

PART 2

AUSTRALIAN ISSUES AND CHALLENGES

Building Brain-Based Industries? First, find the Brains

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Abstract

Knowledge-based industries are generally recognised as the pathway to international competitiveness and its associated social, economic and environmental benefits. Australia has an opportunity to transform itself into a knowledge-based society, particularly in emerging industries such as biotechnology and nanotechnology, but will require substantially larger numbers of highly trained researchers than currently available. For emerging industries, the supply of excellent scientists in the 'hard' sciences areas (chemistry, physics and mathematics) is especially important.

Two major issues impact on the availability of such people. The first is brain drain, where better salaries and work opportunities (career paths, research and commercialisation funding, job security etc) attract Australian researchers overseas. While obviously important for Australian scientists to play a major role in the international community through links, training and exchanges, it is also vital that a reasonable proportion are encouraged to either return, maintain positive links or be replaced by international equivalents. The second issue is brain loss, where students who might have chosen to study science choose otherwise, or opt for 'soft' rather than 'hard' sciences, and scientists who might have pursued science careers leave to pursue other opportunities. Unlike brain drain, brain loss is a world problem, but its impact will be proportionately greater for those nations like Australia, that cannot hope to outbid the world's biggest

economies for limited numbers of trained scientists.

This paper will briefly consider the likely demands for 'hard' scientists in Australia's knowledge-based industries, scan the national and international evidence for brain loss from the 'hard' sciences, and offer some preliminary thoughts on financial, social and cultural initiatives that might help Australia to train sufficient 'hard' scientists to enable us to take our place in the global knowledge economy.

Introduction

In the year that I completed my PhD (1969), Australia produced 18 PhD's in Chemistry per million of population. The US produced 9. According to the report 'Science at the Crossroads' (Australian Council of Deans of Science, 2001), the number of PhD completions in Chemistry for 2001 was 8 per million (just above the US which has decreased from 8 per mill in 1993 to 7 per mill in 2002) (NSF, 2003).

These numbers lie at the heart of the four issues that I want to discuss today.

- 1 How many scientists do we need?
- 2 What is the impact of brain drain/gain?
- 3 What about brain loss?
- 4 What are the solutions?

National Needs for Scientists

Politicians sometimes claim that Australia has already made the transition from a resource-based economy to a knowledge-based economy, but it is hard to find evidence that benchmarks these claims against the performance of our competitors. Let's consider biotechnology.

The following are some international figures for biotechnology revenues generated per head of population:

Nation	Biotechnology revenues/ head of population (A\$)
Belgium	\$260
Finland	\$220
United States	\$150
Netherlands	\$120
United Kingdom	\$80
Australia	\$50

Obviously, we do not compare favourably with our competitors. Why is this so? All available data suggest that the quality of our underlying science is not an issue. Rather, our failure appears to lie in the conversion of science into revenue. What measures can we use to detect shortcomings in the commercialisation process? There are essentially only two.

The first, and most direct measure, is the number of people employed in knowledge-based industry: the grist for the mill, the brains. Numbers of biotechnology employees per million of population range from 200 in the Netherlands to 800 in Finland and Scotland. Australia has around 300, while the US has about 700 and this is projected to double in the next six years.

The second measure, which is clearly linked to the first, is business investment in Research and Development (R&D). You all know the numbers. We are pathetic. Australia spends around \$10 million (per million of population) on R&D in listed core biotechnology companies, the US invests over \$100 million. Listed Australian core biotechnology companies invest an average of \$4 million/annum on R&D expenditure,

their US counterparts invest \$100 million. If unlisted companies are included the corresponding figures are \$2m and \$12m.

Companies like Ford, IBM and GM spend more on R&D than the entire Australian business community. Pfizer estimates its (medical research) R&D budget for 2004 at US\$ 7.9 billion (Pfizer, 2004). Total Australian domestic R&D in 2000- 2001 accounted for A\$ 10.3 billion of which medical and health research was 12.9% of the total (DEST 2003, Charts 1,8). US companies spend 80 cents in the dollar on development. Australian universities, their de facto equivalents, spend 20 cents in dollar. Whatever we decide today, we need our industries to invest vastly more in R&D.

