

Modelling of future skills demand: the implications for skills planning in NSW

Background Research for the NSW Strategic Skills Plan 2011 - 2015



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1. Introduction

1.1 Overview

This report aims to provide an accessible introduction to some recent modelling of future skills demand. It primarily compares two reports, the *Economic Modelling of Skills Demand* prepared by Access Economics in 2009 and the *Demand for qualifications and the future labour market in Australia* prepared by Chandra Shah from the Centre for the Economics of Education and Training (CEET). The first report is referred to hereafter as the 'Access Economics report' and the latter is referred to as the 'CEET report'. For ease of expression, Access Economics and CEET are referred to as authors (though Shah (2010) and CEET are used interchangeably at times).

A comparison of these reports forms the basis of Chapter 2, where a series of forecasts for 2025 are directly compared (though 2015 is also used for some of this). While a number of other reports are available which also deal with the issue of skills demand, only these two present their findings in ways which are directly comparable. In other reports, the data is presented as growth rates, rather than levels, the time frames differ, or the relevant populations are not comparable. Some of these other reports are considered briefly in the later chapters of this report.

As well as forecasts of employment and qualification holding in 2025, Chapter 2 also looks at the projections for the demand for education qualifications in 2015. This makes it possible to pinpoint likely shortfalls in the supply of qualified persons in coming years.

Chapter 3 examines some of the key assumptions behind the economic modelling. Some of these assumptions enter directly into the modelling discussed in Chapter 2, whereas others provide the context in which the

modelling takes place. In the case of Access Economics these assumptions are crafted around three different scenarios, all of which reflect responses to the Global Financial Crisis.

However, these scenarios are far from exhaustive, and in Chapter 4 I look at other scenarios. These are not articulated as scenarios, per se, but they do point to a number of issues which have not been covered by the Access Economics and CEET modelling. These include peak oil and the prospect of prolonged economic decline. This chapter also looks at some of the methodological limitations in the modelling of skills demand. These include the inability of these approaches to incorporate major *qualitative*, as opposed to quantitative, changes into their modelling strategies.

Chapter 5 discusses the New South Wales data. While much of it is limited and thus beyond inclusion in this report, there are some Access Economics projections for the State which can be directly related to the main discussions in this report. This analysis is supplemented by a discussion of the *Foresighting Study* and mention of the Access Economics analysis on future VET demand (conducted for IPART). Finally, the New South Wales State Plan is considered, and the question posed as to whether the COAG targets look likely to be met.

Chapter 6 looks at other related material, namely work done by the UK Commission for Employment Skills.

The final chapter draws together the inconsistencies arising from the economic modelling examined in this report and asks how policy makers should deal with such dilemmas. The conclusion suggests that a more balanced strategy might be possible by

focusing on medium term planning using two methodologies. First, extrapolating from current trends would allow for planning for four to five years into the future. Secondly, this could be supplemented by undertaking in-depth interviews with key informants, people who are positioned at strategic locations in the labour market and whose insights are long-term and far-reaching.

1.2 How the modelling works

I discuss the modelling process in greater detail in the following chapter. However, it is worth summarising, in this introduction, the main steps that are involved. This provides a useful backdrop to both the CEET and Access Economics comparisons; even though they used different macroeconomic models, the underlying strategies are similar.

The goal pursued by both CEET and Access Economics is to arrive at final estimates of the numbers of employed persons holding qualifications, as well as the demand for additional qualifications. This demand can be viewed as reflecting labour market demand for skills.

The starting point is a set of macroeconomic variables, either those expected to prevail or those allowed to vary by scenario. In the case of the Access Economics Macro (AEM) model, these inputs are based on three different scenarios (outlined later) while in the case of the CEET modelling, these inputs are based on assumptions about current trends or forecasts provided by other parties.

The steps to link these ends of the chain consist of:

1. specifying the macroeconomic variables which form part of the scenarios (Access Economics) or are part of the current trends / projections (CEET); these are the parameters for the model; some variables are fixed at the outset; some are implied by the choice of other variables;
2. generating estimates of industry output;
3. based on these estimates, generating industry employment forecasts; this involves using input-output tables (which

specify inter-industry linkages in the economy) to map final components of demand to industry employment;

4. using these industry employment forecasts to generate occupational employment forecasts; this involves using the 2006 Census information on the occupational share held by each industry;
5. using the combined industry and occupational data (the intersection of which can be regarded as a 'job') to generate forecasts of persons holding qualifications. Australian Bureau of Statistics survey data (such as the 2007 *ABS Survey of Education and Work*) is used to map jobs to qualifications on the assumption that historical qualification profiles are likely to apply;
6. this stock of qualified persons is then used, in combination with other data on qualification profiles, to generate forecasts of likely future demand for additional qualifications. For Access Economics, the data on qualification profiles include assumptions from the scenarios as well as historical data.

There are many refinements along the length of this chain, some of which I comment on in the following chapter. They include allowing for skills deepening, where the growth in qualifications occurs at a greater rate than the growth in employment, as well as for multiple qualification holding (in the case of Access Economics). The stock of qualified persons diminishes over time as workers retire, so it needs to be 'refreshed' by new entrants. Analysing these flows requires assumptions about the growth of the labour force and the retirement rates likely to prevail. This analysis then feeds into forecasts for additional qualifications required in the future. Finally, analysis of this labour market demand for qualifications can be supplemented with analysis of labour market supply of qualifications—the demand by students for qualifications. This analysis makes use of data on student completions and can be used to forecast potential shortfalls in the supply of qualified workers in coming years.

2. Comparing forecasts for 2025

There are a number of considerations which have to be taken into account when comparing economic forecasts. There is the actual model itself—its system of equations and its sequence of calculations—and there is the data required for the model to work. As mentioned in the last chapter, this includes the input-output tables, historical data on trends, recent Census tables on various proportions, and other relevant sources. Finally, there are the assumptions: expectations of economic growth, other macroeconomic variables, and particular policy settings.

The outcomes from such modelling can be measured as stocks: the actual numbers of people in particular industries and occupations and the qualifications they hold. They can also be measured as annual rates of growth between particular years (say 2020 to 2025). These are still stock measures, but they reflect growth rates, rather than levels. In the discussion which follows, I present stocks as levels, based on the actual counts found in the CEET and Access Economics reports. But I also present these levels expressed as proportions. This is a very useful way to compare relativities and examine compositional change. The actual numbers in the counts don't matter all that much, given they are forecasts and the time frame is so far into the future. What matters most is whether there is structural change of a compositional nature emerging from the forecasts. As we shall see shortly, one of the Access Economics forecasts expects manufacturing to play a much more important role than do the other forecasts. This then flows through to a different occupational and qualification profile for the workforce.

As well as stocks, labour market forecasting also incorporates flows, the recognition that

new entrants add to the stock, whilst retirees and other persons exiting the labour market, subtract from the stock. The analysis of flows is important for understanding the likely supply of persons with particular qualifications working in particular occupations. Measuring the labour market demand for qualifications is not done directly but is based on the assumption that the number of persons working in an occupation, holding certain qualifications, is a straightforward reflection of the demand for those jobs and for those qualifications.

Finally, all modelling involves stipulating the relevant population. The Access Economics modelling restricts analysis to employed persons while the CEET modelling also produces estimates for non-employed persons. However, CEET also produces tabulated estimates for employed persons so that direct comparisons between Access Economics forecasts and CEET forecasts are feasible. In this report I refer to employed persons as the 'workforce', while the terms 'labour force' and 'labour market' also include the unemployed. Finally, 'non-employed persons' can include both the unemployed and what the Australian Bureau of Statistics terms NILF (not in the labour force).

2.1 Three global scenarios

The Access Economics modelling provides three different forecasts for the Australian economy in 2025. They are based on the three different scenarios developed by Skills Australia (Skills Australia 2009) for the development of the National Workforce Development Strategy (Skills Australia 2010). It is worth briefly summarising the economic character of these scenarios in order to understand how their differing assumptions influence the modelling:

Table 2.1: Macro model parameters, CEET and Access Economics

	CEET	Access Economics		
		Open Doors	Low-trust	Flags
Global growth rate (%)		3.80	3.10	2.60
Assumptions				
Australian growth rate ¹ (%)	2.70	3.93	3.00	2.20
Annual net immigration ¹ ('000s)	180	250	200	100
Annual net immigration ¹ (%)		1.00	0.80	0.40
Labour productivity growth ¹ (%)		1.75	1.50	1.30
Exports ¹ (%)		6.29	4.35	2.94
Capital / labour ratio ¹ (%)		1.50	1.00	0.50
Implied results				
Population growth ¹ (%)		1.70	1.47	1.02
Workforce growth ¹ (%)		2.12	1.49	0.96
Employment growth ¹ (%)		2.15	1.48	0.89
Unemployment rate ² (%)		4.5	5.1	6.0
Participation rate ² (%)	63.0	68.8	64.2	63.1
Exports to GDP ² (%)		30.5	26.0	23.3
Business investment to GDP ² (%)		14.0	12.2	10.5

Notes: 1. Annual growth rates for period 2010 to 2025. 2. Levels as at 2025.

Source: Taken from Access Economics (2009a, Table 2.2).

1. *Open Doors*: national growth paths follow long-term trends and globalisation continues with improved market structures;
2. *Low-trust Globalisation*: increased competition; expansion of natural resource industries; growth in role of multinational corporations; increased trade barriers; focus on bilateral trade;
3. *Flags*: global depression and expansion of bilateral and regional agreements; increased trade barriers and more nationalistic political culture.

As noted in the first chapter, various assumptions are fed into the economic models as parameters and various estimates of industry employment emerge. These parameters can be varied for different scenarios; they can be constrained to fixed values; and they can be determined by other parameters. In the case of the forecasts done by Access Economics which are examined here, these scenarios are entered into the model as assumptions about economic growth, migration, productivity, export intensity and the capital labour ratio. These parameters in turn generate estimates for population

growth, employment growth, the participation rate, and so forth. These parameters, and their intermediate estimates are shown in the last three columns of Table 2.1, and these are taken directly from the Access Economics report. In the case of the CEET modelling, which makes use of the MONASH employment forecasting model, the parameters are not explicitly presented. However, in discussing the macroeconomic context for the CEET report Shah (2010, p. 4) provides some of the key projections from the Treasury modelling for the *Intergenerational Report 2010*. One can only assume that these are the parameters for the MONASH model and they are included in Table 2.1 in the first column.

This table shows that the scenarios differ quite considerably across these important economic variables, with several of the Flags settings—such as economic growth and immigration—between 40 per cent and 60 per cent lower than for the Open Doors scenario. Favourable outcomes—such as low unemployment and high participation—are also considerably worse under the Flags scenario. The CEET parameters place their model closer to the Low-trust globalisation scenario when it comes to economic growth and net immigration, but closer to the Flags

model in terms of the assumption about the participation rate.

Scenarios are a useful device to canvas a range of possibilities, but they are somewhat inflexible. For example, Open Doors is an expansive scenario in every respect, Flags is a conservative, inward-looking scenario for all settings, and Low-trust is simply a middle-position. What is missing is the recognition that some elements of one scenario might be mixed with those of another. For example, in the next few years global growth might limp along at 2.6 per cent, as suggested by Flags, but the Australian growth rate might move along at 3.0 per cent, as suggested by Low-trust globalisation. This may happen because Australia's economic links with China may shelter the domestic economy from the continuing downturn in Europe and North America. The currently revived population debate might see immigration reduced, in line with Flags, but labour productivity might achieve 1.5 per cent, in line with the Low-trust scenario, as a result of large-scale investment in infrastructure, such as the National Broadband Network.

This hybrid scenario is probably more realistic in the current climate than the three scenarios explored by Skills Australia. And it is not as if that exploration is dated—these scenarios were prepared as recently as June 2009. What this suggests is that continuing uncertainty in the global economy, and the speed of developments on the Australian political landscape, render much current speculation about future developments unrealistic. To countenance various hybrid models in the modelling would involve permutations on these three scenarios and make the exercise cumbersome. One might end up, for example, with six or nine sets of forecasts instead of just three.

What are the implications of this? From a forecasting point of view, not a lot. More realistic mixed scenarios, like these hybrids, might simply result in some of the parameters cancelling each other out. Without more detail on the equations used in this modelling, it's hard to be precise but it seems likely that the final forecasts would simply end up somewhere in the middle of the range between

the most expansionist scenario (Open Doors) and the least (Flags.)

2.2 Industry forecasts

What do these different scenarios imply for employment growth in 2025? Do the outcomes differ all that much? Table 2.2 certainly shows quite different outcomes in terms of the size of the workforce, with a spread between 12.5 million and 15.3 million. However, this table also suggests that in a number of key areas, the *structure of employment* in the economy will not differ all that much irrespective of which scenario eventuates. Large public sector employment industries, such as education, health and government differ by less than 1 percentage point across the different scenarios. Core private sector areas like finance, real estate, construction and mining differ by very small amounts—generally about 0.5 percentage points—while large employment sectors like retail differ by about 1 percentage points. The most striking change in forecasts across the three scenarios concerns manufacturing. Under the Open Doors and Low-trust globalisation scenarios manufacturing employment is expected to constitute about 6.7 per cent of the workforce. Under the Flags scenario it will make up nearly twice this proportion: 12.6 per cent. This is consistent with the more closed-economy characteristics of that scenario.

How do these Access Economics forecasts compare with the CEET forecasts? As noted earlier, the latter are not based on scenario projections, but an extrapolation of current trends which take into account the context of the forecasts made by the Intergenerational Report 2010 and the possible impact of the proposed Carbon Pollution Reduction Scheme (CPRS) (Shah 2010, pp.8–9). Shah (2010) does not explicitly tabulate the parameters which were fed into the MONASH model to produce the employment forecasts, but one can surmise that this macroeconomic context influenced the parameters chosen.

