational distributions created from around 400 individual occupations.

The structure of the paper is as follows. In the next section we consider the three indexes used to rank occupations. In section three we show how educational qualifications have increased and how the occupational distribution of jobs has changed between 1996 and 2011. This is followed by an analysis of the occupational distributions, focussing first on the relationship between educational qualification and occupational distributions in 1996 and then the changes between 1996 and 2011. Section 4 repeats the analysis by field of study. We end with a short discussion.

Our main finding is that, despite the occupational structure changing to favour the better jobs, that the expansion in the proportion of persons with qualifications has far out-stripped the change in the employment structure. This means that in general the average job for persons with a particular qualification in 2011 is of lower quality than in 1996. Persons with higher degrees (particularly those in business and administration) and diplomas (particularly education and health) have been the most affected. The former most likely reflects the rapid expansion in supply of persons with higher degrees, while the latter is largely a consequence of changes in minimum job requirements – for example, degrees are now required for nursing and teaching.

2. Occupational Indexes

The main point of this paper is to look at how the likelihood of getting a 'good' job has changed for individuals with a particular level of qualification. This requires an ordering of occupations from the best to the worst. Previously (Karmel, 2011) we ordered occupations by means of a skills index, which assigned a ranking to four digit ASCO2 occupations on the basis of the distribution of qualifications in the occupation. According to that index the most skilled occupation was 2421 University lecturers and tutors (with a high proportion of individuals with post-graduate qualifications) and the least skilled occupation was 9932 Fast food cooks.

An alternative ranking of occupations is by income. This index was constructed using full-time employment by occupation by income data from the 2006 Census. The precise method can be found in Karmel, Stanwick and Moore (forthcoming). The highest ranked occupation according to this index is *2312 Specialist Medical Practitioners*.

A third ranking is available from an index constructed at the ANU. The ASCO version of this index (Jones and McMillan, 2001) is labelled ANU 4[2] and is described as an index of socio-economic status. It reflects qualification levels, income and occupational prestige.

[2] The latest version is AUSEI06 (Macmillan *et al*. 2009).

The essential feature of these indexes is that they can be used to rank occupations.

All of these measures have their limitations. For example, the skills measure can be criticised for being self-referential if we are particularly interested in the outcomes of people with qualifications. Why does working in an occupation where there are few with a degree make the job less desirable? Also the skills index does not account for skills learnt on the job (although the returns to experience tend to be higher in professional jobs relative to trade or unskilled jobs). Nevertheless, it is intuitively attractive that occupations typically performed by individuals who have invested in high levels of education are highly desirable. Similarly, average income does not capture many important attributes of wages, such as the level of entry level wages, income volatility, and likely wage progression. The socioeconomic status index sounds broader conceptually but in practice builds primarily on levels of qualifications and wages.

Thus, there is no single measure of what makes a good job. That said, the three rankings are highly correlated. If we map the index rankings on the 2006 full-time employment data to obtain percentiles (a value of 10, for example, indicates that the occupation is in the top 10 per cent of jobs according to that index), then we can calculate the correlations between the three possibilities (table 1).[3]

Table 1 - Correlations between Occupations according to the Skills Index, the Income Index and Occupational Status (ANU4)

	Skills	*Income*	*Status*
Skills	1.00	0.72	0.92
Income		1.00	0.76
Status			1.00

The correlations are high, suggesting that the precise way occupations are ordered is not a great issue.

The most similar indexes are the skills index and the occupational status index. The least similar are the skills index and the income index. It appears that the ANU4 occupational index lies between the other two, although it is very closely related to the skills index. To keep the analysis tractable, we restrict the ensuing analysis to the skills and income indexes – the two which differ the most. If the results of the analysis are robust to the choice of index then we do not need to particularly concerned about precisely how the occupations are ranked.

To give some flavour of the occupational rankings we present in table 2 the highest and lowest ranked occupations according to the skills and income indexes. The highest ranked occupation is at the top of the table and the lowest at the bottom. Those occupations that are in the top (bottom) 20 occupations according to the two indexes are bolded.

[3] The three rankings for each occupation can be found in Karmel, Stanwick and Moore (2014) (noting that occupations with less than 500 employed persons in 2006 were deleted because of doubts about reliability).

Table 2 - Highest and Lowest Ranked Occupations According to Skills and Income Occupational Indexes

Highest paid occupations	*Highest skilled occupations*
2312 Specialist Medical Practitioners	2421 University Lecturers and Tutors
1111 Legislators and Government Appointed Officials	2110 Natural and Physical Science Professionals, nfd
2311 Generalist Medical Practitioners	2514 Psychologists
2381 Dental Practitioners	2387 Chiropractors and Osteopaths
1212 Company Secretaries	**2312 Specialist Medical Practitioners**
2127 Mining and Materials Engineers	**2522 Economists**
2213 Corporate Treasurers	2113 Life Scientists
1221 Engineering Managers	**2112 Geologists and Geophysicists**
1112 General Managers	2119 Other Natural and Physical Science Professionals
1224 Information Technology Managers	2115 Medical Scientists
2521 Legal Professionals	1293 Education Managers
4988 Power Generation Plant Operators	2420 University and Vocational Education Teachers, nfd
2112 Geologists and Geophysicists	2393 Dietitians
3210 Finance Associate Professionals, nfd	**2311 Generalist Medical Practitioners**
1291 Policy and Planning Managers	2492 English as a Second Language Teachers
2295 Property Professionals	2386 Speech Pathologists
1293 Education Managers	**2381 Dental Practitioners**
2522 Economists	2293 Mathematicians, Statisticians and Actuaries
1213 Human Resource Managers	2322 Nurse Educators and Researchers
2541 Air Transport Professionals	2385 Physiotherapists
Lowest paid occupations	*Lowest skilled occupations*
9200 Factory Labourers, nfd	9915 Railway Labourers
8313 Domestic Housekeepers	9913 Paving and Surfacing Labourers
4931 Hairdressers	9213 Meat and Fish Process Workers
6131 Receptionists	9912 Earthmoving Labourers
4513 Cooks	7297 Clay, Stone and Concrete Processing Machine Operators
6391 Dental Assistants	8115 Betting Clerks
8296 Service Station Attendants	**6324 Hospitality Trainees**
9921 Farm Hands	**8116 Office Trainees**
9931 Kitchenhands	**7211 Sewing Machinists**
9932 Fast Food Cooks	9931 Kitchenhands
8291 Checkout Operators and Cashiers	9000 Labourers and Related Workers, nfd
9221 Hand Packers	**9221 Hand Packers**
6323 Waiters	7112 Forklift Drivers
8315 Laundry Workers	**9933 Food Trades Assistants**
9933 Food Trades Assistants	**8291 Checkout Operators and Cashiers**
6312 Children's Care Workers	9219 Other Process Workers
7211 Sewing Machinists	4612 Shearers
6392 Veterinary Nurses	9215 Wood Products Factory Hands
6324 Hospitality Trainees	9991 Garbage Collectors
8116 Office Trainees	**9932 Fast Food Cooks**

