

Alternative Skills Scenarios to 2020 for the UK Economy

**A report for the Sector Skills Development Agency,
as a contribution to the Leitch Review of Skills**

December 2005

**Rachel Beaven, Derek Bosworth, Richard Lewney
and Rob Wilson***

Cambridge Econometrics
Covent Garden
Cambridge
CB1 2HS

Tel 01223 460760 (+44 1223 460760)
Fax 01223 464378 (+44 1223 464378)
Email info@camecon.com
Web www.camecon.com

* Rachel Beaven and Richard Lewney are at Cambridge Econometrics. Derek Bosworth and Rob Wilson are at the Warwick Institute for Employment Research.

Contents

	Page
Executive Summary	iii
1 Introduction	1
1.1 Seeking to guide the economy towards the ‘high road’	1
1.2 Should we attempt to project future skills needs?	1
1.3 Developing quantified views on long-run trends in skills requirements	2
2 Methodology	5
2.1 The meaning of skill	5
2.2 The Cambridge Multi-Sectoral Dynamic Model (MDM)	5
2.3 Adaptations required for the present skills projections	6
3 Review of Historical Evidence	9
3.1 Links between skills and performance	9
3.2 The scale of increase in skills	14
3.3 Macroeconomic trends	19
3.4 Sectoral trends	21
4 Assumptions for Baseline and High Skills Scenarios	25
4.1 Skills assumptions implicit in the baseline projection	25
4.2 High skills scenarios	25
5 Projections to 2020 for Baseline and High skills scenarios	30
5.1 Baseline projections	30
5.1.1 Macroeconomic projections	30
5.1.2 Sector projections	31
5.1.3 Occupational projections	32
5.1.4 Projections of employment by qualification	38
5.2 Catch-up scenario	43
5.2.1 Macroeconomic projections	43
5.2.2 Sector projections	44
5.3 Restructuring scenario	44
5.3.1 Macroeconomic projections	46
5.3.2 Sector projections	46
5.3.3 Occupations and skills in the high skills scenarios	49
6 Bibliography	62
Appendices	
Appendix A: Alternative Definitions of Productivity	52

Executive Summary

Purpose and scope

- This report sets out the findings of the study examining *Alternative Skills Scenarios to 2020 for the UK Economy* undertaken by Cambridge Econometrics and the Institute for Employment Research. The study was commissioned by the Sector Skills Development Agency to contribute to the Leitch Review of Skills. The objective of the study is to examine the implications for the pattern of employment by sector, occupation and skills in a future in which productivity growth is higher as a result of greater investment in human capital.
- The main contribution of the study is to develop *quantified* projections and scenarios, and to *draw out the qualitative implications* of these alternative futures. The study built on the approach adopted for the SSDA in *Working Futures*¹ by developing sectoral projections within an integrated sectoral economic model of the UK, namely Cambridge Econometrics' Multisectoral Dynamic Model, MDM and extended the projections presented there to 2020 as a 'baseline' projection against which two alternative 'high skills' scenarios were compared.

The baseline projection

- The baseline projection itself embodies trends towards higher skills. For the period to 2014 these trends are similar to those experienced in the past decade. Thereafter the rate of increase is slower, as reflected in the deceleration in the rate of increase in the share of employment in higher level occupations, and in the rate of increase in the numbers with higher qualifications. This slowdown occurs because the rate of increase of the past decade cannot go on indefinitely (for example, the proportion with no formal qualifications approaches zero).
- The baseline projection therefore already incorporates substantial changes in the structure of employment and skills. The occupational groups that are expected to show significant increases in employment over the period to 2020 are managers & senior officials, professional occupations, associate professional & technical occupations, as well as personal service occupations and sales & customer service occupations. The first three groups tend to be better qualified than average. These results therefore imply a steady increase in skill requirements as measured by qualifications. Administrative, clerical & secretarial occupations are expected to become less important as a result of the continued use of computers and IT systems in most offices. Declining employment levels are also projected for skilled trades occupations; machine & transport operatives; and elementary occupations. Among these declining groups, it is the elementary occupations which are expected to see the largest absolute reduction in numbers. This is, of course, the group with the lowest qualification profile.
- By 2020 fewer than 2% of the workforce, and those employed, are projected to have no formal qualifications, while the proportion qualified to post-graduate level is projected to have risen to over 10%. Graduates and post graduates are projected to take an increasing share of jobs while the proportion of those in employment with qualifications below NQF level 2 is projected to fall to just 10% by 2020.

¹ Wilson et al, (2005) *Working Futures 2004-2014*.