In terms of the size of the workforce, the CEET forecasts place it quite close to the Low-trust globalisation projections. However, in relative terms the forecasts for the CEET study are often closer to the Open Doors scenario for

Table 2.2: Industry projections for 2025, comparisons

	CEET		Access Economics					
	'000s	%	Open Doors		Low-trust		Flags	
			'000s	%	'000s	%	'000s	%
Agriculture, forestry & fishing	297	2.2	455	3.0	361	2.6	277	2.2
Mining	229	1.7	241	1.6	163	1.2	133	1.1
Manufacturing	886	6.6	1,032	6.7	914	6.7	1,573	12.6
Electricity, gas, water & waste	215	1.6	144	0.9	117	0.9	217	1.7
Construction	1,207	9.0	1,325	8.6	1,134	8.3	1,019	8.1
Wholesale trade	525	3.9	486	3.2	423	3.1	332	2.7
Retail trade	1,550	11.5	1,800	11.7	1,629	11.9	1,362	10.9
Accommodation & food	863	6.4	1,016	6.6	936	6.8	779	6.2
Transport, postal etc	781	5.8	1,003	6.5	821	6.0	673	5.4
Info media & telecom	250	1.9	332	2.2	352	2.6	318	2.5
Financial & insurance services	478	3.6	549	3.6	535	3.9	443	3.5
Rental, hiring & real estate	246	1.8	345	2.3	305	2.2	253	2.0
Prof, scientific & tech services	1,179	8.8	1,337	8.7	1,179	8.6	979	7.8
Admin & support services	469	3.5	531	3.5	536	3.9	449	3.6
Public admin & safety	835	6.2	992	6.5	911	6.6	762	6.1
Education & training	1,112	8.3	1,096	7.2	1,011	7.4	929	7.4
Health care & social assistance	1,547	11.5	1,733	11.3	1,615	11.8	1,359	10.9
Art & recreation services	292	2.2	286	1.9	255	1.9	180	1.4
Other services	497	3.7	619	4.0	545	4.0	468	3.7
Total	13,458	100.0	15,322	100.0	13,742	100.0	12,504	100.0

Notes: For explanation of Access Economics scenarios see Skills Australia (2009).

Source: Shah (2010, Table 22); Access Economics (2009a, Tables 6.1, 6.2, 6.3).

Population: Employed persons, Australia.

particular industry sectors. This applies to areas like mining, manufacturing, construction, wholesale and retail, accommodation and food, information and media, finance, professional services, health and arts. Where the CEET projections do come closer to Low-trust globalisation in relative terms is in sectors like transport and education. The CEET forecasts are closer to the Flags scenario for sectors like agriculture, electricity etc, real estate and government. The CEET study matches the Access Economics projections for manufacturing for both the Open Doors and Low-trust globalisation scenarios but not for the Flags scenario where this extraordinary figure of 12.6 per cent remains a stark outlier.

Employment in the education and training sector are somewhat higher for CEET than for any of the Access Economics forecasts. This is presumably based on the expectation that the current trend of employment shifting to high-skill occupations continues and thereby reinforces a continuing expansion in education and training provision. It is unclear what role overseas student enrolments play in these scenarios. The Global Financial Crisis (GFC)

has played a role in subduing such enrolments, and this might influence outcomes for the two lower-growth Access Economics scenarios. However, a much bigger impact is likely to flow from immigration policy changes around permanent residency which were announced in early 2010. These changes are expected to have a major impact on overseas enrolments, particularly among private education providers. It is unlikely that this has been factored into any of the modelling.

2.3 Occupational forecasts

As noted earlier the occupational forecasts flow from the industry projections, using occupational employment shares from the 2006 Census. In the case of Access Economics the conversion from industry to occupation makes use of the older ASCO coding system at the 3 digit level, before converting to the current ANZSCO coding system (at the 1 digit level). In the case of the CEET projections, it is not clear how the conversions are done, but the presentation of occupational results at the ANZSCO 2 digit

Table 2.3: Occupational projections for 2025, comparisons

	CEET		Access Economics					
	'000s	%	Open Doors		Low-trust		Flags	
			'000s	%	'000s	%	'000s	%
Managers	1,947	14.5	1,940	12.7	1,711	12.4	1,559	12.5
Professionals	3,116	23.2	3,247	21.2	2,934	21.3	2,608	20.9
Technicians & trades workers	1,888	14.0	2,188	14.3	1,945	14.2	1,891	15.1
Community & personal service	1,307	9.7	1,414	9.2	1,279	9.3	1,123	9.0
Clerical & administrative workers	1,929	14.3	2,381	15.5	2,149	15.6	1,885	15.1
Sales workers	1,166	8.7	1,574	10.3	1,431	10.4	1,219	9.7
Machinery operators & drivers	864	6.4	1,005	6.6	892	6.5	859	6.9
Labourers	1,240	9.2	1,573	10.3	1,402	10.2	1,361	10.9
Total	13,457	100.0	15,322	100.0	13,743	100.0	12,504	100.0

Notes: For explanation of Access Economics scenarios see Skills Australia (2009).

Source: Shah (2010, Table 23); Access Economics (2009a, Tables 6.5, 6.6, 6.7).

Population: Employed persons, Australia.

level suggests that the CEET modelling stays with the ANZSCO system for the entire process.

The most interesting aspect to the occupational projections is the similarity between the three Access Economics forecasts and the sharp difference with the CEET forecasts. This applies, however, only to the top and bottom of the occupational ladder. CEET provides very optimistic projections for managers and professionals, expecting them to constitute 37.7 per cent of the workforce in 2025. By comparison, even the most expansionist Access Economics scenario (Open Doors) expects that these two occupations will constitute 33.9 per cent. On the other hand, Access Economics expects labourers to make up between 10.2 and 10.9 per cent of the workforce while CEET has them at just 9.2 per cent. A similar pattern is evident with salesworkers: Access Economics expects them to constitute between 9.7 and 10.4 per cent, while CEET puts the figure at just 8.7 per cent. CEET clearly foresees a more highly-skilled future for the Australian workforce than does Access Economics.

The stronger position of manufacturing in the Access Economics industry forecasts for the Flags scenario is evident in the occupational projections. Technicians and trades workers, machinery operators and drivers, and labourers all feature strongly in the Flags projections, where they total 32.9 per cent of the workforce. The CEET projections, with

their expectation of a more highly-skilled future, put the figure for these three occupational groups at 29.6 per cent. It's important to keep in mind that a difference of 2.3 percentage points represents about 310,000 workers (in terms of the CEET workforce total).

2.4 Educational qualifications forecasts

Projections of future educational qualifications are based on extrapolating from current occupational qualification profiles, using the occupational forecasts just discussed. In addition, allowance is made for 'skills deepening' within occupations. This means that one does not just extrapolate with a static ratio which reflects the qualifications profile of an occupation as that pertained at a particular time. Rather, those occupations where qualification-holding is growing at a faster rate than the occupation itself (the definition of skills deepening) make use of a higher ratio which reflects this trend. Both the CEET forecasts and the Access Economics forecasts incorporate trends in skills deepening into their projections.

The forecasts for educational qualifications in 2025 are shown in Table 2.4 and follow quite logically from the occupational forecasts. With its expectation of a high-skills future, it is no surprise to see that CEET expects the proportion of the workforce who hold qualifications to be quite high (76.6 per cent), a figure in excess of the most expansionist of the

Table 2.4: Educational qualifications projections for 2025, comparisons

	CEET		Access Economics					
	'000s	%	Open Doors		Low-trust		Flags	
			'000s	%	'000s	%	'000s	%
Higher education	4,324	32.1	5,238	34.2	4,631	33.7	4,039	32.3
VET sub-total	5,985	44.5	6,332	41.3	5,500	40.0	4,934	39.5
Diploma / Advanced Diploma	2,391	17.8	2,001	13.1	1,745	12.7	1,552	12.4
Certificate III / IV	3,184	23.7	3,425	22.4	2,970	21.6	2,685	21.5
Certificate I / II	410	3.0	906	5.9	786	5.7	698	5.6
Qualifications sub-total	10,309	76.6	11,570	75.5	10,131	73.7	8,973	71.8
No qualifications	3,148	23.4	3,752	24.5	3,612	26.3	3,531	28.2
Total	13,457	100.0	15,322	100.0	13,743	100.0	12,504	100.0

Notes: For explanation of Access Economics scenarios see Skills Australia (2009).

Source: Shah (2010, Table 24); Access Economics (2009a, Tables 8.7, 8.8, 8.9).

Population: Employed persons, Australia.

Access Economics forecasts of 75.5 per cent. At the other end of the scale—the Access Economics Flags scenario—this figure is just 71.8 per cent. We saw earlier that the occupational forecasts for the Flags scenario expected higher proportions of blue-collar workers—following on from the elevated role for manufacturing—and this is likely to see lower proportions of qualified workers. By contrast, the Open Doors scenario foresaw more managers and professionals, and this flows into the qualifications forecasts which they make. Higher education qualifications, for example, make up 34.2 per cent of the total in the Access Economics projections for this expansionist scenario.

What is interesting, however, is that while the CEET projections for a highly-skilled future have particularly high expectations for more managers and professionals, this does not translate into particularly large forecasts for higher education qualifications. Indeed, all Access Economics forecasts in this regard are higher than the CEET forecasts.

Where the higher qualifications profile expected by CEET—the 76.6 per cent figure—shows up most notably is in VET qualifications, particularly Diploma and Advanced Diploma qualifications. The gaps here are quite remarkable: the 17.8 per cent figure compares with 13.1 per cent under Open Doors and just 12.4 per cent under Flags.

There are also notable differences with Certificate III / IV qualifications, but not of the

same magnitude. CEET expects 23.7 per cent of the workforce to have this level of qualifications, whereas the Access Economics figures range from 21.5 per to 22.4 per cent.

Finally, at the lowest level of VET the pattern is reversed, with CEET expecting only 3 per cent of the workforce to hold Certificate I / II qualifications and Access Economics expecting proportions which are nearly double this.

Clearly, the CEET vision of a high-skills future translates within the VET field into an expectation of greater proportions of the more advanced qualifications than is the case with any of the Access Economics projections.

As mentioned earlier CEET incorporates the shifting qualifications profile of the Australian population in its modelling and Shah (2010, p. 5) observes that the growth in Diploma holding has been increasing at a rate of 10 per cent per annum while the number holding Certificate I qualifications has been declining. These trends are clearly influencing the CEET projections more strongly than is the case for Access Economics. However, as Shah (2010, p. 49) also notes in his conclusion, it is uncertain how much of the growth in Diploma holding is driven by labour market demand because of the possibility of ‘supply-induced demand’. He suggests that more information would be needed to resolve this.

Table 2.5: Additional educational qualifications required in 2015, comparisons

	CEET		Access Economics					
	'000s	%	Open Doors		Low-trust		Flags	
			'000s	%	'000s	%	'000s	%
Higher education	162	34.0	351	45.5	302	46.8	253	46.8
VET sub-total	315	66.0	420	54.5	344	53.2	287	53.2
Diploma / Advanced Diploma	123	25.8	138	17.9	116	18.0	97	17.9
Certificate III / IV	163	34.2	190	24.7	156	24.1	133	24.7
Certificate I / II	29	6.1	91	11.8	72	11.2	57	10.6
Total	477	100.0	771	100.0	646	100.0	540	100.0

Notes: For explanation of Access Economics scenarios see Skills Australia (2009).

Source: Shah (2010, Table 36); Access Economics (2009a, Tables 8.13, 8.14, 8.15).

Population: Additional number of qualifications required by the workforce, Australia.

2.5 Additional qualification requirements in 2015

The discussion in this section changes in two important ways: the time frame differs and the perspective shifts from stocks to flows. The forecasts are now for 2015 because the CEET projections are tabulated in such a way that this is the only common year between their forecasts and those from Access Economics.

Secondly, one needs a flows perspective which recognises that the stock of qualifications is diminished as people retire, but is refreshed by new entrants to the labour market, either from the educational system or through net migration (that is, additional educated migrants less departing educated locals). If the stock itself is expected to grow—as it does in all the forecasts discussed in the last section—then the rate of inflow must exceed the outflow. Finally, if skills deepening is taking place, then additional qualifications are needed, independently of the growth in stocks. Access Economics provides a useful summary of these concepts (Access Economics 2009a, p. 58) and uses a simple decomposition framework to present its forecasts. This consists of:

1. employment growth overall;
2. additional requirements to offset retirements; and
3. the influence of skills deepening.

Using this framework, Access Economics provides estimates for annual requirements in 2015 and totals based on these are shown in Table 2.5 along with percentage breakdowns.

In the case of the CEET report, the data is presented differently showing just *new entrants* and *existing workers*. It is possible that the latter is equivalent to skills deepening, but CEET does not present it as such. The totals from the CEET report, along with percentage breakdowns, are shown in Table 2.5. Despite slightly different phrasing—Access Economics uses the term ‘additional’—both reports present comparable data at the aggregate level for future qualification requirements for 2015 and this forms the basis of the comparison in the following discussion.

There is also an issue of the relevant population. In the data being compared the common population is the workforce, that is, the employed population. CEET also presents forecasts which include the non-employed population which are considerably higher than the numbers discussed below. However, Access Economics does not discuss this population but restricts its forecasts to the employed population only. Consequently, in the discussion below, the population referred to remains the workforce. A further complication is the fact that the Access Economics forecasts include multiple qualification holding, something which CEET does not incorporate. (I go into more details about this issue on page 11 below). Apart from this, the two different sets of forecasts are as comparable as one can get.