So what if we fix the investment problem? What if we actually make the cultural change that sees Australians investing in knowledge-based industries rather than horse-races, real estate and holes in the ground. What would happen then?

In the case of biotechnology, based on direct comparisons with our international competitors, our biotechnology revenues would grow from \$1 billion to \$12 billion per annum, and our biotechnology industry workforce would grow from 5,700 to 30,000. Our biotechnology industry would need an additional 25,000 employees.

What does this mean in total? I can't tell you what fraction of Australia's knowledge-based industries biotechnology might represent, but I would guess that it's about a third. So, the total need for a knowledge-based industry in Australia is on the order of 75,000 additional scientists by 2010. Obviously this figure is rubbery. On the one hand, I've made no allowance for the indirect employment requirements to support these industries. On the other hand, not all of the direct or indirect employees will be scientists.

Is there some way that I can verify this number? Yes, look at the international projections. The EU is saying that they need an additional 500,000 to 700,000 scientists by 2010. The corresponding figure for the US is 2.2 million. Normalise on a population basis and what do you get? Between 40,000 (Europe projection) and 150,000 (US projection) required by 2010. And that's without allowing for catching up!

Another check. In 2001, Australia had just over 10 R&D staff per thousand total employment, compared with 23, 16, and 13 per thousand in Finland, Sweden and Japan respectively (OECD, 2004). To get to their average, say 20 per thousand, we need an extra 70,000 scientists. So, whatever way you stack it, we need somewhere around an extra 75,000 scientists by 2010.

What sort of scientists will they be? I don't have the statistics, but for reasons that will become evident below, I think the major needs are going to be at the top end (doctoral level) and in the enabling sciences (chemistry, physics and mathematics). By way of an anecdotal example, I mention Alchemia, a Brisbane start-up of which I am a founder and which specialises in carbohydrate chemistry. Alchemia scoured Australia for carbohydrate chemists, but fell far short of its needs. At last count, this small Brisbane company (less than fifty staff) had hired carbohydrate chemists from 23 countries.

The 2003 DITR/DEST report *Mapping Australian Science and Innovation* agrees, saying that the long term sustainability of Australia's skill base in the enabling sciences is under particular pressure. So there's the headline! Wanted: 75,000 additional scientists, preferably with PhDs in the enabling sciences, by 2010. How will we get there?

Impact of Brain Drain/ Gain

If you read Business Review Weekly (BRW) of 16 Feb 2004, you would no doubt have been impressed by the fact that the Chief Operating Officers (CEOs) of News Corporation, DOW Chemicals, British Airways, Coca-Cola and the World Bank are all expatriate Australians. Likewise, the CEOs of DuPont and MacDonalds. Add the fact that the CEOs of Australia's two biggest biotechnology companies, CSL and ResMed, are resident in the US, and you would have to start saying there is something fishy going on.

You can also bet your bottom dollar that most of those 18 PhDs in Chemistry per million of population that finished with me in 1969 are well and truly scattered around the globe. They have risen through the ranks of big pharma and universities in Europe and the

US, many at President and Vice-President level. And we are still losing them: net movements of Australian residents shows a small negative flow of chemists from Australia (approx 50-75 people each year since 97/98) (DITR & DEST, 2003). But that is hardly significant in the scheme of things unless, as some suspect, those 50-75 people are the best of the best.

On the other hand, we and other nations benefit from the reverse, brain gain. In the US, 12% of people in science or engineering jobs are of foreign origin. The 2 million Indians working in the US, mainly in the IT industry, earn roughly double the per capita income of the US population at large. Many will stay there, but others will return home to build India's IT industry. In the long run, brain gains such as this will benefit both nations.

A key source of brain gains such as the US/Indian example is the provision of training for international students. In 2001, Australia had the third highest number (approx 7000) and fifth highest percentage (22%) of foreign PhD students in the OECD. But, take heed of Simon Marginson (2004), writing in *The Howard Years* (edited by Robert Manne) when he talks of the ability of the US to attract students at postgraduate levels. In fact, OECD-wide, most foreign students enrol in social sciences, business and law or arts/humanities (OECD, 2004).

Frankly, the numbers of researchers won or lost by international migration are really quite small compared to the problem we need to address. An increase in our R&D workforce of 10% resulting from affirmative immigration and training policies would only give us an extra 7,000 to 10,000 scientists. Where does Australia find 75,000 researchers by 2010? To answer that question, we need to address the question of what I will term 'brain loss'.