While the correlation between these two indexes is high at 0.72, there are considerable numbers of occupations for which the income ranking is well above the skills ranking, and vice versa. To give some insight into these differences, we show the 10 occupations for which the income percentile is much more favourable than the skills percentile, the 10 occupations for which the income and skills percentiles have the greatest degree of concordance, and the 10 occupations for which the skills percentile is much more favourable than the income percentile.

Table 3 - Selected Occupations and Index Values

Occupation	*2006 full-time emp.*	*Income per cent*	*ANU4 per cent*	*Skills per cent*	*Difference between income and skills per cent*
Occupations in which income >skill ranking					
7911 Miners	20,667	8.1	82.1	83.4	-75.3
4986 Drillers	4,692	11.6	77.3	80.3	-68.7
7912 Blasting Workers	757	9.3	82.1	74.6	-65.3
7315 Train Drivers and Assistants	7,171	20.1	83.3	80.2	-60.1
7122 Crane, Hoist and Lift Operators	6,868	30.3	83.9	82.2	-51.9
9915 Railway Labourers	2,727	46.5	98.4	97.1	-50.6
9911 Mining Support Workers and Driller's Assistants	2,765	33.0	87.0	83.6	-50.6
7124 Pulp and Paper Mill Operators	1,512	34.5	84.0	81.9	-47.5
4987 Chemical, Petroleum and Gas Plant Operators	5,013	12.1	48.2	58.8	-46.7
7913 Structural Steel Construction Workers	10,990	31.7	82.3	77.8	-46.1
7111 Mobile Construction Plant Operators	31,696	47.2	93.8	91.8	-44.6
3393 Transport Company Managers	9,076	36.8	38.6	81.0	-44.2
Occupations in which income=skill ranking (a)					
9111 Cleaners	59,001	92.3	91.5	92.8	-0.5
3291 Office Managers	66,261	53.4	42.2	53.5	-0.1
9931 Kitchenhands	18,131	97.9	89.0	98.0	-0.1
9933 Food Trades Assistants	1,467	99.1	87.8	99.2	-0.1
9221 Hand Packers	23,832	98.6	98.2	98.6	0.0
3120 Building and Engineering Associate Professionals, nfd	8,961	34.6	32.3	34.5	0.1
8211 Sales Assistants	156,772	90.5	81.8	90.3	0.2
4000 Tradespersons and Related Workers, nfd	12,306	44.2	50.0	44.0	0.2
6213 Retail and Checkout Supervisors	15,927	80.9	85.6	80.6	0.4
2521 Legal Professionals	41,167	3.7	1.4	3.3	0.4
Occupations in which income <skill ranking					
3111 Medical Technical Officers	10,012	80.3	32.8	35.2	45.1
6392 Veterinary Nurses	2,820	100.0	73.2	51.9	48.1
6312 Children's Care Workers	36,943	99.8	66.2	51.4	48.3
3997 Library Technicians	3,072	79.8	36.5	29.8	50.0
3411 Enrolled Nurses	8,289	82.1	34.5	30.4	51.7
4931 Hairdressers	27,656	95.4	70.7	42.5	52.9
2394 Natural Therapy Professionals	1,998	69.7	10.8	13.2	56.5
3494 Massage Therapists	1,931	82.7	34.6	24.6	58.2
2515 Ministers of Religion	10,975	69.4	21.1	10.3	59.1
6395 Personal Care Consultants	8,817	93.8	45.2	34.7	59.2

Note: (a) within +/- 0.5per cent.

It is interesting to note that the top group, with very high income rankings, tend to be in male dominated occupations in industries where there is considerable union power. By contrast, the bottom group of occupations – where income rankings are much lower than skills rankings -is largely female dominated, where qualifications are expected but pay is poor.

3. Changes in Education Levels and Occupations 1996 to 2011

The crux of the paper is that the relationship between occupation and educational qualifications has been changing, with the increase in education levels occurring faster that that 'required' by changes in the occupation structure. This implies that - in the terminology of the Skills Australia (2009) – 'skills deepening' has occurred, with the levels of qualification increasing within occupations. Table 4 shows that the fifteen years 1996 to 2011 have seen considerable increases in the proportion of the workforce with qualifications.

Table 4 - Proportion of Employed Persons by Highest Qualification, 1996, 2006 and 2011, Per Cent

	1996	*2006*	*2011*	*Per cent point change 1996 to 2011*
Higher degree	2.1	3.8	5.1	3.0
Bachelor degree	13.6	18.4	20.9	7.3
Diploma/advanced diploma	8.2	9.0	10.1	1.8
Certificate III & IV level	14.3	18.2	19.5	5.2
Other certificates	10.7	8.6	7.1	-3.6
No non-school qualification	51.0	41.9	37.3	-13.7
Total	100	100	100	

Notes: Higher degree includes doctorates, masters and post-graduate degree level (not further defined); bachelor degrees include bachelor degrees and graduate diploma/graduate certificates; other certificates include certificates I/II, certificates not further defined, and level inadequately described or not stated. Four digit occupations with less than 500 persons in the 2006 census have been excluded from the analysis in this and the following three tables to be consistent with the rest of the analysis in this paper, but they only account for a very small proportion of all occupations anyway. When originally constructing the skills index, occupations with less than 500 people were excluded (see, Karmel, 2011).
Source: Derived from the Census of Population and Housing, 1996, 2006 and 2011.

We see that the proportion of the workforce with qualifications has increased quite dramatically over the period. The greatest increase has been in the proportion with a bachelor degree and certificate III/IV.