Turning to the comparisons, the differences between CEET and Access Economics are quite stark. By 2015 CEET is expecting the demand for additional qualifications to number about 477,000. By contrast, none of the

Access Economics forecasts come close to this: they range from a conservative 540,000 to an expansionist 771,000. As noted earlier, the CEET assumptions come closer to the Open Doors and Low-trust scenarios, so the fact that these projections are so far from these more relevant scenarios suggests quite different assumptions are entering the modelling. I explore this issue shortly.

Looking at relativities, the breakdowns within these additional qualifications are also quite revealing. CEET expects that VET requirements will make up 66 per cent of the total. It's worth noting that while this figure refers to 2015, the discussion in the CEET report makes it clear that this figure is close to the average across the whole period (which cannot be easily tabulated here because of incompatible presentations between CEET and Access Economics). The Access Economics forecasts for VET are considerably below this: ranging from 53.2 per cent to 54.5 per cent.

The pattern we saw earlier, in which higher level VET qualifications are emphasised by CEET, is also evident here. CEET expects Diplomas and Advanced Diplomas to make up nearly 26 per cent of the total; Access Economics puts this figure at about 18 per cent, a difference of 8 percentage points. The starkest difference, however, is at the Certificate III / IV level: CEET expects just over a third of the total to be at this level; Access Economics expects demand at this level to be only a quarter of the total. This is a difference of nearly 10 percentage points. Not surprisingly, at the other end of the scale, additional demand for Certificate I / II qualifications is forecast by CEET to be very low, at just 6.1 per cent. The Access Economics figures range from 10.6 per cent to 11.8 per cent. Finally, the higher education figures also reflect the earlier pattern: CEET downplays this while Access Economics emphasises it. The difference is considerable: between 11 and 13 percentage points.

As mentioned above, the issue of differences in magnitude does require further discussion. To begin, it's worth bringing these differences into relief by comparing Tables 2.4 and 2.5 above (and rounding off the numbers for convenience). Looking first at Table 2.4 the

CEET projections and the Low-trust projections are quite close: around 13.5 million persons. The expectation that between 4.3 and 4.6 million workers will have higher educational qualifications is also in reasonable agreement. Similarly, the difference between 3.2 million and 3 million workers with Certificate III / IV qualifications does not stretch credibility. However, the size of the discrepancy in the Diploma / Advanced Diploma differences does raise eyebrows: CEET expects 2.4 million, Access Economics expects 1.7 million. While a difference of this size is likely to affect further comparisons it is still fair to say that the amount of overlap between CEET and Access Economics is not unreasonable, particularly given the magnitudes involved (measurements in the millions) and the time frame of 2025.

Let us now turn to Table 2.5, the Table which has greater policy and planning implications because it constitutes the estimates of future demand. Here the magnitudes are in the hundreds of thousands and the time frame is much closer, 2015. Yet the overlaps are few and far between. The closest matching forecasts are between CEET and the Flags scenario, but even this puts the totals at odds by more than 60,000. The differences for higher education are in the order of 90,000, though the differences for VET are in the order of about 30,000. To be consistent, however, we should compare the CEET forecasts with the Low-trust scenario, particularly given that most of the earlier assumptions suggest a closer match with this comparison. In this case, the overall gap is about 170,000; the higher education difference is about 140,000 and the VET difference is again 30,000. This difference, however, lies in the opposite direction. In the Flags scenario—despite a larger overall total—Access Economics expected that VET qualifications would amount to an additional 287,000 workers, 28,000 *less* than CEET. For the Low-trust scenario, Access Economics expected that VET would amount to 344,000 additional workers, 29,000 *more* than CEET.

Why are there such large discrepancies? As mentioned earlier, forecasts for Diploma / Advanced Diploma levels differ considerably between the two reports, but this is insufficient

to explain these differences in additional requirements.

One likely explanation is multiple qualification holding which is likely to boost the overall magnitude in the Access Economics forecasts by a considerable amount. As the CEET report notes,

The total number of qualifications that would need to be completed in this period is likely to be higher than estimates provided in this report because some people do [hold] multiple qualifications. Lower level qualifications are sometimes stepping stones to higher level qualifications (Shah 2010, p. 49).

Some indication of the size of this difference is evident if we compare the Access Economics estimates for highest level qualifications (discussed in the last section) with those for multiple qualification holding. The latter has not been presented so far but the data are to be found in Tables 8.10, 8.11 and 8.12 (Access Economics 2009a, p. 57). For 2015 the *highest level* of qualification numbers are at 8.6 million, 8.1 million and 7.7 million for the three scenarios (Open Doors, Low-trust and Flags). The equivalent figures for *multiple qualification* holding are 12.9 million, 12.1 million and 11.4 million. The ratio between these figures is almost constant across scenarios, at about 1.5. In other words, using the assumption that multiple qualification holding should be taken into account produces estimates of population totals which are 1.5 times greater than would be the case if this assumption were ignored.

Of course, this set of estimates is for the total stock of qualifications, not for the additional qualifications required. This means that we can't just expect the latter to be magnified by 1.5 in the Access Economics forecasts. This is because assumptions about retirements and skills deepening also contribute to the final forecasts.

Skills deepening

An obvious question which arises at this point is whether there is overlap between multiple qualification holding and skills deepening. It is

quite likely that some of the skills deepening—that is, growth in qualification holding at a faster rate than the growth in the workforce—involves existing qualification holders taking on additional qualifications, as well as the trend in which qualification holding spreads more extensively within the workforce. While Access Economics explain their methodology (Access Economics 2009a, p. 58) for calculating additional qualifications, the detail is insufficient to know how they have dealt with this potential for overlap and whether it might constitute a form of double-counting. In the case of CEET, there is little discussion of this issue of multiple qualification holding, though assumptions about skills deepening play an important role in their forecasts (Shah 2010, p. 46).

Is it possible to compare the assumptions regarding skills deepening? Shah (2010, p. 46) notes that the CEET estimates for skills deepening within occupations use 'recently observed trends' so they incorporate the expectation that skills deepening will increase over time. Access Economics takes a similar approach, in which 'rules of thumb related to historic trends' are used rather than any measure of 'underlying requirements' (Access Economics 2009a, p. 77).

Because the Access Economics and CEET reports report their breakdowns differently, it's not easy to directly compare estimates of the contribution made by skills deepening. If we assume that the qualifications required for the existing workforce in the CEET report are equivalent to the skills deepening component of the Access Economics report, then we can tentatively compare these figures. These skills deepening rates are expressed as proportions in Table 2.6 and are labelled 'skills deepening' (with the caveat that this is only assumed to be an appropriate term for the CEET figures).

It appears that CEET expects much higher rates of skills deepening in 2015, somewhere in the order of 0.40. (That is, 40 per cent of the additional qualifications will be accounted for by skills deepening.) By comparison, the figure for Access Economics across all scenarios is 0.29. The differences for higher education are less marked: CEET expects a figure of 0.31 while the Access Economics figures range

Table 2.6: Skills deepening rates for 2015, comparisons

	CEET	Access Economics		
		Open Doors	Low-trust	Flags
Higher education	0.31	0.33	0.34	0.36
VET sub-total	0.46	0.25	0.25	0.24
Diploma / Advanced Diploma	0.56	0.33	0.33	0.34
Certificate III / IV	0.40	0.29	0.29	0.28
Certificate I / II	0.34	0.05	0.01	-0.03
Total	0.40	0.29	0.29	0.29

Notes: For explanation of Access Economics scenarios see Skills Australia (2009).

Source: Calculations based on Shah (2010, Table 36); Access Economics (2009a, Tables 8.13, 8.14, 8.15).

Population: Employed persons, Australia.

from 0.33 to 0.36 and all are greater than the CEET figure. By contrast, in the VET area CEET expects much higher skills deepening, an average of 0.46 and a figure as high as 0.56 for Diplomas and Advanced Diplomas. Access Economics, on the other hand, not only puts the VET figures much lower than those for higher education, but considerably lower than the equivalent CEET figures. The average for VET is just 0.25 and for Diplomas and Advanced Diplomas it is 0.33.

These CEET expectations for higher levels of skills deepening among the VET qualified workforce partly explain the significant role given to VET in the CEET forecasts. As noted earlier, CEET expects 66 per cent of additional educational qualifications in 2015 to come from the VET sector, a figure some 11 percentage points higher than what Access Economics expects. Apart from the Flags scenario, the actual numbers forecast by CEET are lower than for Access Economics but this is because CEET forecasts such low totals to begin with (the 477,000 figure).

Retirements

The other important issue which influences future requirements for qualifications is the assumption made about retirements. Access Economics puts the replacement rates which take account of people leaving the labour force (or moving permanently to another occupation) at 0.30, 0.35 and 0.41 for the three scenarios (Open Doors, Low-trust and Flags). In other words, somewhere between one third and two fifths of the future demand for educational

requirements arises because of departures from the labour force due to retirement. These estimates are for the near future—2015—while those for the more distant future—2025—are somewhat higher, reflecting the demographic time-bomb assumptions: 0.33, 0.40 and 0.50. What is interesting about these figures is that the highest retirement rates apply to the most conservative scenario, the inward-looking scenario of Flags in which immigration levels are more subdued. In this scenario retirements not only constitute the largest ratio, but one which increases considerably over time. In Open Doors, for example, the increase is from 0.30 to 0.33. For Flags the increase is from 0.41 to 0.50. With reduced immigration, the ageing of the population results in considerably higher retirement rates because the age structure of the population is not being balanced by as many migrants, a group whose average age is younger than the population as a whole.

Access Economics calculates its estimates for retirements using five year age cohorts and three-digit ASCO counts from the 2006 Census (Access Economics 2009a, pp. 75–76). These retirements reflect the number of retirements to be expected in each occupation in each forward period. In this way, the ‘baby-boomer bulge’, for example, moves through the forecasts producing different retirement rates at different points in time.

Because the CEET projections are tabulated differently it’s not possible to compare retirement rates. CEET uses the category ‘new entrants’ to cover both the growth in the labour

force and the need to replace departing workers. In assessing the numbers involved, CEET includes a number of causes of labour force departure (emigration, death, retirement) as well as taking account of 'occupational turnover' (Shah 2010, pp. 58, 2). Shah (2010, p. 58) does discuss the assumptions made in the calculations for retirement rates, which make use of age, sex and occupational trends for the last few years. He estimates replacement rates of between 2.0 per cent and 2.3 per cent. These figures don't relate to the Access Economics figures because these represent the rate at which the stock of qualified persons will decline in coming years. Fortunately, the CEET report does include a table showing the relative importance of replacement needs compared to employment growth and these can be used to calculate a ratio which is equivalent to the ratio of the first two components (employment growth and retirements) in the Access Economics tables. CEET puts these two rates at 1.4 per cent for economic growth and 2.3 per cent for net replacement (Shah 2010, p. 60), a ratio of 1.65. It is important to note that these rates are for the period 2010 to 2025. The economic growth components for the Access Economics forecasts are: 0.37, 0.29 and 0.19. These figures have been selected for 2025, in order to approach some degree of comparability with the CEET forecasts. Expressing these growth figures as a ratio to the retirement rates mentioned earlier produces ratios of: 0.89, 1.38 and 2.63.

In summary, only the Low-trust scenario comes close to the CEET assumptions about the likely ratio between how much future qualification demand will be driven by replacement needs, and how much it will be driven by economic growth. CEET expects replacements to be 1.65 times greater than what economic growth will require, Access Economics expects it to be about 1.38 times greater. However, in the Flags scenario, which reflects a low growth future for Australia, this figure is as high as 2.63. By contrast, in the Open Doors scenario, with its higher rates of GDP growth and its high immigration levels, economic growth will actually contribute more to future demand for qualifications than will the need to replace retiring workers.

2.6 The supply of qualifications

The discussion of skills demand up to this point has relied on the assumption that the demand for skills can be measured by the employment of workers holding certain qualifications. As the CEET report puts it: '[The modelling] also assumes that the number holding qualifications represents the true demand for qualifications.' (Shah 2010, p. 46). As I suggest in the next chapter, this assumption can be misleading because it unproblematically equates qualifications with skills and it ignores the under-utilisation of skills in the workplace. Nevertheless, in the absence of other data which might more directly measure skills demand, this assumption is a reasonable operational necessity.

As well as looking at qualifications in terms of *labour market demand*, it can also be looked at in terms of *student demand*. This is best measured by student completions and can be regarded as one measure for the potential supply of skilled workers in the future. Net migration is another source of future supply.

While CEET does not provide information on course completions, Access Economics does. It also provides information on the contribution made by net migration. Combining these data with the additional qualifications requirements discussed in the last section allows Access Economics to estimate possible shortfalls in the supply of qualified persons in coming years. As noted earlier, the requirement forecasts are based on assumptions about employment growth, skills deepening and retirement rates and these are used to produce 'implied' labour market demand for various levels of qualification (Access Economics 2009a, p. 62).

By way of contrast, the estimates for future student course completions are based on equations which combine projections from Year 12 completion rates, unemployment rates and wages. The first of these is a structural component, which is largely independent of the business cycle and reflects 'underlying changes in the demand for education (Australia's move to becoming a higher skill economy)' (Access Economics 2009a, p. 25). Educational policy over the last two decades

Table 2.7: Potential shortfall in qualifications in 2015, (thousands)

	Open Doors			Low-trust			Flags		
	Supply	Demand	Difference	Supply	Demand	Difference	Supply	Demand	Difference
Higher education	203	351	-148	199	302	-103	191	253	-61
VET sub-total	330	420	-90	325	344	-19	315	287	27
Diploma / Advanced Diploma	51	138	-88	50	116	-66	48	97	-49
Certificate III / IV	188	190	-3	185	156	29	179	133	45
Certificate I / II	92	91	1	91	72	19	88	57	31
Total	533	771	-238	524	646	-121	506	540	-34

Notes: Supply refers to projected student demand (supply of students); demand refers to implied labour market demand; difference is supply less demand and represents the shortfall.