Brain Loss

I am not sure whether or not there is a standard definition for 'brain loss'. My personal one refers to those situations where students who might have chosen to study science choose otherwise, those who do choose science opt for soft sciences rather than hard sciences, and scientists who might have pursued careers in science leave to pursue other opportunities. Unlike brain drain, brain

loss is a problem for all nations, but its impact will be proportionately greater in those nations, like Australia, that cannot hope to outbid the world's biggest economies in competition for limited numbers of trained scientists.

Let us consider the evidence at four levels: primary school, secondary school, undergraduate and postgraduate studies.

Primary School

At the primary school level, the clear issue is the lack of teachers with training and/or interest in science. Kids are naturally curious, but that curiosity must be stimulated and nurtured. The impact of a primary teacher who revels in helping children to explore the wonders of natural science cannot be underestimated. Oliver Sachs' (2002) book, *Uncle Tungsten*, gives insights into what follows in the presence and absence of such nurturing.

In Australia, the proportion of BEd and DipEd students taking maths and science subjects dropped between 1991 and 2000 (DITR & DEST, 2003). At the same time, national assessment of the labour market for teachers suggested shortages in maths, physics/chemistry and general science teaching (Dept Employment & Workplace Relations, cited by DITR & DEST, 2003).

Secondary School

The *Mapping Australia's Science and Innovation* (2003) report refers to declining participation in the more demanding mathematics and sciences in Year 12 at school, and falling participation in Science and Technology (S&T) subjects recently at the undergraduate level in university.

Year 12 enrolments in Australia:

- o Downward trend since 1976 in the percentage of students enrolling for physics, chemistry and biology.
 - Chemistry 33% in 1980, 17% in 2002
 - Physics 29% in 1980; 16% in 2002
 - Drop in enrolments for two physical sciences subjects studied **in combination** (eg as basis for tertiary education in physical science)

dropped to 9.7% of year 12 students in 2001, compared with 15% in 1990 (DITR & DEST, 2003).

Tertiary

- o In 2001, only 1% of tertiary graduates in Australia were in the Physical Sciences (physics, chemistry); Sweden 2.5%; UK 5.2%; US 1.5%, OECD mean 2.6% (OECD, 2003)
- o Total student load (units are full-time student equivalents rather than 'bums on seats') in chemical sciences dropped by almost 5% from 1989-2002
- o Total student load in physics and materials sciences dropped by over 31% from 1989-2002
- o Total number of new places announced by Minister Brendan Nelson would not meet our needs

Postgraduate

As noted at the outset, the number of PhD graduates in chemistry has declined. This applies right across the physical sciences (in Australia only 8% of doctorates are in the physical sciences) and it applies around the globe (in the US the number of PhDs in Physical Sciences has declined from 3700 to 3200 over the past ten years, although they still represent 16% of the total).

So, far from solving the problem of finding 75,000 researchers in Australia and 2.2 million in the US, we are producing less of the very scientists we need most. What's to be done?

Solutions

Let me address these issues at the same four levels, and let me offer you a mish-mash of solutions - some financial, some social and some cultural - that are representative of what I think is the real need - 'brain train'.

Primary School

We need to pay primary school teachers with science qualifications sufficient to attract them into teaching. We need the salaries that we pay

them to reflect the fact that we hold them in high esteem.

We need to expose primary school students to scientists. How many retired scientists do you know who would love to spend a day a week sharing their knowledge with children in their local primary school?

And we need to get the community involved in understanding and doing science in schools. Appoint a science co-ordinator for each primary school (from the grey army?)

Secondary School

Again, teacher salaries.

And again, we need students to be exposed to practising scientists whose roles illustrate the importance of science to all. People who can talk about their work making better vaccines, creating more nutritional foods, or protecting our rain forests.

We need to create science committees involving parents, teachers and scientists to encourage linkages between schools, research organisations, industry, and the wider community to raise awareness of science subjects, career paths, and the importance of science to the community at large.

Tertiary

We need to honour our champion scientists as we honour our champion athletes.

We need to create scholarships for science students, and bonuses for high achievers.