There has been substantial change in the occupational structure of the workforce (table 5), reflecting the impact of technological and other structural changes (Kelly and Lewis, 2010), but the increase in levels of qualifications has been much greater than that needed to maintain the status quo. Thus we see in table 6 that in every occupation there has been an increase in the proportion of workers with post-graduate, bachelor degree, diploma and certificate III/IV qualifications, and a decline

in the proportion with no qualification. The table also shows an element of upgrading in qualifications with the proportion with a certificate other than at the III/IV level declining.

Table 5 - Employment Growth 1996 to 2011, by ASCO2 Major Groups (Per Cent)

	1996	*2011*	*Per cent change*
1 Managers and administrators	708,626	877,325	23.8
2 Professionals	1,306,709	2,091,565	60.1
3 Associate professionals	860,501	1,237,677	43.8
4 Tradespersons and related workers	995,523	1,174,805	18.0
5 Advanced clerical and service workers	329,673	272,064	-17.5
6 Intermediate clerical, sales and service workers	1,222,762	1,763,988	44.3
7 Intermediate production and transport workers	660,330	784,406	18.8
8 Elementary clerical, sales and service workers	677,190	912,194	34.7
9 Labourers and related workers	666,221	741,896	11.4
Total	**7,427,535**	**9,855,920**	**32.7**

Source: Derived from the Census of Population and Housing, 1996 and 2011.

Table 6 - Changes in the Proportion of Occupations (ASCO 2 Major Groups) with Qualifications, 1996 and 2011 (Percentage Points)

	Higher degree	*Bachelor degree*	*Diploma/ advanced diploma*	*Certificate III & IV level*	*Other certificates*	*No non-school qualification*
1 Managers and administrators	5.9	10.3	2.5	2.5	-4.2	-17.1
2 Professionals	6.3	7.8	-6.8	2.0	-3.5	-5.8
3 Associate professionals	2.6	8.3	5.2	4.7	-5.8	-15.0
4 Tradespersons and related workers	0.2	1.5	1.9	6.1	-3.5	-6.3
5 Advanced clerical and service workers	1.7	8.0	6.4	9.0	-9.7	-15.4
6 Intermediate clerical, sales and service workers	1.6	5.5	4.5	12.0	-3.9	-19.6
7 Intermediate production and transport workers	0.6	2.0	2.1	7.7	-1.0	-11.5
8 Elementary clerical, sales and service workers	1.1	3.6	2.7	5.4	-1.7	-11.2
9 Labourers and related workers	0.6	2.4	2.0	7.2	-0.5	-11.7
Total	**3.0**	**7.3**	**1.8**	**5.2**	**-3.6**	**-13.7**

Source: Derived from the Census of Population and Housing, 1996 and 2011.

Thus we see that people with higher degrees increased their share of employment by three percentage points between 1996 and 2011, but increased their share of employment in *managers and administrators* and *professionals* by 5.9 and 6.3 percentage points respectively. We also see that the proportion of people with qualifications has increased even in occupations where there is unlikely to be a link between the qualification and the work. For example, we see increases in the proportion of workers with a higher degree in *intermediate clerical, sales and service workers; intermediate production and transport workers; elementary clerical, sales and service workers;* and *labourers and related workers*.

Finally, we note that the growth of qualifications has been uneven across fields of study (table 7).

Table 7 - Average Annual Growth 1996-2011 (Per Cent)

	Higher degree	*Bachelor degree*	*Diploma and advanced diploma*	*Cert III & IV*	*Other quals*	*Total*
Agriculture, Environmental and Related Studies	8.9	7.6	2.9	5.7	2.3	4.3
Architecture and Building	14.3	6.4	3.9	2.8	1.3	2.7
Management and Commerce	12.2	6.5	5.0	17.6	2.0	5.1
Education	7.9	3.2	-2.3	n.a.	3.8	3.0
Engineering and Related Technologies	6.8	4.7	2.0	1.1	1.7	1.8
Health	6.4	5.8	-0.5	19.0	1.1	3.3
Natural and Physical Sciences + Information Technology	6.6	4.4	4.8	12.3	3.8	4.8
Society and Culture + Creative Arts	6.6	4.0	7.0	14.7	5.2	5.8
Food, hospitality and personal services + mixed fields	9.3	5.9	4.3	3.9	-0.7	0.2
Total	8.3	5.1	3.4	3.9	-0.1	1.5

Source: Derived from the Census of Population and Housing, 1996 and 2011.

The growth in higher degrees has been particularly high in *architecture and building* and *management and commerce*. The growth in degrees has been relatively uniform while the growth in diplomas was highest in *society and culture and creative arts* and *management and commerce* but negative in a couple of areas (presumably degrees are edging out diplomas). The growth in certificates III and IV is quite concentrated: *management and commerce, health, natural and physical sciences and information technology,* and *society and culture and creative arts* all have annual growth rates exceeding 10 per cent per annum.

4. Occupational Distributions

We now analyse the change in the relationship between education level and occupation in a rather more sophisticated way, by looking at the occupational distribution of jobs for those with a particular level of qualification.

Before looking at the occupational distributions at the qualification level we show how the occupational distributions have changed between 1996 and 2011. The distributions are represented by Lorenz style curves, with the cumulative share of employment in 2011 on the y axis and the cumulative share of employment in 1996 on the x axis (each point is an occupation). If there had been no change in the distribution of jobs by occupation across the two periods then the curve would be a 45 degree line.

Figure 1 shows the change based on the distribution in which jobs are ranked by skill levels, figure 2 by income levels.

We see that both curves are to the left of the 45 degree line, indicating that employment growth has been biased toward the better jobs, irrespective of which ordering of occupations is used. For example, if we take the occupation corresponding to the 40th percentile in 1996 according to the skills index (figure 1), we see that around 45 per cent of jobs in 2011 were at this skills level or higher. That is, the 'better' occupations grew faster than the lower skill occupations.

We now consider the occupation distributions at the qualification level. In figure 3, we show the Lorenz style curves for 1996 for each of the qualification levels, based on the skills index. On the x axis is the cumulative distribution of all jobs, with the 'best' job at the zero point. On the y axis is the cumulative distribution of the jobs for individuals possessing a particular qualification. Rather than present this for all persons we look at 25-44 year olds – this age group best reflects the job prospects of young people once they have completed their education.[4] Figure 4 shows the curves for the income index.