For explanation of Access Economics scenarios see Skills Australia (2009).

Source: Access Economics (2009a, Tables 9.1, 9.2, 9.3).

Population: Employed persons, Australia.

Table 2.8: Potential shortfall with net migration included, (thousands)

	Open Doors	Low-trust	Flags
Higher education	-75	-44	-31
VET sub-total	-51	12	44
Diploma / Advanced Diploma	-67	-50	-40
Certificate III / IV	15	43	53
Certificate I / II	1	19	31
Total	-127	-32	13

Notes: For 2015. Figures are the equivalent of the 'Difference' column shown in Table 2.7. For explanation of Access Economics scenarios see Skills Australia (2009).

Source: Access Economics (2009a, Tables 9.4).

Population: Employed persons, Australia.

which has focussed on raising Year 12 retention rates is part of this framework.

The latter two components—unemployment rates and wages—are more cyclical in their effects. They shape decisions students make between studying and entering the labour market. A classic instance of this was evident during the recessions of the early 1980s and 1990s, when school retention rates rose dramatically as young people realised their labour market options were very limited. Relative wage rates also influence such decisions, as well as shaping the enrolment patterns between different sectors, such as the choice between higher education versus vocational education.

Access Economics presents forecasts showing the balance between the implied labour market demand for qualifications and the supply based on student completions. For consistency with the last section, I present only the 2015 forecasts (though Access Economics also provides figures for 2020 and 2025). As

Table 2.7 makes clear, Access Economics expects shortfalls in the supply of students for higher education across all scenarios, though the magnitude is considerably reduced in the Flags scenario. When it comes to VET, none of the scenarios envisage shortfalls for Certificate I and II students, but all scenarios do show shortfalls for Diplomas and Advanced Diplomas, though the magnitudes do not differ all that much (unlike the higher education differences).

When it comes to Certificate III and IV students, there is some variation according to the scenario. In the high-growth Open Doors scenario shortfalls are expected, though the magnitude is very small in relative terms. Neither the Low-trust nor Flags scenarios expect shortfalls at the Certificate III and IV levels. In other words, essentially all of the shortfalls in VET student completions are expected to occur in the Diploma and Advanced Diploma stream, with the differences

between scenarios far less pronounced than is the case for higher education.

What is striking about Table 2.7 is the assumption that the supply of students will barely change at all across these differing scenarios—even though they imply quite different assumptions about population growth (as was evident in Table 2.1). Whether a shortfall eventuates is almost entirely driven by the labour market demand for qualifications. For example, comparing overall VET figures, the differences between Open Doors and Flags entails a reduction of just 4.5 per cent in student completions. On the other hand, the comparable figure for labour market demand is a reduction of 31.6 per cent as one moves from Open Doors to Flags.

Access Economics also goes on to calculate what the shortfall in qualifications might be when net migration is incorporated. This means taking account of the difference between losses to the labour market from qualified Australians emigrating and the gains to the labour market from qualified foreigners immigrating to Australia. This modified version of the shortfalls table is shown in Table 2.8. The most notable feature of this table is that there is an improvement in the situation across the board, but the improvement is much greater in higher education than in VET. The effect of net migration is to almost halve the shortfall in higher education. By contrast, in the VET sector, the shortfalls for Diplomas and Advanced Diplomas is reduced by only about one quarter. In terms of Certificate level courses, the impact of immigration is an expected over-supply of qualifications—and this applies across all scenarios, though it is particularly pronounced for the Low-trust and Flags scenarios.

What is particularly interesting about these VET forecasts is that in the earlier projections for additional educational qualifications (see Table 2.5) Access Economics expected much lower relative demand for Diplomas and Advanced Diplomas than did CEET. The latter expected them to constitute nearly 26 per cent of all additional educational qualification requirements; the former put the figure at around 18 per cent. And yet in these shortfall forecasts, the Access Economics figures for

VET highlight Diplomas and Advanced Diplomas as the areas of concern. If CEET's (forthcoming) modelling of the supply of educational qualifications is in the vicinity of the Access Economics projections—which as we've just seen, don't vary all that much by different scenarios—then one could assume that the CEET forecasts for shortfalls of Diplomas and Advanced Diplomas may be considerably higher than these Access Economics figures.

3. Assumptions behind the modelling

There are a number of assumptions which form the backdrop to the forecasts discussed in the last chapter. Some are long term structural changes, others are more recent policy-oriented changes, while others reflect the recent contemporary economic situation. Some of these issues enter directly into the model parameters, and others are simply discussed as part of the context.

3.1 The demographic ‘time-bomb’

Over the last decade the Australian government has produced three Intergenerational Reports, generally abbreviated to IGR 2002–03, IGR 2007 and IGR 2010 (Commonwealth Treasury 2002; Commonwealth Treasury 2007; Commonwealth Treasury 2010). While the most recent Intergenerational Report (IGR 2010) sparked a public debate on immigration and the potential size of Australia’s population, it was the first one (IGR 2002–03) which had the most impact on public policy in terms of confronting the challenges posed by demographic change.

The ageing of the population, with its potential health costs, and the impending departure from the labour force of the baby boomer generation, with the potential loss of taxation revenue and workforce skills, were central features of the analysis. When combined, the impact of these were seen as a major challenge for Commonwealth finances and were often discussed in terms of a rising ‘dependency ratio’. More broadly, the economic implications of an ageing population for labour supply were also canvassed.

The policy responses which have been discussed since 2003 have emphasised increased immigration, higher levels of labour

force participation, and efforts to increase productivity. A prosperous future was seen to depend on achieving good outcomes in these areas to offset the demographic ‘time bomb’. This policy framework is a constant backdrop for both the CEET and Access Economics modelling and enters directly into their model parameters. For example, assumptions about differing levels of immigration and population growth are key inputs in all three Access Economics scenarios. In the case of the CEET modelling, assumptions about immigration levels based on the latest IGR appear to be part of the parameters for the MONASH model.

In its discussion of the macroeconomic context, the CEET report draws on the most recent IGR to emphasise the challenge of an ageing population, particularly the need to lift participation rates (Shah 2010, pp. 1–2). Access Economics observes that the three scenarios imply different outcomes in terms of population growth, with the Open Doors scenario more likely to ensure no long term decline in population. However, in terms of the *age composition* of the population, all three scenarios point in the same direction. In particular, projected growth in the prime student cohort (aged 18 to 22) sees a major decline for the period 2010 to 2020, before reviving and moving upward to reach levels still below those of 2010. Access Economics emphasises the ‘demographic challenge facing Australia’ with the impending retirement of baby boomers and the risk that inadequate participation rates will not be able to compensate for their departure from the labour market (Access Economics 2009a, p. ii–iii).

While the projections from the IGR 2002–03 have been revised in the more recent reports, it is worth looking at these early projections because we are now in a position to evaluate

Table 3.1: Intergenerational report: projections and outcomes

Age range	Intergenerational Report 2002-03 (millions)					ABS
	2002	2012	2022	2032	2042	2009
0 to 14	3.9	3.8	3.8	3.8	3.7	4.2
15 to 64	13.2	14.6	15.1	15.3	15.4	14.9
65 to 84	2.2	2.7	3.8	4.7	5.1	2.5
85+	0.3	0.4	0.5	0.8	1.1	0.4
Persons	19.6	21.5	23.2	24.5	25.3	22.0
Working age as %	67.3	67.9	65.1	62.4	60.1	67.7
Older to working age as %	18.9	21.2	28.5	35.9	40.3	19.5

Notes: IGR 2002 and ABS figures for 2009 are actual outcomes; all others are projections.

Source: IGR from Commonwealth Treasury (2002, Table 3, p. 22); ABS from ABS (2009b, Table 9).

Population: Australian population, all persons.

their accuracy. Table 3.1 shows the population projections from that report and the relevant Australian Bureau of Statistics population figures for 2009. The closest forecast year for these actual figures is 2012, so the comparisons are made with that year.

The first notable feature of Table 3.1 is the consistent trend in the projected numbers for young people (0 to 14) as they slide gradually downward. At the same time, the numbers of older people (those 65 and older) rises quite sharply. Indeed, by 2042 this group is projected to have more than doubled in size (from 2.5 million to 6.2 million). Where the concerns about dependency ratios surfaces is in the shrinking ratio of the working age population to the remainder of the population. This is projected to fall from 67.3 per cent in 2002 to 60.1 per cent by 2042. While young people make up part of the dependent sector of the population, it is mainly the older age groups which are the cause for policy concern. As Table 3.1 shows, this group is projected to increase from 18.9 per cent to 40.3 per cent over this period. In other words, where there were over 5 workers generating national income to support one retired person in 2002, by 2042 there will only be 2.5 workers carrying this load. This kind of scenario is the basis for much of the policy angst which seeks to encourage greater workforce participation among all groups, and to delay retirement among older age groups.

The actual outcomes in 2009 show an interesting break from these projections. For a start, the gradual decline in young people is reversed, with an increase in their numbers to

4.2 million rather than a decline to 3.8 million. This reflects recent changes in the birth rate which have begun to depart from long term trends. At the same time, the rate of growth in the working age population is greater than that foreseen in the IGR. By 2012 the IGR expected this group to number 14.6 million, up from 13.2 million. By 2009 they had already reached 14.9 million, well ahead of expectations. This boost mostly reflects record levels of immigration over recent years, levels not anticipated during the late 1990s.

The rise in the percentage of the population who are of working age may still reach expectations—in 2009 it was 67.7 per cent and it was expected to reach 67.9 per cent by 2012. After that, it is expected to decline. Of course, the unexpected boost in the younger age group (0 to 14) may alter this trajectory, since as they mature in coming decades they will enter the labour force and boost the numbers of working age persons.

As for the concern about older persons relying on the working age population, this ratio has not increased at the rate expected. It was 18.9 per cent in 2002 and had only grown to 19.5 per cent by 2009. It seems unlikely to reach 21.2 per cent by 2012.

So is the demographic time-bomb looking more or less likely to eventuate? These figures suggest its ultimate trajectory is unchanged, but the rates of change implied in the IGR 2002–03 look unlikely. The closest match occurs with the figure of the working age proportion: 67.9 compared with 67.7 per cent. But the reason this figure is close, given the

above-expected increase in the working age population, is because of the influx of young people (0 to 14) into the dependent sector, thereby pulling this rate further down than might otherwise be the case. However, this younger cohort will eventually join the labour force and thus improve this ratio of workers to non-workers. The dependency issue which has most troubled policy-makers—the ratio of older persons to working age persons—does appear to be moderating, partly because net migration levels have boosted the numbers of working age persons more than was anticipated back in 2002.

3.2 Climate change and the CPRS

Recent Australian research, such as the report by the Australian Academy of Science (2010), outline the likely effects of climate change in Australia. These range from higher temperatures, more extreme weather events (such as floods and cyclones), rising sea-water levels and coastal flooding, higher levels of ocean acidity, declining biodiversity and increased migration flows ('climate refugees'). The direct impact of these on the economy is likely to be profound, particularly in sectors like agriculture, tourism, insurance and property development. These impacts will flow through to businesses and households, and particularly to state and local governments.

Despite this reality, in a short space of time the centrality of climate change to political debate has receded. It was central to the political debates in the 2007 election, but marginal to the debates in 2010. The failure of the Copenhagen process, and the renewed efforts of climate change skeptics, has seen public concern about climate change wane in recent years (as tracked by the Lowy Poll, for example).

Prior to the current impasse, public policy in Australia had moved in recent years to directly address climate change, with Australia's Garnaut Report echoing the UK's Stern Report in arguing that the long-term economic costs of ignoring climate change would outweigh the burden of dealing with the problem in the immediate future (Garnaut 2008; Stern 2006). Australia's policy position, until quite recently, entailed a Carbon Pollution Reduction Scheme

centred on an emissions trading framework. This policy response, and the actual risks of climate change, have therefore been an important backdrop for much Government commissioned research in recent years. Both Access Economics and the CEET report emphasise the importance of climate change and the CPRS in their discussions of the broader economic context.

In the case of the CEET report, the challenge of climate change forms part of the context for the forecasting but it does not enter the modelling process per se. In discussing the employment forecasts for 2010 to 2025, the CEET report observes:

MONASH forecasts do not include the impact of climate mitigation and adaption policies that are likely to be implemented over the next few years, although the impact of some large infrastructure projects that are related to climate change, such as in the water industry, are likely to have been factored in. Nevertheless, the model is really about a 'business as usual' case but one which ignores the costs of not tackling climate change, costs that Stern (2006) and Garnaut (2008) believe will be incurred. Future research in modelling the economy does need to consider the impact of climatic events that are predicted to increase in frequency. The modelling will need to incorporate the risk associated with these events. These risks are measurable and have already been calculated by climate scientists (Shah 2010, p. 25).

In other contexts, the MONASH model has been used to model the employment effects of responding to climate change (such as moving more decisively to renewables) but this does not appear to have been incorporated into the CEET modelling. The CEET report stresses, however, that policies like the CPRS will have implications for skills formation, and foresees that additional skills would be needed to deal with new tasks, new tools and new materials.

It also sees the requirement to reduce carbon pollution leading to innovation in industry and a diffusion of new knowledge into the wider population (Shah 2010, p. 2).