We need to involve eminent scientists from industry and learned societies in our tertiary teaching, and to promote links between postgraduate and undergraduate science students.

We need elite courses in the enabling sciences that offer students fast tracks and industrial experience. We need to involve scientists from industry on University councils.

Postgraduate

We need to increase scholarships for PhD students in the enabling sciences and to improve pay and conditions for young researchers.

One of the other things we need to do is to look at increasing the representation of women in science; while the proportion of females studying physical sciences has increased, more work needs to be done. More particularly, encouragement is needed for women to pursue a career in science as well as flexibility to enable them to return to the work force (Dr Pauline Gallagher, 2004, personal communication).

We need to encourage the entrepreneurs driving the development of knowledge-based industries to park their Porsches at the University gates while they tell postgraduate students their stories.

And we need to persuade the Minister, Brendan Nelson, that every one of the approximately 25,000 additional places being proposed for the tertiary sector for this decade should be for graduates and postgraduates in the enabling sciences, not more low cost places for accountants and lawyers. Then we will have made a start!

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Opportunity, Risk and Reward: A Personal View of Science and Technology in Australia

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Abstract

This paper reflects a personal view of the development of Science and Technology (S&T) in Australia from the passionate setting up of the first universities in the 19th century to the rationalist demand of government in 1985 that CSIRO should obtain thirty per cent of its earning from external sources. The most recent view of the sector and the demand for commercial return to S&T is best understood in terms of defining Australian motives, goals and strategies. Given that Australia can never hope to emulate the US and European models, we must devise and work to a new model – one that best serves our strengths.

Introduction

Science and Technology has held many positions in the minds of Australians over the past century. From the formation of the first Universities in Sydney and Melbourne in the 19th Century through to the formation in 1946 of the Australian National University a cultural will was evident that we Australians wished to be seen as world class participants in progress through intellectual excellence, as much as we wished to be seen as top stockmen and athletes. Although commonly described as a cultural cringe, this period was driven by a deep belief in the maturity brought to a young culture by knowledge, of which science and engineering were a major part.

After World War II, our belief in science was totally vindicated by the linking of scientific knowledge with world power through the Manhattan Project, Hiroshima and the Cold War. This belief grew from passion to

religion during the 1960s and peaked with the first footprint on the moon.

However, even by 1962, with the publication of Rachel Carson's 'Silent Spring', an accusing finger was pointing at science as having gone too far. Caught up in the social churning of the civil rights movement and the Vietnam War, science and its progeny of technologies were coldly reviewed and with very few defenders, found to be untrustworthy and requiring tight external control.

The first tangible evidence of this shift within Australia was the declaration in 1985 that CSIRO would meet a 30% external earnings target. This, in one stroke, caused the already aging but still highly respected research organisation to terminally lose its direction. It became confused as to whom it was serving, whose money should pay for it and who should be financially rewarded, should anyone be successful.

On the international stage, the popular image of science had moved from the moon to environmental damage and corporate greed. The image fixed in the minds of government and business was of overspent budgets and unfocussed activities. During the post-Dawkins era it was assumed science was there for an economic outcome, that it should be driven by government and business, and the big question was simply how to make it happen. The lawyers, patent attorneys and consultants grew fat.

Some within the Science and Technology groups prospered. Most became lost and

dispirited. For the last decade the stayers in the scientific community have grown old. Some have retired; some have kept their jobs by doing less science and more, much more, administration. The once clear concept of a career in science evaporated. To contemplate becoming 'an academic' required that one knew what students should be taught and even more that we understood why we were teaching them at all.

The following comments are directed to these questions and although not researched to the depth these issues deserve, I offer my observations from over a decade at the boundary of science and its application for commercial return. The problem is simply to define our motives, our goals and our strategy.

Motive

Across many societies I propose that the attitude towards science and technology broadly correlates with population size. This proposition is shown below in Figure 1 in terms of the three major motives of cultural, economic and strategic.