The above figures map out the cumulative distributions of the employment level for each qualification; one can read off the proportion of employment for each qualification that corresponds to any point in the overall employment distribution. So, taking the skill index for example (figure 3), we see that around 55 per cent of those with a higher degree had jobs in the top decile of jobs, with the corresponding figure for bachelor degrees around 40 per cent, for diplomas 15 per cent and close to zero for those with a certificate III/IV. Similar statistics can be extracted at any percentile of the overall job distribution. There is a clear hierarchy of qualifications, and this pattern is quite robust in respect of the choice of occupational index.

[4] The analysis was also done for all persons aged 15-64 years.

Figure 1 - Cumulative Shares of Employment (15-64 year olds) for Each Occupation, 1996 and 2011, Occupations Ordered by Skill Levels

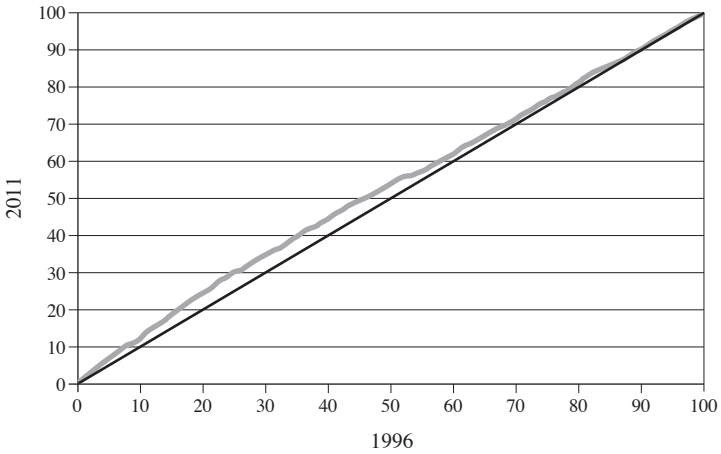


Figure 2 - Cumulative Shares of Employment for Each Occupation (15-64 year olds), 1996 and 2011, Occupations Ordered by Income Levels

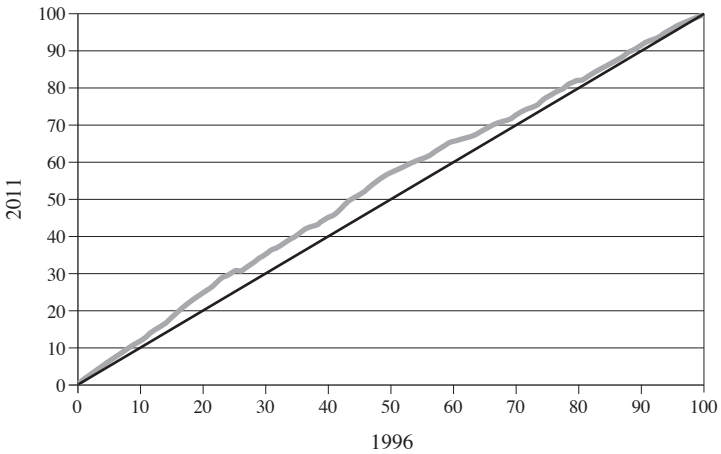


Figure 3 - Cumulative Shares of Employment by Qualifications, 1996, 25-44 years, Occupations Ranked by Skill Level

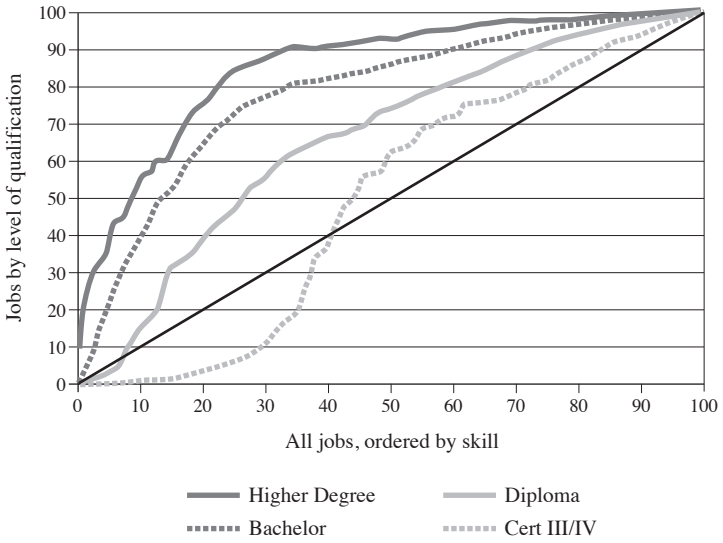
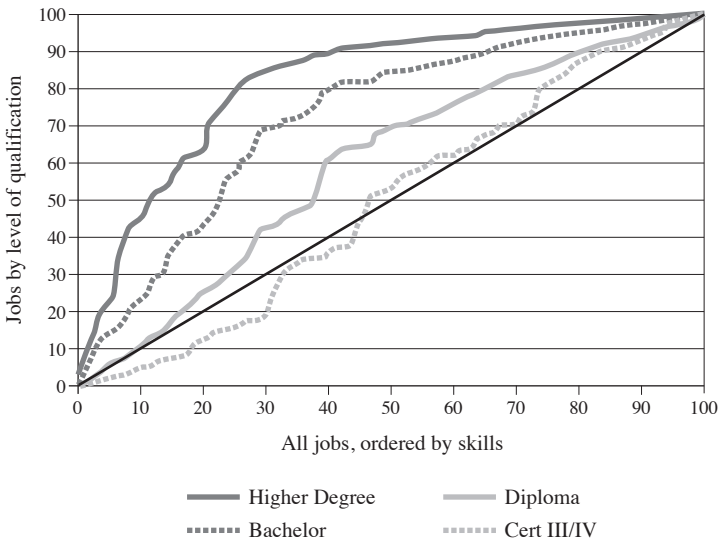


Figure 4 - Cumulative Shares of Employment by Qualifications, 1996, 25-44 years, Occupations Ranked by Income Level



When we start considering changes over time and the various fields of study we end up with a very large number of graphs. This becomes a little overwhelming and thus it is expedient to have a single summary statistic to summarise the distributions. The simplest single statistic to capture the shape of the curve is its mean or expected value, with the units being the percentile of the overall distribution of jobs as displayed on the x axis.[5] This has a simple interpretation: for example a value of 35 for a particular curve means that the average job (or expected job) is at the 35th percentile of all jobs (with 0 representing the best job).