In the case of Access Economics, the Open Doors scenario includes the prospect of a global agreement to mitigate climate change. Earlier modelling by Concept Economics in 2008 examined the effect on industry employment of implementing the CPRS and Access Economics incorporates the findings of that modelling into its own forecasts for the Open Doors scenario. The Concept Economics modelling forecast an 18 per cent reduction in coal mining employment by 2025, a 14 per cent reduction in employment in electricity and gas supply and a 7 per cent reduction in oil and gas extraction employment. These reductions were then applied, in the Access Economics modelling, to the industry aggregates (with the other industries adjusted so that the totals still matched the model's targets) (Access Economics 2009a, p. 35). Using this methodology, Access Economics does manage to incorporate some of the potential employment effects of the CPRS into the Open Doors scenario. The other two scenarios do not include any responses to climate change.

3.3 The global financial crisis

Both the Access Economics and CEET modelling were undertaken in the wake of the 2008 Global Financial Crisis (GFC). The latter phrase has become common terminology for the credit crisis of September 2008, which followed the collapse of Lehman Brothers in the United States, and the subsequent crash in share market prices around the world. With global liquidity drying up, and facing the risk of major recession as economic transactions ground to a halt, governments around the world stepped in to safeguard the banking and credit systems. In some cases, this involved guaranteeing bad debts held by banks and other financial institutions, guaranteeing bank deposits, and even nationalising banks.

As an economic problem, the crisis had its immediate roots in the subprime mortgage crisis of 2007 and the 'credit crunch' of 2007–08, whilst its longer term genesis lay in

the deregulation of investment banking dating back to at least the 1990s and the securitisation of debt, which flourished during the 2000s. For a useful overview see Mason (2009). The broader context was a long-term decline in US economic hegemony and the rise of the Chinese economy, something I return to in the next chapter.

In Australia, a combination of shrewd stimulus measures engineered by the Commonwealth Treasury, rapid falls in interest rates initiated by the Reserve Bank, and the unexpected continuation of strong demand for raw materials from China, helped avoid recession.

Against this backdrop the Access Economics and CEET reports were written, in October 2009 and March 2010 respectively. The scenarios used by Access Economics were also constructed in mid-2009. Not surprisingly, the GFC is a central element in all three scenarios, and one can regard each of them as a different response to the problems for economic growth thrown up by the GFC. The Open Doors scenario envisaged a quick recovery from the GFC and a resumption of economic globalisation, with improvements in the governance of the international financial system. The Low-trust globalisation scenario was less optimistic: a global depression was avoided but countries moved to become more insular and distrustful and economic behaviour was expected to become dominated by 'carrots and sticks' rather than improved systems of governance. Finally, the Flags scenario foresaw the world economy sliding into a depression as a result of the GFC, an outcome which might last as long as three to five years (Skills Australia 2009, pp. 6 ff.).

It is interesting to note that despite the Skills Australia depiction of the Flags scenario as a global depression, when Access Economics operationalised this scenario in their modelling of skills demand, the parameters were based on assumptions of growth. Global growth was expected to average 2.6 per cent per annum and Australian domestic growth was expected to average 2.2 per cent. Given that the Flags scenario foresaw the global depression lasting three to five years, and the time frame for Access Economics is 2010 to 2025, these growth rates may be realistic. This would

mean, however, considerably higher growth rates in the period 2015 to 2025 in order to compensate for negative growth rates in the period 2010 to 2015. Whether this assumption is made, and how these higher growth rates might occur, particularly in a climate of inward, nationalistic economic management, is not discussed.

The CEET report discusses the GFC in a number of places. It notes, at the outset, that Australia largely avoided the GFC and attributes this to the role of its Asian trading partners (China, Korea, Japan and India) continuing to buy raw materials (2010, p. 1). CEET also notes that the GFC had less impact on the Australian labour market because of the unexpected behaviour of employers, who reacted to the crisis by reducing hours rather than retrenching workers (2010, p. 9). A number of economic commentators have also noted this behaviour, suggesting that the skill shortages of the previous few years had made them wary of losing staff, particularly if the GFC proved to be short-lived.

As far as the modelling itself, the CEET report notes that the MONASH model incorporated Access Economics five-year macro forecasts which had taken account of the impact of the GFC, 'though not necessarily the speed of the recovery so far' (Shah 2010, p. 25).¹ In terms of outcomes, the modelling indicated a minimal impact on aggregate employment flowing from the GFC, with most of the negative consequences restricted to the period from 2010 to 2011. In terms of sectoral effects, manufacturing and construction were expected to suffer, whilst the occupations most affected were technicians, tradesworkers and labourers (Shah 2010, pp. 26–27)

3.4 Long-term labour market changes

The key labour market issues addressed in both the Access Economics and CEET reports include participation rates, impending skills losses with the retirement of the baby boomers and the changing skills composition of the workforce. The first two issues have been canvassed in the earlier discussion on the

demographic time-bomb. In this section I look at the last issue.

The CEET report, in particular, discerns a long-term trend in the labour market, namely a fundamental *shift to high-skill occupations*. CEET attributes this to industrial restructuring, primarily driven by international competition and new technology. Low skill manufacturing jobs were an early casualty of this process, but 'service and high-skill production jobs are increasingly being exposed to competition' (Shah 2010, p. 3). Some insulated industries—such as aged care—are likely to avoid competition and we can expect growth in low-skilled service jobs in sectors like these. As shown in the last chapter, the CEET report is strongly attuned to a high-skills future, particularly for vocational skills such as Diplomas and Certificate III and IV qualifications. There is no doubt that assumptions about this long-term trend have shaped the modelling for the CEET report.

In the case of Access Economics both the Open Doors and Low-trust scenarios share the CEET perspective, whereby future skills demand is at the 'higher end of the skills spectrum' (Access Economics 2009a, p. 63). By contrast, the Flags scenario envisages an 'excess supply' of qualifications in the decade following 2015, a forecast which implies a lower demand for high skills in the economy. Despite this variation, the modelling forecasts of additional educational requirements discussed in the last chapter (Table 2.5) showed they actually differed very little. The differences between the Flags scenario and the other two were minor when it came to forecasts for additional higher level educational qualifications. Rather, it was the sharp differences between the CEET projections and *all* of the Access Economics projections which was one of the most striking findings in that chapter.

There is little doubt that long-term occupational change has seen a solid expansion in the share of jobs held by the most skilled group, namely professionals (Wooden 2000, p. 192). However, in looking at jobs growth during the 1990s, (Watson et al. 2003, p. 57) argued that

¹ The CEET report also noted that the MONASH occupational employment forecasts had themselves been produced in 2007, which meant they did not include the strong employment growth of 2008 nor the impact of the GFC in 2009 (Shah 2010, p. 25).

we need to look beyond the aggregated occupational categories, because the story at lower levels in the occupational scheme is somewhat different: in the 1990s 'there was remarkable growth in lower skilled jobs, particularly sales assistants and checkout operators'. Watson points to the findings of Cully (1999) and Cully (2002) who argues for a 'hollowing-out thesis'. While it's true that the share held by highly-skilled jobs has been increasing, so too has the share held by low-skilled jobs. The jobs in decline are those with middle-level skills.

While this thesis has been contested by Wooden (2000, p. 197), that refutation was partly based on an hours analysis of occupational growth, rather than a headcount measure. From the perspective of educational provision, the headcount measure is the appropriate approach. This remains a controversial area of labour market research, but it is important to note that the assumption of a secular trend towards a uniformly higher-skilled future, which is particularly important for the CEET analysis, is not uncontested.

4. Neglected issues

In this section I discuss some of the issues which are neglected in the forecasting models used by CEET and Access Economics. I also look at issues which are mentioned by these reports, but which don't appear to influence their modelling strategy. Some of these issues overlap with those in the last chapter, but take a different direction, such as different responses to climate change. There are two broad dimensions to this discussion: thinking about different scenarios and recognising methodological shortcomings in the modelling. To some extent these themes overlap but I deal with each in turn.

4.1 Other scenarios

In this section I consider two of the main omissions from the forecasting modelling: peak oil and prolonged economic malaise. Elements of both are present in the Access Economics and CEET modelling, but their full implications are never acknowledged.

Peak oil

As noted in the last chapter, both Access Economics and CEET discuss the challenge of climate change, but none of their modelling fully incorporates this recognition. The kind of transformation of the economy, particularly in the areas of energy and transport, required to fully meet the challenge of climate change is simply not envisaged in these reports. As I suggest in the methodological discussion below, the modelling approach does not appear suited to such a task.

In the case of peak oil there is no acknowledgement of its presence and the challenges it poses. Peak oil refers to the

situation when oil extraction reaches its maximum and thereafter begins to decline. This is not the same as depletion or running out of oil. Rather it refers to declining aggregate production over time, even with new reservoirs being opened up. The more optimistic forecasts are for global peak oil to be reached by about 2020; the more pessimistic suggest it may already have arrived. The *Hirsch Report*, written in 2005, expected peak oil to occur within 20 years (Hirsch & Bezdek & Wendling 2005, p. 5).

The demand for oil at a global level is expected to grow by 50 per cent during the period 2005 to 2025. To meet such a demand, oil production must also expand, something which requires increased production from existing reservoirs and the opening of new reservoirs. Hirsch and his colleagues observe: 'When world oil production peaks, there will still be large reserves remaining. Peaking means that the rate of world oil production cannot increase; it also means that production will thereafter decrease with time' (2005, p. 12).

The expectation that the inevitable rise in the price of oil will spur the opening of new reservoirs and provide an incentive for more intensive extraction using new technology—as has happened with other minerals—appears unlikely. Geographical constraints, in terms of how oil reservoirs are laid down, appear to place fundamental limits on this process: 'Higher prices and improved technology are unlikely to yield dramatically higher conventional oil production' (Hirsch & Bezdek & Wendling 2005, p. 17).¹

Hirsch and his colleagues summarise the implications of global peak oil and note: 'The

¹ It is important to distinguish conventional oil (high quality, light oil) and unconventional oil (heavy, tar-like oil) (Hirsch & Bezdek & Wendling 2005, p. 13). Most production over the last century has concentrated on the former because the ease of extraction and costs of production have been much more favourable.

peaking of world oil production could create enormous economic disruption, as only glimpsed during the 1973 oil embargo and the 1979 Iranian oil cut-off' (2005, p. 13). Estimates of the cost to OECD countries of the 1979 interruption has been put at 3 per cent of GDP in 1979, rising to 4.25 percent in 1981 'and accounted for much of the decline in economic growth and the increase in inflation and unemployment in the OECD in 1981–82' (2005, p. 29). Oil production is not only central to energy and transport but is used extensively as an input into other products, particularly chemicals. The full implications of a decline in the long-term availability of oil do not appear to be part of any serious public policy discussions.

One reason the lessons of these earlier crises were misread was that the restrictions in oil supply were short-lived and oil prices stabilised in the ensuing period, leading to the assumption that oil price rises were likely to be cyclical. The prospect of long-term restrictions in oil supply have not been fully recognised (Hirsch & Bezdek & Wendling 2005, p. 27). In the wake of the Global Financial Crisis (GFC) most of the bleak scenarios which arise have focussed on financial instability and the term 'crisis' is invariably linked to debt, rather than to something as fundamental as peak oil. In practice, serious efforts have been underway to reduce dependence on oil, but so far they represent only a small beginning. In Australia, they include LPG gas and ethanol for transport (Davidson 2004, p. 1).

Thus despite a general recognition that oil prices will rise, the implications of peak oil remain a blind spot for public policy. For example, the Skills Australia scenarios which formed the basis of the Access Economics modelling did contemplate higher oil prices in the Low-trust globalisation scenario, 'uncertainty and price variability' in the Open Doors scenario, and restricted access to oil resources in the Flags scenario (though this is offset by a slowing in the demand for oil) (Skills Australia 2009, pp. 9, 19, 28). These scenarios acknowledged the prospects of oil price rises, as well as major shortages of supply, but the full implications of peak oil were never canvassed. Alternative energy sources were discussed, suggesting that the builders of

these scenarios envisaged a straightforward transition to a post-oil economy. In the case of the CEET report, there are no references to oil, not even in the general contextual discussions.

Prolonged economic decline

We saw in the last chapter that the Global Financial Crisis (GFC) featured prominently in both the Access Economics modelling and the CEET report. Indeed, the scenarios which the Access Economics modelling addressed were largely constructed as likely outcomes or responses to the GFC. The GFC was seen largely as a dampener on economic growth, a possible impediment to further globalisation and a challenge for governance of the financial sector. It was not, however, seen as symptomatic of structural weaknesses in the capitalist system and the sign of a prolonged economic decline in Europe and North America. There is a growing body of literature which suggests that the period of American economic hegemony is coming to an end and that these structural weaknesses are moving increasingly beyond the control of nation states. This section draws on both journalistic commentary in the business press and the following literature: Wood (2005); Stiglitz (2002); Brenner (2002); Brenner (2006); Henwood (2003); Arrighi (2007); Huang (2008).

There is certainly an awareness in both the Access Economics and CEET reports of changing economic fortunes on the global stage, particularly the rise of China and India and the general importance of North Asia to Australia's prosperity. But there is little discussion about Europe or North America, even though developments during 2010 have emphasised the fragile nature of economic recovery in both these continents.

In the case of the United States, the subprime mortgage crisis may have passed, but expectations of another property market collapse have been recently raised. While the banks have returned to profitability, the bad debts off-loaded onto the public purse have contributed so much to government debt that fiscal measures (ie. budget spending) to stimulate the United States economy have become politically unacceptable to the

Democrats. At the same time, near zero interest rates have left monetary policy with nowhere to go. Whether the United States enters a double-dip recession, as some commentators are speculating, is largely a definitional question. The main point is that the United States economy has entered a period of prolonged decline. Only a series of speculative bubbles over the last decade (in property and in technology stocks), and a period of household consumption based on ever-increasing levels of debt, have sheltered Americans from the realisation that their time in the sun has passed.