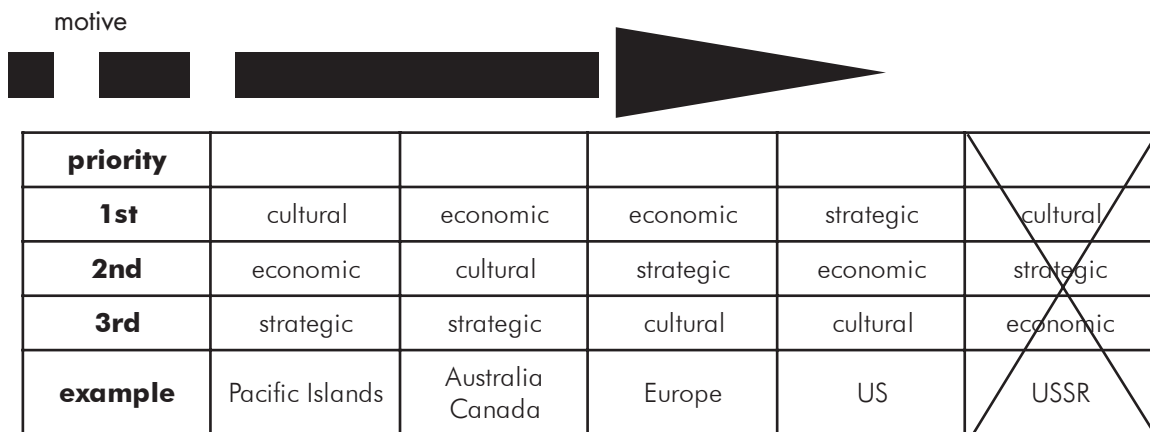
A shift from cultural to economic justification

for science and technology has, in Australia, run parallel with the slow realisation, post WWII, of the true extent of our isolation in the world. Along with Canada, which for other reasons is in the same category, we are unlikely ever to have the resources to achieve an alliance between the economic and strategic justification for Science and Technology. The absence of the alliance of the economic and strategic motives means that most Australian start-ups using the US and European models are doomed to fail through lack of the services and networks essential to surviving. This is a problem to which Australia has not yet admitted, let alone solved.

Goals

The goal then is to define the problem and then propose a strategy for its solution. The goal must be based on a big picture view. Let us start with the multiple tiers of society: school room; the university; R&D and business. The only group that is empowered to intervene at this level or has any interest in doing so is of course the government. All of these groups must be engaged, although it is for government to sound the alarm. At present, despite good will and intent, I suspect the problem is not even appreciated. The minimalist Goal is to have the problem recognised.

Figure 1: A proposed trend in motive for pursuing science and technology across small to large populations².



Issue I. Secondary School

It is evident from presentations I have given as an invited speaker to careers nights that the best and brightest secondary students are still driven in their early years by curiosity. Not surprisingly, teachers are obsessed with vocation, but the students remain fascinated by how things work. Curious about both the workings of machines as well as at the structure of organisations. There is no shortage of potential for change and new directions from this group.

Issue II. University

The upper levels of the secondary system and throughout the university system, curiosity has been replaced by a focused and furiously competitive chaos. The norm when invited to talk to students at any university in any city in Australia is to find that most of them are either pursuing an ersatz financial services career and that they have percolated into the class because other options were unavailable. In most circumstances they are mistaken in their understanding of career outcomes. Only a tiny fraction are there because they have thought it through.

Issue III. Research and R&D support

At the research level an even greater confusion over motive prevails. Most researchers are now attempting to follow models of R&D start-ups proven in Europe and the US. However, they fail to appreciate that the essential ingredients for a successful start-up include a domestic market ten times the size of the Australian domestic market and a military-industrial complex, which Australia does not possess. A further symptom of the absence of a military-industrial complex is the absence of the contractors and suppliers that this complex generates. As a result companies such as my own are driven to go to the US, Canada and Europe to obtain the services of contractors and engineers. This is notwithstanding the efforts of CSIRO, CRCs and Australian

universities all attempting to establish industry support groups. The disconnect is that Australian industry is too small a market for any of these suppliers to grow to a size to provide the required standard of service that Australian industry dare depend on.

Issue IV. Market Size and Focus

All of the forgoing issues assume that the chosen markets for Australian technologies are accessible and large enough for a return to justify the effort. This is a hard problem but not impossible. Although it is improbable that Australian S&T outputs will ever challenge the value of the Australian resource-based economy, international interactions are complex and we should never relax our drive to be technical leaders in niche areas. In fact, as a small economy, one of our marketing plays must be that we are the best in our chosen area. Forget offering broad services, the larger economies will always dominate in the lower risk, more straightforward markets. As a small, intelligent and polymath society our advantage is to excel in the off-beat and the novel. The guiding rule is that we must choose to be the best in that chosen area.