Calculating this 'mean percentile', gives the following table.

Table 8 - Mean Percentile of Jobs by Qualification Level, Persons Aged 25-44 Years, 1996

	Income	*Skills*
Higher degree	18	15
Bachelor degree	28	22
Diploma	41	34
Certificate III/IV	51	51

Source: ABS 1996 census data.

We see the same general pattern, irrespective of the index used to rank occupations. The 'average job' for persons with a higher degree is in the top 15-18th percentile of jobs, depending on which occupational index and which age group is used. By contrast, those with a certificate III/IV can expect on average to get a job in the middle of the distribution (51st percentile).

We now move to the changes in the distributions by qualification level. Figures 5(a) to 5(d) present three Lorenz style curves for each of the four qualification levels, based on the skills index (i.e. occupations are ranked from the most highly skilled (qualified) to the least). Each of these figures has three curves:

- The 1996 distribution of jobs for the qualification plotted against the 1996 distribution of all jobs.
- The 2011 distribution of jobs for the qualification plotted against the 2011 distribution of all jobs.
- The 2011 distribution of jobs for the qualification plotted against the 1996 distribution of all jobs.

In making an assessment of whether in 2011 individuals with a certain qualification are obtaining similar jobs to the situation in 1996, it is the first and third of these curves that are relevant. This is because the 2011 job distribution has shifted to the left of the 1996 distribution because the better jobs have grown relatively quickly (as illustrated earlier in figures 1 and 2). To compare the first and second of these curves would 'move the goal posts', because the definition of, say, the top decile of jobs in 2011 is a more restrictive set of occupations than in 1996.

We see that for each qualification, the share of 'good' jobs declines, reflecting the fact that the increase in people with each of the qualifications has been greater

[5] In fact, the mean percentile of a Lorenz curve is approximately equal to the area above the curve. So the summary measure is closely related to the Gini coefficient (a measure often used to measure inequality) which can be calculated as twice the area between the curve and the 45 degree line.

than the expansion in good jobs. However, the higher degrees and diplomas have been particularly affected. For example, in figure 5(a) we see that in 1996 almost 80 per cent of higher degree graduates had a job in the top 20 per cent of jobs, while in 2011 this had dropped to around 65 per cent (keeping the 1996 definition of the top 20 per cent of jobs).

Figure 5(a) - Cumulative Shares of Employment for those with a Higher Degree Qualification, 1996 and 2011, 25-44 years, Occupations Ranked by Skill Level

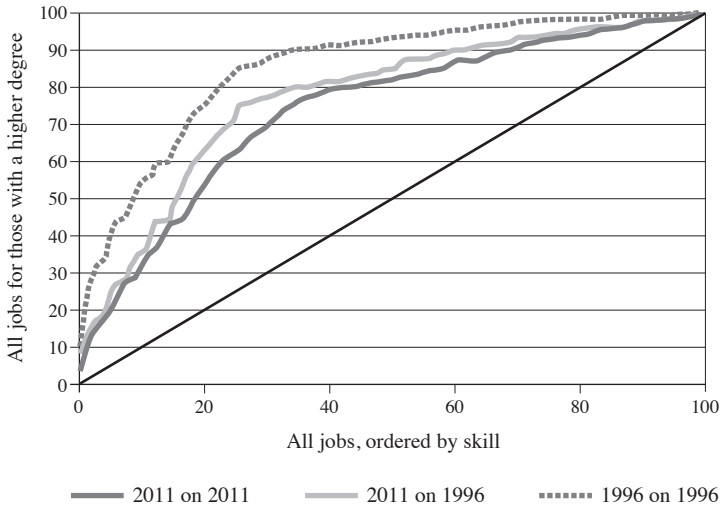


Figure 5(b) - Cumulative Shares of Employment for Those with a Bachelor Degree Qualification, 1996 and 2011, 25-44 years, Occupations Ranked by Skill Level

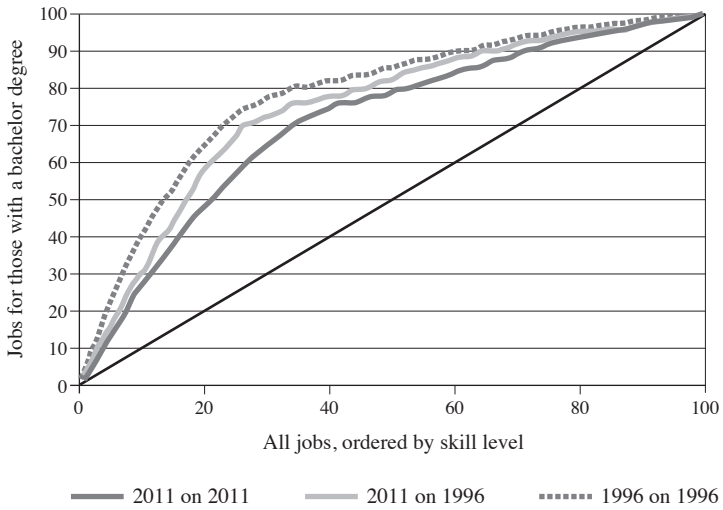


Figure 5(c) - Cumulative Shares of Employment for Those with a Diploma Qualification, 1996 and 2011, 25-44 years, Occupations Ranked by Skill Level