Europe's predicament is similar. Bad loans were also off-loaded onto the government books, already burdened with large public debts. Austerity measures to contain the further expansion of this debt were introduced during 2010, sparking political turmoil in countries like Greece. The main dilemma, for most European countries, is that such austerity undermines the potential for any Keynesian-style revival of economic activity and it is hard to see a revitalised private sector leading them out of their current malaise. For example, a large proportion of Britain's economic buoyancy over the last decade was based on the finance sector in the City of London. This has now been left considerably weakened by the GFC. In the case of both Wall Street and the City of London, there remains the prospect of a second round of bad debts surfacing in the near future.

As in Australia, the Keynesian strategy of the Chinese government appeared to have protected the Chinese economy from the wash-up of the GFC. With its heavy reliance on export trade with the West, China was expected to suffer badly when recession unfolded in its main markets. However, a major shift in major economic activity from manufactured exports to domestic consumption and to domestic infrastructure projects appears to have allowed the Chinese economy to continue growing at exceptional rates. While some commentators cast doubt on the veracity of Chinese statistics, there is little doubt that China has escaped recession and has continued to grow its economy at a rate commensurate with the growth in population. Indeed, labour shortages and

significant wage increases became a feature of the Chinese labour market during 2010.

This is not to say China's structural problems have been resolved. These largely centre on the downside of being a successful export economy. Domestic consumption has been constrained for a long period, as the strategy of using cheap labour to build export markets has been pursued relentlessly, particularly in the coastal regions of southern China. When combined with rural discontent over local government corruption—particularly around land expropriations—this exploitation of cheap labour has led to considerable political unrest in recent years. This is well documented but not often discussed in the West (see, for example, Lee 2007). The imbalances brought about by rural under-development and rapid urban expansion point to a major structural weakness in the Chinese economy (see, for example, Huang 2008).

The other negative aspect to China's export success has been its trade imbalances. Its massive trade surpluses have been invested in the West, predominantly in United States bonds and securities. This has given China a large stake in the fortunes of the United States economy and its currency. Moves to unseat the US dollar as the global reserve currency have been pursued more forcefully by China and Russia over the last few years as one strategy to break this vulnerability. Another strategy has seen China diversifying its overseas investments by buying stakes in resource companies, a move which also aims to ensure future access to raw materials.

Australian press coverage of China in recent years, such as that by the *Herald's* John Gaunaut, coalesce around two main themes. First, there are the networks of patronage and the accompanying spread of corruption, which appear to accompany many economic transactions involving government agencies, particularly at the local government level. These not only inflame discontent among the Chinese people, but they also impose major burdens on economic activity. Secondly, the Chinese state is capable of decisive action in pursuit of its economic and social goals. Decisions to close down small and dangerous coal mines are taken without regard to the

local employment consequences; decisions to massively expand renewable energy are taken without being hampered by vested interests, such as fossil fuel industries; and decisions to build major rail infrastructure throughout the interior of the country are taken without regard to the size of public debt.

National strategic decision-making on this scale has not been evident in Western countries since the 1960s. The ascendancy of neo-liberalism in the West from the 1980s onwards pushed major public infrastructure investments off the agenda, as governments increasingly recast their role as stewards of economic growth rather than 'nation-building' states (Pusey 1991). The Australian government's recent decision to embark on building the National Broadband Network marks a sharp departure from this tradition, though the intention to privatise the system within a few years shows that neo-liberal sentiments are still firmly in place.

It is worth noting, in passing, that much of the discussion in both the CEET and Access Economics reports emphasises the importance of raising productivity, as well as raising participation rates, yet there is only the slightest acknowledgement of the importance of large-scale public investment in infrastructure for achieving this goal.

While many of the problems outlined above involve problems for nation states, there remains an over-arching dilemma for economies which derives from the nature of capitalist production. This is the problem of excess capacity, the tendency for firms to continue producing long past that period when a declining rate of profit dictates that their capital should exit from that sector of production. This problem has been analysed extensively by Brenner (2002) and Brenner (2006) and is the basis for a theory of the long-term decline in the rate of profit in Western economies. Two decades of bubble economies—based on a series of speculative booms—has allowed this long term decline to be masked, but its implications are now being confronted directly in Europe and North America.

In summary, while most current economic commentary acknowledges the problems of

economic stagnation in Europe and North America, the Asian story makes many commentators more optimistic. The fact that Australia's fortunes are increasingly linked with China and India, in particular, is seen as useful insurance against the storm clouds hovering over Europe and North America. However, such optimism overlooks the deeper problems in the Chinese economy, the structural imbalances in the global economy, and the problems of excess capacity and declining long term profitability.

4.2 Methodological limitations

Modelling qualitative change

As mentioned in the opening chapter, the approaches used for forecasting introduce parameters into the models which largely vary in quantitative terms: GDP growth rates, immigration levels, population growth, labour force participation rates, productivity growth, export intensity and capital labour ratios. There is very little scope for variables which reflect qualitative change. This is one reason why all of the Access Economics forecasts are so similar in terms of their estimates for the composition of employment, even though their scenarios are quite disparate and their estimates of total employment are quite different. The two parameters which shape the composition of employment—as opposed to its overall magnitude—are the share held by exports and the capital to labour ratio in the economy. Differing assumptions in these areas can result in qualitative changes in the economy's industry mix, but the scale of these changes is modest.

The most notable qualitative change in the Access Economics report is the enhanced role of manufacturing in the Flags scenario, an outcome which reflects more nationalistic and protectionist policy settings. This is achieved in the Access Economics modelling by 'scaling' the industry employment projections to meet these policy targets (Access Economics 2009a, p. 73).

Is there scope for other policy settings to influence forecasts in a more fundamental way? It appears that the input-output tables which transform the policy inputs into industry

projections appear to be largely taken as given.² There is, in the case of Access Economics, an adjustment made to these calculations which makes use of historical data to correct for changes in worker productivity or structural changes in the economy (Access Economics 2009a, p. 73). However, in terms of policy options, these input-output tables are largely fixed, and these inter-industry linkages are not regarded as variables in the same way that the macro parameters are.

As noted above, the Access Economics modelling can accommodate policy responses to climate change and their use of the employment effects of the CPRS using the Concept Economics projections provided an example of this. However, this was a fairly simple quantitative adjustment to the industry aggregates which had already been produced from the application of the input-output tables. It did not constitute a reworking of the relationships between different industries which might arise with the kind of restructuring implied by a major response to climate change.

The inter-industry linkages represented in the input-output tables have historically evolved and are expected to continue largely undisturbed. Take electricity supply, for example. As an input into the economy (expressed in value terms) it is primarily consumed by industry and private households, with the former consuming about two-thirds of output and latter consuming one third. By way of comparison, the consumption of gas by industry is about 72 per cent while households consume about 28 per cent. Looking at the inputs into electricity supply, these are drawn from a large number of sectors, but in terms of the raw materials needed for electricity generation, coal provides two and a half times as much input as does oil and gas (ABS 2005–06, year 2005–06).

Now, one of the expected responses to climate change at a policy level is a movement away from coal to gas. Though the latter is still a fossil fuel, it is viewed as less carbon polluting. However, one could argue that a brighter future for gas is still only a quantitative change—a shift in relative shares between gas

and coal. What about a truly qualitative change, such as a movement to a 100 per cent renewable energy sector, as envisaged by the Zero Carbon Australia Stationary Energy Plan (Wright & Hearps 2010)? Such a shift would see all of the current inter-industry linkages between coal, gas and electricity become largely redundant.

The implications of a large network of regional thermal solar power stations and wind farms would have a considerable impact on a range of industries, particularly manufacturing and transport. The composition of employment—in terms of occupational and skills requirements—arising from such a scenario would be quite different to a future based primarily on extrapolating historical trends which assume central roles for coal or gas.

The current Access Economics approach would not appear to be capable of modelling such a change, since it introduces its adjustments with the input-output tables taken as a given. Access Economics points to current research by the Commonwealth Treasury which might provide a foundation for ‘better understanding the likely employment effects of climate change mitigation’, thereby providing them with possible data for future modelling (Access Economics 2009a, p. 77).

This is not to say that current modelling cannot accommodate the climate change challenge. As well as the Concept Economics modelling mentioned above, there is the modelling report by Hatfield-Dodds & Turner & Schandl (2008). This makes use of the Monash University MMRF-Green model, which is a computable general equilibrium (CGE) model of the Australian economy ‘with enhanced detail of electricity generation, other energy products, and greenhouse emissions accounting’ (2008, p. 4). This modelling is able to produce projections for future labour demand in different industries which flow from various scenarios for responding to climate change. While not specifically modelled, the skills dimensions of a green-collar economy are discussed at length.

² The Australian Bureau of Statistics prepares input-output tables as part of the Australian national accounts. As the ABS puts it ‘They provide detailed information about the supply and use of products in the Australian economy and about the structure of and inter-relationships between Australian industries.’

Assuming qualifications equal skills

In discussing both the context and the results of forecasting, both CEET and Access Economics assume that the concepts of skills and qualifications are equivalent. To some extent, this is a necessary evil, since only qualifications are quantified in a way which lends itself to the modelling exercise. There are, however, four major issues which this simplification does not address:

1. 'over-qualified' workers;
2. employer under-use of skills;
3. literacy and numeracy issues; and
4. informal and on-the-job learning.

In surveying these issues I do not propose to go into detail. There is a considerable literature which discusses all these issues and is well known among policy makers.

Recent research (Linsley 2005; Cully et al. 2006; Watson 2008) has highlighted the extent to which workers have educational qualifications in excess of the requirements of their jobs. One estimate is that 21 per cent of workers with a degree are working in jobs which don't require that level of education, while about 46 per cent of workers with a VET qualification are in jobs that don't require that level (Linsley 2005, p. 121).

Allied to this problem is the research which shows that under-use of skills by employers is a more widespread problem than skill shortages or skill gaps (Watson 2008; Mavromaras et al. 2007; Mavromaras & McGuinness & Fok 2009). Skills shortages and gaps are usually assumed to be major constraints on economic growth and much of the skills formation policy debate presumes that a more qualified workforce is needed to deal with this. Yet this recent research reinforces the observation that a greater utilisation of existing skills requires a broad workforce development strategy, not a narrow educational qualification strategy.

The *National Workforce Development Strategy* devotes considerable attention to the problems of literacy and numeracy within the Australian workforce. In 2006 some 46 per cent of Australians 'had literacy scores below the

minimum level needed to function fully in life and work' (Skills Australia 2010, p. 35). I do not intend to rehearse these findings in any detail but it is worth observing that the *Strategy* emphasises the impact of poor levels of literacy and numeracy on workforce productivity and participation, educational achievement and social inclusion (2010, pp. 36–37). Data on literacy and numeracy is important because it highlights the potential 'disconnect' between skills and qualifications. Some 20 per cent of persons with a bachelor degree fall into the two lowest literacy levels (on the prose literacy scale), levels which are regarded as inadequate from a skills formation point of view (ABS 2006, Table 10).

The final issue, informal and on-the-job training is particularly important. It is linked to the literacy and numeracy issue in a fundamental way; it is an important dimension of workplace productivity which does not show up in any projections of qualifications—though it is mentioned in passing—and it is fundamental to the very concept of skill formation.

To illustrate the problem it's worth briefly considering some findings from the most recent Australian Bureau of Statistics survey of literacy and numeracy. Looking just at those with Level 1 prose literacy (the lowest level), some 17 per cent participated in an adult learning course. The equivalent figure for those with Level 4/5 (the highest) was 65 per cent. Of those with Level 1 literacy, some 65 per cent took part in informal learning. The equivalent figure for the Level 4/5 group was 97 per cent (ABS 2006, Table 11). In other words, reasonable literacy and numeracy is the basis for entry into further workplace learning, and being blocked in this regard means relegation to a skills formation backwater.

5. The NSW dimension

Some of the forecasts produced by Access Economics are also available for New South Wales, though there is little in the way of commentary or analysis for the state-level data. In the case of the CEET modelling there are no state-level forecasts at this stage. In this chapter I consider the New South Wales dimension in two ways: I look at these New South Wales forecasts and compare them to the national figures to see what light these differences might shed on the ways in which New South Wales is distinctive. Secondly, I look at the Access Economics *Foresighting Study* which deals specifically with the situation of the New South Wales economy in 2020 and I look at an earlier study by Access Economics for the Independent Pricing and Regulatory Tribunal (IPART). I conclude by looking at the Council of Australian Governments (COAG) targets in the New South Wales State Plan to see how far these goals are likely to be met.

5.1 New South Wales Access Economics tables

The state results produced by the Access Economics modelling of skills demand (Access Economics 2009b) are mostly presented as growth rates. Consequently, it is not possible to compare them with the results of the national forecasts discussed earlier in Chapter 2. However, when it comes to additional educational qualifications and student completions, the state results provide estimates for levels and this makes them directly comparable with the data in the earlier chapter.

The earlier forecast for additional educational qualifications by Access Economics at the national level (Table 2.5) are shown here in

Table 5.1, with the equivalent New South Wales tables below them for comparison. (The CEET projections are missing because there is no New South Wales data available.) The New South Wales estimates are nearly all about 31 per cent of the national figure, and this proportion is almost constant across all scenarios and across all levels of qualification, ranging from a low of about 28 per cent to a high of 32 per cent. This is somewhat unusual and is probably the result of the uniformity of the modelling approach. The commentary on the state tables notes that the methodology used is ‘the same as at the national level’ (Access Economics 2009b, p. 3). Without more details it is hard to know if relevant state-level data has been used throughout the modelling chain, or only for the key macroeconomic parameters. For example, the input-output tables may only be available at a national level.