Strategy

Despite what sounds to be a pessimistic message, it is not. It is simply that Australia must work to a new model, different from that of the US and Europe. Furthermore, one of the unexpected opportunities that exists for Australia is the rapidly aging core of US technical knowledge. Attending meetings with US corporations during the past decade I have met with a steadily aging population of technical specialists, most of whom are now in their mid to late 50s. The US has attempted to make up for this rapidly aging population of their expert technical talent by feeding off their equivalent of the colonies. NIH, NIST, NSF and the US corporates are brim full with Africans, South Americans, Indians, Russians and Asians, who in most cases do not have green cards and who are planning to return to their native countries and good jobs with the status of their newly-won US experience. This situation has been accelerated by the new era of terrorism presently gripping the world.

Recommendation no 1. *Encourage students, particularly at the post graduate and post doctoral level to take advantage of this shortage and push for positions in the US.*

Concerns over the loss of the young and talented from Australia that this recommendation may elicit are, I think ill-founded. Lacking the essential ingredients of an Australian start-up community, we must develop networks into the world of those that have them. Australians remain Australians regardless of where there are working. Family ties and sentiment have an uncanny way of returning expatriates to their home countries and with that return will come the networks Australia so keenly needs. An economic motive for our Research & Development means this is a must.

Recommendation no 2. *Offer scholarships for Australians to study, work and develop International networks.*

The rule is simply to internationalise Australian students, scientists and engineers as soon as possible. This recommendation is saying we should not only encourage the fastest growth of international experience in Australia, we should actually help pay for it. Incidentally, the growth of the Asian economies is a common theme in discussions of the future of the Australian economy. The absence here of a recommendation to push for closer links with Asia is due to the belief that the groups we need to meet from Asia and with whom we must establish links are also pushing into the US and Europe. We will meet on common US or European soil and in the longer-term, if we are successful, a common time zone and geography will bring us closer together.

The image and structure of our technological community.

Two further issues I would like to address concern the image and structure of Australia's technological community.

Across the world the last decade has seen an enormous growth in the popularisation of science. This is appropriate in an economy that actually produces a major fraction of its wealth

from science. In Australia, however, science returns only a small number of jobs and generates only a small fraction of our wealth, and yet its population is repeatedly presented with subtle scientific concepts reduced to the arguments of a 9 year old. This leaves the popular viewer and thus voter, thinking that if they bothered to listen they would have easily comprehended most of what science is about. I propose that this devalues the once mystical and powerful message that was part of the scientific image presented to earlier generations. Although well intentioned, the popularisation of science has in my opinion 'dumbed down' science in the eyes of the community and thus in the eyes of the best students, who now reasonably think that a career in the financial services sector ranks equally with medicine and law and that careers in technology are second class.

A further concern is the current silence on the value of the complementary services required for a functioning technological economy. A visit to the Grand Place in Brussels reveals the power in the 14th Century Europe of the Artisans Guilds. For the last twenty years in Australia, the skilled technicians, tradesmen and support professionals have been subsumed as part of our university system. Despite the platitude that you get four times the remuneration as a plumber than you do as a PhD on a postdoctoral appointment, the message being sent to the early-stage students is that everyone must aspire to a university education, an education which I believe has not yet determined how to cope with the full range of skills required by our society. This has again devalued both the output of the universities attempting to offer qualifications in areas previously offered by technical colleges, and the quality of the courses that are seen by the businesses wanting to hire the graduates as being too academic and not related to industry needs.

Recommendation no 3. *Review the images beings presented to society of the scientific and technological world. Encourage government- funded dissemination of science to promote plain speaking descriptions of science without the emphasis on 'dumbing down' the message to make it presentable. Grow an appreciation of the importance of the technical and support groups in the*

Science & Technology community and provide a high status conduit for their training.