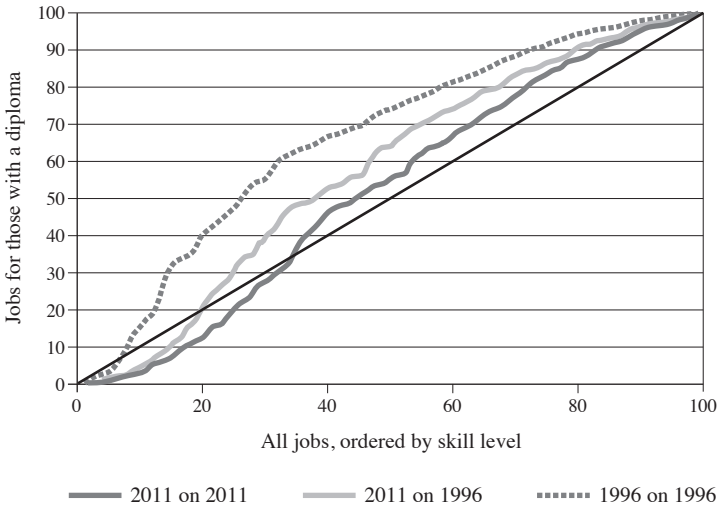
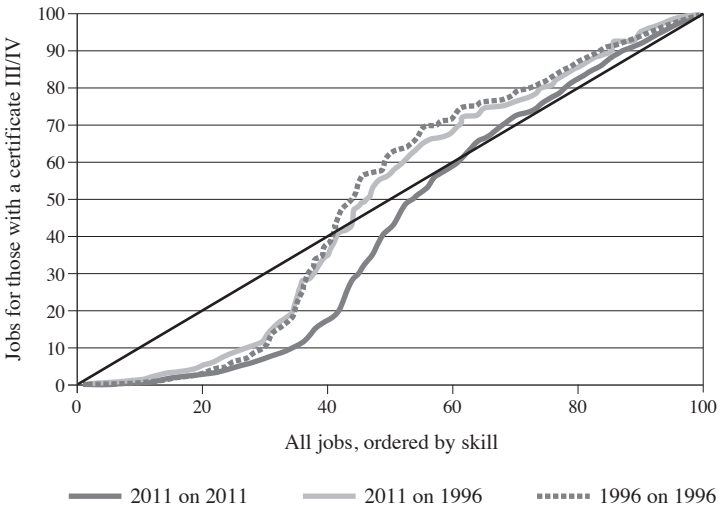


Figure 5(d) - Cumulative Share of Employment for Those with a Certificate III/IV Degree Qualifications, 1996 and 2011, 25-44 years, Occupations Ranked by Skill Level



Similar patterns emerge for the income index. Rather than present another set of graphs we summarise the changes through the change in the average job (table 9).

Table 9 - Changes in the Average Job, 1996 to 2011, 25-44 Years, Percentile of 1996 Job Distribution

	Jobs ordered by skill			*Jobs ordered by income*		
	Mean 1996	*Mean 2011 (1996 base)*	*Increase in mean percentile (percentile points)*	*Mean 1996*	*Mean 2011 (1996 base)*	*Increase in mean percentile (percentile points)*
Higher degree	15	23	8	18	26	8
Bachelor degree	22	26	4	28	30	2
Diploma	34	43	9	41	48	7
Certificate III/IV	51	52	1	51	54	3

Note: 1 represents the best job, 100 the worst.

We see a robust pattern. There has been a decline in all qualification levels, but that those with a higher degree or a diploma have been more affected than those with a certificate III/IV or a bachelor degree.

5. Occupational Distributions by Field of Study

We complete our analysis by looking at the distributions of jobs and their changes by field of study. We first present the mean job for each qualification and field of study for 1996, based on the skills index (table 10) and the income index (table 11).

Table 10 - Mean Job, by Qualification and Field of Study, Persons 25-44 years, 1996 (1996 Job Distribution Percentiles Based on Skills Index)

1996 Skill 1996 base	*Cert III/IV*	*Diploma*	*Bachelor*	*Higher degree*
Engineering	49	35	24	16
Education	**	24	16	11
Health	43	24	13	7
Agriculture	65	57	37	26
Architecture and Building	52	38	21	15
Business and Administration	47	44	29	22
Natural and Physical Science	46	36	24	13
Society and Culture	48	40	27	15
Miscellaneous fields	56	41	49	22
Total	51	34	22	15

** There was no one recorded as having a certificate III/IV in the field of education in the 1996 census data provided to us.

Note: In this table and table 11 below the 1996 fields have been used as the tables pertain solely to 1996 data. To reiterate though, Natural and Physical Sciences also largely incorporates Information Technology, Society and Culture also largely incorporates Creative arts, and Miscellaneous fields also largely incorporates Food, Hospitality and Personal Services.

Table 11 - Mean Job, by Qualification and Field of Study, Persons 25-44 Years, 1996 (1996 job Distribution Percentiles Based on Income Index)

1996 Income 1996 base	*Cert III/IV*	*Diploma*	*Bachelor*	*Higher degree*
Engineering	47	31	20	15
Education	**	39	31	23
Health	54	42	26	13
Agriculture	62	53	37	32
Architecture and Building	47	33	23	19
Business and Administration	40	41	25	16
Natural and Physical Science	51	38	25	19
Society and Culture	67	54	32	22
Miscellaneous fields	72	38	42	14
Total	51	41	28	18

** There was no one recorded as having a certificate III/IV in the field of education in the 1996 census data provided to us.

A clear hierarchy emerges; the qualifications 'pecking order' is maintained in each field of study, irrespective of which index is used: the mean job for someone with a higher degree is better than for a bachelor degree, which in turn is better than someone with a diploma, which in turn is better than someone with a certificate III/IV (with the exception of 'mixed fields for which the position of diplomas and degrees are reversed, noting that that the mixed field category is difficult to understand). However, the rankings of fields within each qualification level do depend to some extent by which index is used.

Some fields stand out. Among higher degrees the field with the best average job irrespective of the index is *health*. But among those with a bachelor degree, according to the skills index the field with the best average job is *health* (13th percentile) while according to the income the index the field with best average job is *engineering* (20th percentile). Similarly, among those with a diploma, the fields with the best average job according to the skills index are *health* and *education* (24th percentile), while the field with the best average job according to the income index is *engineering* (31st percentile). Irrespective of which index is used *agriculture* fares poorly.

We also see some overlap between qualifications. For example, according to the income index, a diploma in engineering on average will provide a better job than a degree in *education, society and culture* and *agriculture*.

We now look at the changes in the style curves between 1996 and 2011 by field of study. Again we use the mean to summarise the distribution.