Methodology for developing ‘high skills’ scenarios

- The logic of the approach adopted in the study was as follows. We made assumptions for changes in the availability of workers with different skills levels, by sector. We assumed that the impact on labour productivity was equal to the increase in an index of the quality of labour, in which workers at different qualifications levels are weighted according to the average earnings at each level. We then implemented changes in the sectoral economic model that had the effect of reproducing these assumed changes in labour productivity at a sectoral and aggregate level. In doing so, we needed to form views on the extent to which each sector’s increase in productivity came about through higher output, or lower employment, or some variation of these. The economic model’s results for employment by sector were then used as inputs for a subsequent model of the profile of occupations and qualifications, to complete the picture and to check that the outcomes were broadly consistent with the initial assumptions.
- It might be thought that the main impact of higher productivity would be to reduce unit labour costs and hence improve competitiveness and market share. In practice the scale of such effects is empirically small, and economically significant only in commoditised sectors which compete mainly on price. For the economy as a whole, the more important effects of improved skill levels and productivity are: a higher level of output, representing the impact of higher skill levels on the quality of products and the capacity to innovate; and a higher level of average earnings.
- It is possible to think of a variety of scenarios in which the relative scale of output and employment effects varies, for the same improvement in productivity. On the basis of past experience of structural change in the economy, these effects will certainly differ across sectors. Skill improvements could be translated into productivity gains without much or any increase in output, resulting in a fall in employment. In this case improved quality of labour would raise productive efficiency, but would not bolster demand for output through product quality gains. In other cases, where the improved quality of labour results in an improved quality of output as well, this is likely to increase the volume demanded and/or increase the price customers are willing to pay. In such circumstances employment levels may rise. Taking account of interactions across the economy, we could even expect to observe a *decline* in output in some sectors under a higher-skill scenario: as higher skills leads to a rise in the general level of wages in the economy, firms in low value-added activities have to pay more and respond in part by changing the character of jobs to raise productivity, but also by exiting from activities that are no longer viable.

Two ‘high skills’ scenarios

- The two ‘high skills’ scenarios presented in the report both produce similar increases in the UK’s aggregate skill level and labour productivity, but incorporate differing assumptions for the distribution of skills improvements across sectors and the implications for output and employment by sector. The whole-economy increase in the annual rate of growth of value added per workplace job is 0.1 – 0.2 pp.
- The ‘catch-up’ scenario illustrates a future in which sectors that have performed less well in the past decade are regarded as offering the greatest scope for improvement. Hence, the catch-up scenario embodies greater investment in skills and a stronger relative improvement in those sectors which are less skill-intensive

and which have under-performed in the last decade. In all sectors, the improvement in productivity is translated (by assumption) one-for-one into higher output.

- The ‘restructuring’ scenario illustrates a future in which the sectors that have performed less well in the past decade are regarded as being most vulnerable to the impact of globalisation and technological change in the future. Hence, the restructuring scenario embodies greater investment in skills in the same sectors that saw the largest increase in the skills index in the last decade. Assumptions for the relationship between the level of skills and output are varied across sectors, so that ‘basic’ sectors see the least increases (or greater falls) in output, to reflect the sensitivities to globalisation and different elasticities of demand with respect to reductions in price or improvements in quality.
- Although the two scenarios result in a somewhat different pattern of value added and employment by detailed sector, the implications for employment by occupation and qualifications level do not differ greatly. To put it another way, the results have not proved very sensitive to different sectoral outcomes for the same given boost to skills and productivity. With regard to occupations, the baseline scenario envisages increases of 1-3 pp over 2004-20 in the shares of the three groups: managers and senior officials, professional occupations, and associate professional and technical. In the high skills scenarios, these shares increase by a further 1-2½ pp. Compared with the baseline scenario, the rise in the share of the two groups, personal service occupations and sales & customer service occupations, is less pronounced in the high skills scenarios. With regard to qualifications, the baseline projection envisages an increase of 5-7 pp in the proportion of the workforce qualified to each of NQF levels 3, 4 and 5. In both the high skills scenarios, these shares increase by a further 1-2 pp, with the larger increases at NQF 4 and 5.
- The implications of the analysis are as follows. There are clear trends towards occupations which require higher qualifications, and towards higher levels of qualifications within any given occupation. We expect these trends to continue in the long term, even if there are upper and lower bounds to how far they can go. We can envisage various futures in which a higher rate of investment in skills would raise productivity and improve the UK’s aggregate economic performance. It may be that, in some sectors, such improvements could reverse or slow down what would otherwise be a decline in output and a sharp decline in employment. Alternatively, higher productivity might reinforce the restructuring of the economy away from activities that showed a weak performance during the last decade. In either case, if we are to achieve a future with higher productivity and living standards, the required pattern of changes in occupational structure and qualifications is generally one in which the trends already projected are reinforced.
- How such improvements in skills and productivity are to be brought about is the subject of the Review. Our own view is that although supply-side improvements in the provision of education and training are no doubt a prerequisite, the more important factor is stimulating the demand among employers for more highly skilled workers, with the concomitant changes in training and product strategy that this implies.

Implications for the Leitch Review of Skills

Plan of the report

- Chapter 1 of the report sets out the motivation for the study and locates it in the context of the current debate about skills policy. Chapter 2 discusses the methodological issues that the study confronted, notably in the areas of defining and measuring skills, and in representing a skills-led improvement in productivity in the sectoral economic model used for the economic analysis. Chapter 3 reviews the historical evidence of the past decade to draw lessons for the likely nature of changes in economic performance and the structure of employment by occupation and qualifications. Chapter 4 presents the assumptions actually adopted for the scenarios. Chapter 5 presents the results, for macroeconomic indicators, output and employment by sector, and for employment by occupation and qualifications, for the baseline projection and the two skills scenarios.