Conclusion

Over the past ten years the Australian Science and Technology community has made major progress on the management of intellectual property. This progress has not been matched by an appreciation of some of the other fundamentals. In particular, we must recognise that we will never be able to follow the US and European models. We lack the military-industrial complex that drives these technological societies and, for that reason, we must focus our efforts on forming international networks to encourage Australia students and scientists to gain international experience. Without this, the opportunities promised by the initial flowering of Australian IP will remain unrealised, the risks of failure will be minimised because we will never be players and the rewards will be limited to government grants.

Footnotes

¹Bruce Cornell serves on the NSW Innovation Council.

²The move to larger populations first sees a primary cultural motive displaced by an economic motive and an economic motive by a strategic motive. Only one of the models has been proven untenable and that is a cultural justification for science and technology supported by a strategic motive. With the collapse of the USSR, a strong case was made for the close alliance of the economic and strategic motives.

'Beyond Brain Drain' - Statistical Notes from the Australian Bureau of Statistics

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Australian Statistician

The following material is extracted from "Measures of a knowledge-based economy and society, Australia" (Catalogue No. 1377.0). This is an electronic publication available on our web site¹. The messages provide a mixture of good, bad and uncertain news with respect to Australia's strength in science based human capital.

Some of the key messages are:

- Australia is a net importer of "professionals" although there are significant movements in both directions.
- There have been substantial increases in movements over the last 10 years. Departures of professionals from Australia have doubled.
- The level of unmet demand for tertiary education declined from 15.6% in 1994 to 9.3% in 2001.
- Increase in demand was much higher for females than males.
- About 9.6% of the population had a Bachelor degree or above in 1992. Ten years later this had increased to 17.8%.
- Recent graduates were far more successful in finding employment in 2001 than 1991.
- In percentage terms, Australia rates low among the OECD countries for graduates with science and engineering degrees.
- Australia has a relatively high percentage of foreign PhD students.

International migration of human resources by selected qualifications and occupations

In 2001–02 there was a net gain of 18,787 persons in selected occupations equivalent to definitions and guidelines in the OECD's manual, *The Measurement of Scientific and Technological Activities, Manual on the Measurement of Human Resources Devoted to S&T* (Canberra Manual).

PERSONS AGED 15 YEARS AND OVER, ARRIVING AND DEPARTING PERMANENTLY OR LONG-TERM 2001–02

Occupation	no.	no.	no.
	Arrivals	Departures	Net gain
Persons in selected occupations			
Specialist managers	6,762	3,840	2,922
Professionals			
Natural and physical science	2,324	2,030	294
Building and engineering	9,944	7,131	2,813
Computing	9,478	4,415	5,063
Health	10,656	8,416	2,240
Education	11,001	10,091	910
Other	29,014	24,469	4,545
<i>Total persons in selected occupations</i>	79,179	60,392	18,787
Other occupations	81,110	66,885	14,225
Not stated/inadequately described	22,149	11,620	10,529
Not applicable(a)	125,275	54,376	70,899
Total	307,713	193,273	114,440

(a) Includes retired, pensioners, disabled, housekeepers, students and unemployed.

Source: ABS Human Resources by Selected Qualifications and Occupations Australia, 2001 (cat. no. 8149.0).

Unmet demand for education as a proportion of total demand [Indicator being considered for inclusion in KBE/S web product]

Female demand for non-school study increased by 22% between 1994 and 2001, while male demand increased by only 6% over the same period.

TOTAL, MET AND UNMET DEMAND FOR NON-SCHOOL STUDY, By age & sex

	1994(a)				2001			
	Total demand for study(b)	Met demand(c)	Unmet demand(d)	Unmet demand as a proportion of total demand	Total demand for study(b)	Met demand(c)	Unmet demand(d)	Unmet demand as a proportion of total demand
Sex	'000	'000	'000	%	'000	'000	'000	%
Males	357.8	301.5	56.3	15.7	380.0	344.9	35.1	9.2
Females	377.5	319.2	58.3	15.4	460.5	417.2	43.3	9.4
Age (years)								
15-24	347.3	300.6	46.7	13.4	380.5	357.9	22.6	5.9
15-19	213.0	189.4	23.6	11.1	223.6	215.4	8.1	3.6
20-24	134.4	111.2	23.1	17.2	156.9	142.4	14.5	9.2
25-34	187.1	152.6	34.6	18.5	190.8	169.7	21.1	11.1
35-44	125.3	105.4	19.9	15.9	150.3	132.7	17.6	11.7
45-64	75.5	62.1	13.4	17.7	118.9	101.8	17	14.3
Total	735.3	620.7	114.6	15.6	840.4	762.1	78.4	9.3

(a) Met demand for 1994 represents only those people studying for a recognised qualification.