Table 12 - Change in Mean Percentile Job, 1996 to 2011, by Qualification and Field of Study, Persons 25-44 years, 1996 (1996 Job Distribution Percentiles Based on Skills Index)

	Cert III/IV	*Diploma*	*Bachelor*	*Higher degree*
Engineering	0	4	-1	4
Education	**	10	0	4
Health	1	7	2	2
Agriculture	1	0	-2	-4
Architecture and Building	0	2	2	0
Business, Administration	7	2	4	11
Natural and Physical Science and Information Technology	-3	1	4	10
Society and Culture and Creative Arts	3	3	3	5
Food, hospitality and personal services + mixed fields	0	14	6	4
Total	1	9	4	8

** There was no one recorded as having a certificate III/IV in the field of education in the 1996 census data provided to us.

Table 13 - Change in Mean Percentile Job, 1996 to 2011, by Qualification and Field of Study, Persons 25-44 years, 1996 (1996 Job Distribution Percentiles Based on Income Index)

	Cert III/IV	*Diploma*	*Bachelor*	*Higher degree*
Engineering	-2	2	-1	3
Education	**	14	2	7
Health	12	8	3	7
Agriculture	1	2	0	-5
Architecture and Building	-2	2	1	1
Business, Administration	13	3	5	13
Natural and Physical Science and Information Technology	-8	-1	3	6
Society and Culture and Creative Arts	2	1	2	4
Food, hospitality and personal services + mixed fields	0	31	20	21
Total	3	7	2	8

** There was no one recorded as having a certificate III/IV in the field of education in the 1996 census data provided to us.

What is interesting about these results by field of study is the variation in the change in the mean percentile:

Engineering: according to the income index those with engineering qualifications have largely maintained the quality of their jobs. According to the skills index, there have been small declines in the average quality of higher degrees (four percentile points) and diplomas (three percentile points).

Education: those with a diploma or a higher degree have seen a significant decline in the quality of their jobs.

Health: diplomas have been badly affected irrespective of which index is used (declines of eight to nine percentile points). However, according the income index, there have also been declines within the other qualifications – 13 percentile points (certificate III/IV), five percentile points (bachelor degree) and 13 percentile points (higher degree).

Agriculture: this field is one which has seen little decline in the quality of jobs obtained. In fact there are examples where there has been a modest improvement in the quality of jobs, notably a four to five percentile improvement for those with a higher degree.

Architecture and building: this field has seen little change in the quality of jobs obtained.

Business and administration: persons with a certificate III/IV or a higher degree have seen large declines in the quality of jobs (of between eight and 13 percentile points). Persons with a degree have seen a more modest decline (five percentile points).

Natural and physical sciences and information technology: persons with a higher degree have seen a large decline in the quality of their jobs (nine percentile points on the skills index and six percentile points on the income index). Persons with a bachelor degree have seen a lesser decline, and those with a diploma have been little affected. Against the overall trend those with a certificate III/IV have seen an improvement, but it should be noted that there are relatively few certificates delivered in the physical sciences - this field is dominated by higher level qualifications.

Society and culture and creative arts: as with many of the fields the group that has seen the largest decline in the mean occupation is persons with a higher degree (four to five percentile points). Those with a bachelor degree have seen a more modest decline (three percentile points).

Food, hospitality and personal services, and mixed fields: the results for this field grouping needs to be treated with caution (a) because there are hardly any higher degrees and few bachelor degrees in this grouping, and (b) because of the disparate nature of occupations this grouping of fields is ill-defined.

One point to emerge from the above analysis is that at this level of disaggregation the choice of index does not make a huge difference. It certainly affects the magnitude of the changes but not the broad patterns. The overall picture is that there have been declines in the average quality of jobs particularly for those with a diploma or a higher degree. And particular qualifications have been affected, notably: higher degrees in *business, administration*, diplomas in *education* and *health* and certificates III/IV in *business, administration*. The only specific qualification which shows a completely different picture depending on the choice of index in certificates III/IV in *health*: according to the skills index there was virtually no change, while according to the income index there was a decline of 12 percentile points in the average quality of the job.

6. Concluding Comments

The conventional way of looking at the return to education is to focus on employment rates and relative wages. However, in this paper we have taken a different approach and looked at the return in terms of the 'quality' of the job that an individual obtains. Quality is defined by occupation (some 400 of them) with the occupations ranked by skill level (proxied by the qualification profile of the occupation) and average income (of a full-time worker). Our approach was to look at how the distribution of jobs for individuals with particular qualifications has changed between 1996 and 2011, with the benchmark distribution being the one in 1996. We focused on the age group 25-44 years, that being the most relevant group for young people embarking on their post-school education.

On a methodological note, one might quibble with the whole concept of job 'quality'; what is a good job for one person is a bad one for someone else and our indexes of occupational quality capture only certain attributes of a job. However, at an intuitive level, all would acknowledge that some jobs are better than others. Our use of two indexes provides a test of robustness to the analysis. As an aside, the two indexes we use are highly correlated but there are differences and many of those differences appear to reflect industrial history and the degree of feminisation of occupations.

What has emerged is that over this 15 year time period, the distribution of jobs has changed in way to favour the better jobs. That is, any technological change over this period has been, at least to some extent, skills-biased. However, the expansion in the proportion of persons with qualifications has far out-stripped the change in the employment structure. This means that within occupations there has been 'skills deepening', with a higher proportion of individuals having qualifications (or a qualification at a higher level). An alternative way of looking at the same data, and the one adopted in this paper, is to look at the distribution of jobs for people with a certain qualification. In general the average job for persons with particular qualification in 2011 is of lower quality than in 1996. Persons with higher degrees (particularly those in *business and administration*) and diplomas (particularly *education* and *health*) have been the most affected.

In trying to make sense of these findings, there seem to be a number of forces at work. First, there is no doubt that the labour market is changing in a way that favours persons with qualifications, but there is equally no doubt that the supply of people with qualifications has grown more than commensurately. One element that must be taken

into account is the role of regulation. An obvious example is the decline in average job quality of those with a diploma in education or health. Changes in mandatory qualifications have meant that a diploma in those areas no longer allows entry into the same types of jobs as it once did. Other areas which have been affected are those occupations which have become more highly regulated. Examples here are financial services, childcare and aged care. To operate in these occupations is requiring the possession of very specific qualifications. An example of where there has been a 'de facto' change in required qualifications is in the university sector where a doctorate has become virtually an entry requirement for most academic jobs.