In summary, the forecasts for educational qualifications in New South Wales follow the national pattern very closely. Demand for higher education is projected to be slightly higher in New South Wales than at the national level, particularly in the Flags scenario. Diploma level requirements and Certificate I and II levels are almost identical, while the demand for Certificate III and IV level qualifications is slightly lower in New South Wales than nationally.

Access Economics also produced estimates of student completions at the state level, comparable to those at the national level which were shown earlier in Table 2.7. Again, the New South Wales figures constitute about 31 per cent of the national figures, which is again unusual, perhaps more so. The variation across the different scenarios and levels is not as great as with labour demand: ranging from 31 to 32 per cent. One would not expect this

Table 5.1: Additional educational qualifications Australia and NSW, comparisons

	Open Doors		Low-trust		Flags	
	'000s	%	'000s	%	'000s	%
Australia						
Higher education	351	45.5	302	46.8	253	46.8
VET sub-total	420	54.5	344	53.2	287	53.2
Diploma / Advanced Diploma	138	17.9	116	18.0	97	17.9
Certificate III / IV	190	24.7	156	24.1	133	24.7
Certificate I / II	91	11.8	72	11.2	57	10.6
Total	771	100.0	646	100.0	540	100.0
New South Wales						
Higher education	111	46.7	95	48.0	79	48.5
VET sub-total	127	53.3	103	52.0	84	51.5
Diploma / Advanced Diploma	43	18.0	36	17.9	29	17.8
Certificate III / IV	55	23.3	45	22.7	38	23.1
Certificate I / II	29	12.1	23	11.4	17	10.6
Total	238	100.0	198	100.0	163	100.0

Notes: For explanation of Access Economics scenarios see Skills Australia (2009).

Source: Access Economics (2009a, Tables 8.13, 8.14, 8.15) and Access Economics (2009b, Table 4.1).

Population: Additional number of qualifications required by the workforce, Australia (top panel) and New South Wales (bottom panel).

Table 5.2: Potential shortfall in qualifications in 2015, New South Wales, (thousands)

	Open Doors			Low-trust			Flags		
	Supply	Demand	Difference	Supply	Demand	Difference	Supply	Demand	Difference
Higher education	64	111	-47	63	95	-32	60	79	-19
VET sub-total	104	127	-23	102	103	-1	99	84	15
Diploma / Advanced Diploma	16	43	-27	15	36	-20	15	29	-14
Certificate III / IV	60	55	4	59	45	14	57	38	19
Certificate I / II	29	29	0	28	23	5	27	17	10
Total	168	238	-70	165	198	-33	159	163	-4

Notes: Supply refers to projected student demand (supply of students); demand refers to implied labour market demand; difference is supply less demand and represents the shortfall.

For explanation of Access Economics scenarios see Skills Australia (2009).

Source: Access Economics (2009b, Tables 2.2, 4.1).

Population: Employed persons, New South Wales.

ratio to be so constant in all these comparisons. It seems reasonable to assume that some aspects of school completion and different qualification enrolment patterns would differ more substantially and this would show up as different estimates of student supply.

As with the national data, there is hardly any difference in the absolute numbers of student demand for qualifications (supply) across all three scenarios. As noted earlier, this consistency is somewhat unusual (see the comments made earlier in Section 2.6).

In terms of the difference between implied labour market demand and potential supply, Table 5.2 confirms the national picture. These

data point towards larger shortfalls for higher education rather than VET. The shortfalls range from a low of 19,000 in the Flags scenario to a high of 47,000 in the Open Doors scenario. Within the VET sector, the shortfalls which occur are only with respect to Diplomas and Advanced Diplomas, and range from a low of 14,000 (Flags) to a high of 27,000 (Open doors). In New South Wales there are no projected shortfalls for certificate level courses. Indeed, there is an expectation of surplus Certificate III and IV qualification holders of nearly 20,000 in the Flags scenario and about 14,000 in the Low-trust scenario.

Unlike the national reporting by Access Economics, there is no information for New South Wales on the effect of net migration on qualification shortfalls. As we saw in Section 2.6 this factor made a considerable difference to the extent of the shortfalls, reducing their impact considerably. There is little doubt that taking account of net migration for New South Wales would see similar improvements, though there is no way of quantifying this as there is at the national level. As we shall see in the next section, among the various scenarios used in the Access Economics modelling, New South Wales appears to come closest to the Flags scenario, so one might expect that the shortfalls likely to emerge in New South Wales will be at the bottom end of these estimates. When we combine this with the (unquantified) reduction in the shortfall due to net migration, it seems likely that the VET sector in New South Wales does not face any serious potential shortfalls.

5.2 The IPART report

As part of a modelling exercise in 2006, Access Economics prepared projections for the Independent Pricing and Regulatory Tribunal (IPART) on the future demand for vocational education and training in New South Wales (Access Economics 2006). Unfortunately, most of the data in the IPART report is presented as annual growth rates, with no substantial information on levels. This makes it impossible to compare the projections in the IPART report with those presented above in Chapter 2.

Unlike the 2009 modelling, the projections for IPART did not incorporate a number of fictional scenarios. Instead, one set of projections was based on a baseline scenario, in line with the IGR 2002–03 (discussed earlier in Section 3.1), and the other set was based on a scenario in which the participation rate was raised so that the more dire predictions of the demographic time-bomb were avoided.

For the baseline scenario, Access Economics expects annual employment growth in the period from 2005 to 2025 to average 0.6 per cent for New South Wales and 0.9 per cent for Australia (Access Economics 2006, p. 20). It is worth noting that this New South Wales figure is well below the Access Economics national

figures used in the 2009 report. The more pessimistic Flags scenario which anticipated employment to grow at 0.89 per cent, while the more optimistic Open Doors scenario expected growth of 2.15 per cent.

The IPART report anticipates that the key drivers of the employment growth in New South Wales will be property and business services, recreational services and community services, while the big losers are expected to be agriculture, utilities and manufacturing (Access Economics 2006, p. 24). Access Economics anticipates that the average annual growth in VET students will be about 0.98 per cent, and the growth in VET hours will average 1.08 per cent (Access Economics 2006, p. 41).

For the target scenario—of higher participation rates—Access Economics expects annual employment growth in New South Wales over the period 2005 to 2025 to be much higher, at 1.1 per cent (Access Economics 2006, p. 48). Not surprisingly, VET activity is expected to be much greater: annual average growth in students is put at 2.37 per cent per annum and VET hours are expected to average 2.61 per cent growth (Access Economics 2006, p. 56).

In terms of assessing the future of VET, the IPART report makes a useful distinction between the short term and the long term:

changes in the composition of the workforce are a clear negative for VET demand initially – more so in NSW than Australia as a whole. This reflects a relative movement in jobs away from VET-intensive occupations and towards occupations which are less VET-intensive. Most notably, this is caused by a cyclical downturn in demand for trade skills over the short term. That downturn has arguably already begun in New South Wales. Beyond the short term, such trends are a positive for VET demand, led by strong demand for service sector workers over the longer term, such as for nurses and care staff, business support workers and hospitality (Access Economics 2006, p. 45).

5.3 The Foresighting Study

The *Foresighting Study* produced by Access Economics is primarily a broad ranging document dealing with the New South Wales economy over the next 10 years. It contains little in the way of specific forecasts for qualifications or skills but it does contain some employment projections which can be related to the national-level forecasts discussed earlier in this report. For example, Access Economics (2010, Table 3.3, p. 21) predicts annual employment growth of 1.3 per cent for New South Wales in the period from 2010 to 2020. The comparable national figures (though for the period 2010 to 2025) are 2.12 per cent, 1.49 per cent and 0.96 per cent for the Open Doors, Low-trust and Flags scenarios respectively. In the case of productivity growth, the NSW projection is also for 1.3 per cent annual growth. By contrast, the national projections are for 1.75 per cent, 1.5 per cent and 1.3 per cent for the three scenarios.

In summary, Access Economics expects New South Wales to be somewhere between the Low-trust and Flags scenarios when it comes to employment growth—though closer to the latter—and squarely within the Flags scenario when it comes to productivity growth.

If we compare the *Foresighting Study* figures with the IPART projections, produced nearly five years earlier, it's clear that they are much more optimistic. IPART put annual employment growth at just 0.6 per cent for its baseline scenario compared with the figure here of 1.3 per cent. The IPART figure for the 2020 projections (to make them more comparable with the *Foresighting Study*) are just 0.5 per cent.

As we have just seen, the IPART report identified the key drivers for employment growth to be located in property and business services, recreational services and community services. The *Foresighting Study* endorses this assessment but places mining at the top of the list.¹ Where the IPART study had mining employment in decline (-1.4 per cent), the

Foresighting Study expects it to boom (3.7 per cent). Similarly, but at a more modest level, the IPART study expected agriculture to be in decline (-2.2 per cent), but the *Foresighting Study* expects a positive story (1.1 per cent). Both reports expect a bleak outcome for manufacturing, with the *Foresighting Study* even more pessimistic (-2.8 per cent compared to -1.4)

The *Foresighting Study* covers many of the issues touched on in earlier sections of this report. It takes climate change seriously and also looks closely at the situation in China and India. It also deals more thoroughly than do CEET or the other Access Economics reports with the likely future role of innovation and developments in the information economy.

However, despite this openness, the *Foresighting Study* also repeats some commonly held views concerning future energy security. While admitting that carbon capture and storage is an unproven technology, it does not discuss its viability and simply recommends more research and development in the area (Access Economics 2010, p. 88). On the other hand, the feasibility of solar thermal for base-load electricity—as emphasised by Wright & Hearps (2010)—is ignored in the repetition of the view that renewable energy cannot provide for base-load demand.² In both respects, the economic importance of the coal industry in New South Wales is evident.

5.4 The New South Wales State Plan

In its discussion of the 'Clever State' the New South Wales State Plan refers to the COAG VET targets (NSW 2010, p. 25). These include:

1. By 2015, 90% of 20–24 year olds in NSW will have achieved Year 12 or a Certificate II qualification or above;
2. By 2020, 90% of 20–24 year olds in NSW will have achieved Year 12 or a Certificate III qualification or above;

¹ The *Foresighting Study* uses a more recent industry classification scheme to that used by IPART, which makes exact comparisons difficult. For the comparisons considered here, the 2020 projections from Table 3 of the IPART report are compared with the projections in Table 3.3 of the *Foresighting Study*.

² 'Apart from wind generation, most of the activity on renewable energy for electricity is likely to be of relatively small scale and not useful for baseload generation.' (Access Economics 2010, p. 87).

3. A 50% drop in 20–64 year olds without Certificate III level or above qualifications between 2009 and 2020;
4. A 100% increase in people achieving Diploma and Advanced Diploma qualifications between 2009 and 2020.

Unfortunately, the state results for the Access Economics modelling do not contain any projections which would allow us to assess the likely progress towards some of these targets. The national results, on the other hand, do contain useful material but it is not available with age group breakdowns. The Access Economics report does, however, contain an explicit discussion of whether some of these targets will be met.

The CEET forecasts suggest that in 2010 about 39 per cent of employed persons would be in the category of ‘no post-school qualifications’ (Shah 2010, Table 24). By 2020 this figure was forecast to fall to 29 per cent. Access Economics does not provide estimates for 2010, but its 2015 estimates put the comparable figures at 32 per cent (Open Doors), 33 per cent (Low-trust) and 34 per cent (Flags). In 2020 Access Economics expects these three figures to have dropped to 28 per cent, 29 per cent and 31 per cent respectively.

Clearly there is a close alignment between these projections, particularly for the Low-trust scenario. The CEET projections, in particular, show a substantial improvement in increasing the qualifications profile of the workforce in the order of 10 percentage points. How this translates into targets for 20–24 year olds in New South Wales (targets 1 and 2) is impossible to say.

With respect to targets 3 and 4, Access Economics summarises its findings and I draw directly on these here. With regard to target 3, taking account of differing age definitions of the population, Access Economics notes that reductions of the order of 31 per cent can be expected by 2020 (that is, from 48.4 per cent to 33.6 per cent). This takes place under the Open Doors scenario. As Access Economics observes, this is a ‘substantial reduction’, but not quite halving the proportion. To meet the COAG target, Access Economics notes that an additional 1.3 million people would need to

obtain Certificate III or above qualifications by 2020.

Access Economics further notes that the supply shortfalls (discussed earlier in Section 2.6) imply that there would be insufficient student completions to meet this target ‘so a further condition to meet the target would be a significant contribution to qualifications resulting from net migration and/or additional resources to encourage higher student participation’ (Access Economics 2009a, p. 67).

As for target 4, the 100 per cent increase in persons holding Diplomas and Advanced Diplomas, Access Economics expects that this target will not be met under any of the scenarios (Access Economics 2009a, p. 68). This is based on the student completion projections. Access Economics does note, however, that if one looks at the implied labour market demand, there is scope for these targets to be met. There are two caveats to this expectation: significant skills deepening over time and multiple qualification holding whereby those with higher qualifications also hold Diplomas or Advanced Diplomas. Whether this last caveat is consistent with the spirit of the COAG targets is perhaps a moot point.

In summary, while there are no data in either the CEET or Access Economics reports by which to judge how well New South Wales is faring in meeting these targets, it seems reasonable to assume that the national picture also applies at the state level. If anything, NSW may face additional challenges given the *Foresighting Study* predictions of employment growth to 2020.