However, not all qualifications have been affected by changes in regulation or entry requirements to the same extent. Much of the decline in the average quality of the job held by persons with a higher degree can simply be explained by the interaction of supply and demand. Relatively few jobs 'require' a higher degree, implying that the expansion in those with a higher degree has increased the competition for good jobs. Persons with a higher degree in business administration are a case in point, and there is certainly considerable anecdotal evidence pointing to an MBA no longer being a fast track into a top job.

The two qualifications where there has been the smallest change have been bachelor degrees and certificates III/IV. Overall, there has been some decline in the average quality of the job but these declines have generally been small.

Are there any policy implications from the analysis? First, from a young person's point of view the changing relationship between qualifications and the labour market is very relevant to educational choice. Particular qualifications on the whole will not guarantee the same sort of job as held by earlier cohorts with that qualification. At this level there has been credential creep. Nevertheless the relationship between level of qualification and the distribution of jobs is still strong. While a higher degree has seen the greatest decline in the average quality of jobs, it is still the case that on average those with higher degrees obtain better jobs than those with a bachelor degree, and the pecking order – higher degree, bachelor degree, diploma, certificate III/IV- has not changed. Thus while a higher degree, for example, may not provide the same job prospects as it did previously, it is still ranks well ahead of an ordinary degree. Credentialism may have occurred but that is the labour market in which young people have to compete. While credentialism may reflect over investment in education from society's point of view, it may still be optimal from an individual's perspective to invest in that additional qualification, even if employers are seeking higher qualifications as a sorting device or believe that academic standards have been declining. The other point to note from an individual's perspective is that some fields have been more affected than others. In particular, higher degrees in *business and administration* have seen a very large decline in the average quality of job. Finally, the analysis brings home the point that while the average return to a qualification might be high, not everyone will get that average; for any particular qualification there will be a distribution of jobs and some will do better than the average and others worse.

The analysis could be extended by breaking down the supply side into domestic and foreign born graduates, perhaps splitting the latter into whether they come from a non-English speaking background or not. It may be the case, for example, that

Australian born graduates have fared better than those born overseas. Of particular interest would be the role in increasing the supply of graduates of skilled migration and international higher education students who remain in Australia after graduation. However, such analysis is beyond the scope of this paper.

From governments' perspective the issues are a little different. On the labour demand side, part of the story is the increased regulation of the labour market. Degrees rather than diplomas in health jobs (education went through this change before the time period we are considering), and the introduction of mandatory credentials in financial services and community services have naturally been addressed through an increase in people training in and obtaining these credentials. Whether this has led to an improvement in the quality of these services is an important policy question in its own right. However, only part of the expansion in the proportion of people with qualifications can be attributed to regulatory changes. In unregulated parts of the labour market, the question is whether the educational expansion, or 'skills deepening' is providing any real benefit (noting that the balance between public and private benefits goes to the issue of public/private financing of the expansion). One can argue that the 'skills deepening' might lead to improved productivity within occupations; if this is the case then the decline in the average 'job quality' as measured by occupation would be less of a concern. However, there must be a nagging feeling that part of what we have observed is credentialism, with individuals requiring higher level qualifications to obtain a job in an occupation without an impact on productivity. The uncapping of university places over recent years implies that increasing education levels will be a feature of the emerging labour market, and the job prospects of new higher education graduates since 2008 have been worsening (Graduate Careers Australia, 2013). Whether this is a cyclical phenomenon or reflects longer term structural changes will become clearer with the passage of time. The match between the labour market and education is certainly a concern of the OECD (2012), asking how the world economies are going to absorb the increasing number of well-educated young people. Of course, if individuals were paying for the full cost of qualifications then that would be an issue for private concern but the very significant public contribution to the costs of qualifications means then it must be a public policy concern.

References

Australian Bureau of Statistics (2008), 'Information Paper – Census of Population and Housing: Link Between Australian Standard Classification of Occupations (ASCO) Second edition and Australian and New Zealand Standard Classification of Occupations (ANZSCO)', Cat. no. 1232.0.

Australian Workforce and Productivity Agency (2013), 'Future Focus: 2013 National Workforce Development Strategy', AWPA, Canberra.

Coelli, M. and Wilkins, R. (2008), 'Credential Changes and Education Earnings Premia in Australia', Melbourne Institute of Applied Economic and Social Research, Melbourne.

Dockery, A.M. and Miller, P. (2012), 'Over-education, Under-education and Credentialism in the Australian Labour Market', NCVER, Adelaide.

Graduate Careers Australia (2013), 'GradStats: Employment and Salary Outcomes of Recent Higher Education Graduates', http://www.graduatecareers.com.au/wp-content/uploads/2013/12/GCAGradStats2013.pdf

Jones, F.L. and McMillan, J. (2001), 'Scoring Occupational Categories for Social Research: A Review of Current Practices, With Australian Examples', *Work, Employment and Society*, 15(3), 539-563.

Karmel, T. (2011), 'The Implications of Skills Deepening for Vocational Education and Training in Australia', *International Journal of Training Research*, 9, 72-94.

Karmel, T. (2013), 'Surely There Are Too Many Graduates Now?' *Australian Bulletin of Labour*, 39(2), 59-73.

Karmel, T., Stanwick, J. and Moore, J. (forthcoming), 'The Return to Education: An Occupational Perspective', Occasional Paper, National Centre for Vocational Education Research, Adelaide.

Kelly, R. and Lewis, P. (2010), 'The Change in Labour Skills in Australia Over the Business Cycle', *Australian Bulletin of Labour*, 36(3), 260-277.

Mavromaras, K. and McGuinness, S. (2007), 'Education and Skills Mismatches in the Labour Market: Editors' Introduction', *Australian Economic Review*, 40, 279-285.

McMillan, J., Beavis, A. and Jones, F.L. (2009), 'The AUSEIo6: A New Socioeconomic Index for Australia', *Journal of Sociology*, 45(2), 123-149.

Miller, P.W. (2007), 'Overeducation and Undereducation in Australia', *Australian Economic Review*, 40, 292-9.

OECD (2012), 'How is the Global Talent Pool Changing', OECD, Paris.

Skills Australia (2009), 'Foundations for the Future', Skills Australia (Later the Australian Workforce and Productivity Agency), Canberra.

Sloane, P.J. (2007), 'Overeducation in the United Kingdom', *Australian Economic Review*, 40, 286-91.