6. Other relevant publications

6.1 UK Commission for Employment and Skills

Targets for 2020

The UK Commission for Employment and Skills (UKCES) outlines two kinds of targets for skills formation in the UK (UKCES 2010). One set of targets concerns the percentage of adults with certain levels of qualifications to be achieved by 2020. The other target is a goal of certain level of OECD ranking (based on the first set of targets). The latter is an elusive goal, in so far as the first set of targets might be achieved, but improvements by other countries might see the UK fail to gain the desired rankings. In other words, achieving domestic goals in skills formation might not translate into adequate league table outcomes.

The first set of UKCES targets are for:

- 95 per cent of adult to have functional literacy and numeracy (termed 'Basic skills');
- 90 per cent of adults being qualified to at least level 2 (termed 'Low level skills');
- 68 per cent of adults being qualified to at least level 3 (termed 'Intermediate level skills')
- 40 per cent of adults being qualified to at least level 4 (termed 'High level skills')

Because higher level skills imply lower level skills, these targets translate into the following figures *at each level* for 2020:

- Level 4+ (high): 40 per cent;
- Level 3 (intermediate): 28 per cent;
- Level 2 (low): 22 per cent;
- Below Level 2: 6 per cent;
- No qualifications: 4 per cent.

The projections in 2010 suggested that the high level target would be exceeded (42 per cent), the intermediate would be well below target (19 per cent); the low level would be slightly below target (20 per cent). As for the bottom levels, the 10 per cent target would be badly missed, with a forecast of 19 per cent.

In terms of ranking, the UKCES aimed to be in the top 8 of the international rankings for the three main levels of skills. Its actual ranking in 2007 was 19th for low skills, 21st for intermediate skills and 12th for high level skills. It expected that these rankings would be 20th, 21st and 11th respectively by 2020. In other words, the goals would not be achieved, and improvement was only expected for high level skills. For both basic and intermediate skills UKCES expected the UK to remain the same or fall back one place (UKCES 2010, p. 5).

Clearly, whether using rankings or percentage outcomes, the forecasts outlined by UKCES in 2010 suggest that the UK is considerably behind at current rates of progress on where it hopes to be by 2020.

The UKCES methodology

The UKCES forecasting model is on based projecting existing trends into the future, with some account taken of population changes (including migration) and age-cohort effects. For example, as people progress through their working lives their qualifications change and the modelling takes this into account. By way of contrast, the Australian modelling reviewed earlier begins with assumptions concerning economic growth, derives industry projections from these, then moves onto occupational projections, before arriving finally at qualification forecasts. The upshot of this is

that UKCES takes the current rate of progress and examines where the UK will be in 2020.

The UKCES Technical Report also notes, however, an alternative approach to skills forecasting. The Department for Business, Innovation and Skills (BIS) use a method which combines planned public funding of skills formation with expected population flows (including migration) and 'private upskilling' to arrive at a predicted level of skills at a future date (in this case 2020). In other words, 'assuming ...planned levels of investment are implemented' then the skills position in 2020 will look like this. In this respect, the BIS approach captures how much investment is needed to arrive at future targets (Bosworth & Kik 2009, p. 12).

The UKCES Technical Report suggests that the two approaches are complementary and that the forecasts should converge as 2020 approaches, assuming of course that the planned investments actually take place.

The UKCES approach is both more expansive and more limited than Australian approaches. It is more limited in that it relies entirely on projecting future trends, without attempting to model industry and occupational change. In addition, it does not incorporate different growth scenarios into its forecasts. On the other hand, the UKCES approach is located within a conceptual framework which is more expansive because it considers issues such as inequality and social justice, both of which are off the radar in the Australian studies. Both the UKCES and the Australian studies emphasise productivity and participation as key drivers of economic prosperity, but the UKCES studies appear more aware of the social dimensions of economic growth. This does not influence the actual modelling methodology—which is really quite simply an extrapolation technique—but it does influence the policy framework in which the whole exercise takes place.

Unresolved issues

Like the Australian studies the UKCES team unproblematically equate qualifications with skills when it comes to quantifying their projected outcomes. They are, however, aware that qualifications are an inadequate

measure of skills but argue along pragmatic lines:

Traditionally however skills have been measured by qualifications, despite their shortcomings as a proxy for skills; qualifications allow relatively simple and straightforward comparisons over time, between sub-groups, and internationally (Bosworth & Kik 2009, p. 15).

7. Conclusion: planning for the medium term

7.1 Shortcomings in modelling qualifications

The earlier chapters have highlighted a number of shortcomings in modelling educational qualifications in Australia. Despite reasonably close alignment in projections for industry employment, different economic models produce quite different policy-relevant outcomes. At each link in the chain—from macro-settings to industry employment to occupational employment to educational qualifications—the divergence between different models increases. By the time one arrives at the key outcomes from a policy point of view, one confronts a number of perplexing choices:

1. is the likely demand for additional educational qualifications at the national level likely to number about 480,000, or is it more likely to be as high as 770,000 (see Table 2.5)?
2. is there going to be a national shortfall in VET qualifications of over 50,000, or a surplus of over 40,000 (see Table 2.8)?
3. in the case of New South Wales, is there going to be a shortfall in VET qualifications of over 20,000, or a surplus of about 15,000 (see Table 5.2)?
4. in more general terms, is the labour market in coming years likely to be characterised as largely high-skilled, or is there a more polarised skills future awaiting us?
5. in other words, is a large expansion in the provision of educational qualifications required, or are current arrangements by and large adequate?

It is clear that all of the models considered in this report make use of detailed empirical material, drawn from the Census and other survey data, and their macro-models appear to be robust and comprehensive. However, what appears to happen is that key assumptions are made at each link in the modelling chain and this leads to divergence. In particular, different assumptions about skills deepening and multiple qualification holding result in important divergences between the CEET modelling and the Access Economics modelling. In this sense, despite the richness of the data employed, outcomes are basically assumption-driven.

Even the uniformity in the macro-settings is to some extent premised on shared assumptions. While there may be sharp differences in expectations about economic growth, and even differences around compositional change—such as the role of manufacturing—the overall framework used by all the models does not depart from conventional assumptions. As noted in Chapter 4, this means that some key blind spots are ignored, particularly around critical environmental and economic issues. Again, this suggests that even the core macro-modelling is to some extent assumption-driven. A truly low-carbon future, for example, is just not part of any modelling framework.

So what are policy makers to do when faced with these dilemmas? Should it come down to siding with those projections which accord with one's own assumptions, or is there a more balanced strategy available? The option of vacating the terrain of planning is not an option; it simply leads to reactive policy formulation. Even if state governments were to abdicate any role in managing their local

economies, leaving the private sector to sort out its own future, they would still have unavoidable obligations in the labour market. As the primary employers of the workforce in the health, community and educational sectors, not to mention police and public transport, the state governments in Australia must undertake some form of workforce planning if they are to fulfil their basic functions. In the case of educational provision, state governments are directly implicated in the provision of future qualifications, at least at the secondary and VET levels.

As a minimum then, some kind of framework for medium-term planning seems unavoidable, even for policy-makers who may be completely jaded with the confusing perplexity of economic projections. What options are available that avoid some of this confusion, but which go beyond mere short-term reactive policy-making?

7.2 Extrapolating trends

One of the most reliable approaches for planning in the medium term—say from four to five years out—is to simply extrapolate from current trends. Most labour market trends are glacial. Only a sharp economic contraction or a major shift in policy settings disrupts these trends. Examples of these include the major tariff cuts of the 1970s and the recessions of the early 1980s and 1990s. All had major ramifications for the composition of employment in Australia, particularly for manufacturing, and the time-frames involved were quite short-term. But many of the other trends which characterise the labour market—under-employment, casualisation, low participation rates, work intensification, limited workplace training—have evolved slowly over the last thirty years. Similarly, both industry and occupational restructuring have evolved slowly, and have been largely predictable.

What about skills shortages? Surely, it can be argued that the resources boom and the demands it has placed on skilled labour have largely come out of the blue? It's important to realise that mining and construction are industries which are very prone to stop-and-start conditions. With the onset of the GFC, the resources boom in Western Australia

contracted sharply, only to restart within a short period once China's own recovery was guaranteed. The imminent collapse of construction jobs at the start of the GFC was largely averted by Federal Government stimulus measures. Both examples highlight the fragility of the boom and bust characteristics of these sectors.

What is the relevance of this for the wider economy? Writing in 2008, Watson argued that the 'skills crisis' was over-rated, and that Western Australian shortages did not adequately reflect the national picture. The DEWR skilled vacancy index at the national level was largely flat from 1994 through to 2005, with a small rise around 1999–2000 which was followed by a steady decline (Watson 2008, p. 7). Employer associations have, of course, emphasised skills shortages, but this needs to be seen in the light of two important issues. The first is an employer preference for importing skilled labour, rather than investing in domestic training, and a highly vocal lobbying presence follows from this. Secondly, confusion between recruitment difficulties and actual skills shortages is widespread, leading many employers to mistake the former for the latter. The overall conclusion of Watson (2008) was that there were undoubtedly major skills shortages in some sectors of the economy, but the overall skills crisis was exaggerated.

Returning to the theme of extrapolating trends, it seems clear that one cannot allow anomalies like the resources boom or the construction industry to dictate an overall methodology for the labour market as a whole. What is required for the latter is simply good data. In this respect, policy makers are well placed, with one major exception. On the positive side:

1. the five-yearly Australian Bureau of Statistics Census of Population and Housing provides very rich data on industry, occupation, education and age. Moreover, it is available in great detail at the regional level. The information on age, in particular, allows for useful retirement planning. The recent introduction of the *TableBuilder* product means that researchers can now produce their own customised Census

tables, including detailed regional tables and data items at a very disaggregated level (see ABS 2009a).

2. the surveys of student outcomes, conducted by the National Centre for Vocational and Educational Research (NCVER), provides rich detail on which qualifications are in high demand by industry (see, for example, NCVER 2008).
3. the Household Income and Labour Dynamics in Australia (HILDA) survey provides the best longitudinal data on detailed labour market outcomes over time. While its sample size is adequate at the national level, it is somewhat limited at the state level. (See <http://www.melbourneinstitute.com/hilda/>.)
4. public sector employee databases, such as the NSW Public Sector Workforce Profile, provide planners with extensive and detailed information on all public sector occupations. In the case of those key groups likely to be affected by the exit of the baby boomers, such as teachers and nurses, the data exists for predicting these outcomes quite precisely.

On the negative side, no adequate large-scale workplace surveys have been conducted in Australia to rival the Australian Workplace Industrial Relations Survey (AWIRS) endeavours of the 1990s. Such surveys provide core information on the behaviour of employers—how they make recruitment decisions, how they engage their workforce and then deploy them, how they utilise their workers' skills and what training arrangements they put in place. While some insights into these are available from household surveys, like HILDA, the full picture only emerges when the unit of analysis is the workplace and the respondents include managers.

All of these data sources can be utilised to discern medium-term trends and likely developments during the next five years. In some cases, these will apply at the national level, but in many cases both state-level and regional-level trends will be apparent.

7.3 Key informants

While a quantitative analysis of the labour market is fundamental, much is to be gained from qualitative research as well. However, rather than interview people as 'subjects'—where their experiences are the object of enquiry—it is preferable to interview people as 'key informants'.

The problem with a focus on subjects is generalisability. While the data gathered with this approach may be much richer than with structured questionnaires (as in HILDA, for example), sample selection is highly problematic and collection costs for an adequate sample size are enormous. By contrast, if key informants are the focus, the sample does not need to be large, and sample selection is based on deliberation rather than probability. This means choosing people who are positioned at strategic locations in the labour market and whose insights are long-term and far-reaching.

For example, interviewees might include: members of employer associations and unions who have been around a long time and have sound knowledge of developments occurring in their sectors; senior teachers and administrators in the training and education field who have observed changing patterns in enrolments and outcomes over the last decade and can discern emerging trends; senior staff in the recruitment industry who possess a good overview of a number of industry sectors. In-depth interviews with people such as these can provide rich material on labour market developments. While it may not be comprehensive, when augmented with the quantitative material, the overall picture should be adequate for medium-term planning.

7.4 Context and regions

The importance of both these sources—qualitative and quantitative—is that the research outcomes are much richer than is the case with economic forecasting. The latter simply produces bald numbers and presents the policy maker with the quandary discussed earlier: is this number realistic, or is it too high or too low? The results are largely decontextualised and only the assumptions

are open for discussion. The overall planning process is largely a black-box affair.

By contrast, the strategy being discussed here provides information which is heavily contextualised and the process is transparent. The research outcomes contain numbers, of course, but they are provided in the context of trends, patterns and processes. While some of these may be matters for judgment—as with the assumptions in the forecasting approach—all of this is open for discussion. If some of the trends appear unrealistic, then this can be openly discussed: the material is there to be scrutinised.

Finally, regional planning can become an important element in this process. With economic forecasting the inputs for the macro-models are overwhelming national-level data, or at best, state-level. Even when the policy focus is explicitly regional, the underlying assumptions are largely about developments at a national or state level. In some cases, the local ‘share’—some fixed proportion—is simply applied to aggregate projections.

By contrast, more useful outcomes are likely with a medium-term planning approach which makes use of regional-level data—such as the Census or the Workforce Profile—in conjunction with key informants who are based in the region. This means that the actual research outcomes are explicitly regional in nature and thus consistent with the policy focus. The analysis of the Hunter region carried out by researchers at the Centre of Full Employment and Equity at the University of Newcastle (see, for example Cook et al. 2008) illustrates the useful possibilities which a regional research focus can bring to policy formulation.

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