(b) People who applied to attend at a non-school educational institution.

(c) People who were studying or deferred their study at the time of the survey, and in the previous year, were either not studying or were studying at a different type

(d) People unable to gain a place at a non-school educational institution.

Met demand data for 1994 to 1996 include only those studying for a recognised qualification. Data are from the ABS's Survey of Education and Work, conducted in May each year, and relate to people aged 15-64 years.

Source: ABS Education and Training Indicators, Australia, 2002 [Cat. no. 4230.0].

Proportion of all persons aged 15–64 with a non-school qualification

There has been a marked increase in the proportion of people aged 15–64 with a bachelor degree or higher, from 10% in 1992 to 18% in 2002. The proportion of persons whose highest non-school qualification was an Advanced diploma or below has remained relatively constant.

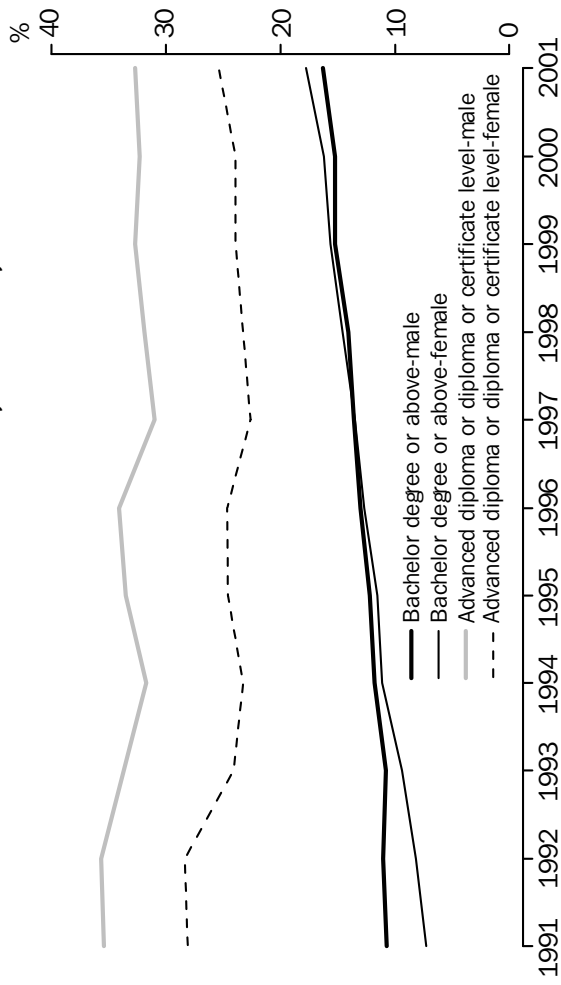
PROPORTION OF ALL PERSONS AGED 15–64 WITH A NON-SCHOOL QUALIFICATION(a)

Level of highest non-school qualification	1992	1994	1996	1998	2000	2001	2001
	%	%	%	%	%	%	%
Bachelor degree or above	9.6	11.5	12.8	14.3	15.7	17.0	17.8
Advanced diploma / Diploma or below	31.7	27.5	29.4	27.6	28.1	29.1	29.8
Age Group (years)(b)							
15–24	23.0	21.8	23.2	22.1	22.4	24.6	25.1
25–34	51.2	46.6	50.1	51.6	54.0	58.9	59.1
35–44	51.7	48.4	52.2	50.7	52.0	55.5	56.4
45–54	44.8	42.8	46.2	45.6	48.9	52.1	54.0
55–64	36.3	33.6	37.1	36.1	38.6	42.3	44.2
Total(c)	41.7	39.0	42.3	41.9	43.8	47.2	48.2

- (a) Non-school qualification refers to educational attainments other than those of pre-primary, primary or secondary education.
 (b) Persons in a particular age group with a non-school qualification as a percentage of the total population in that age group.
 (c) Includes persons whose highest non-school qualification was at a level not determined.

Break in series, 1993 ABSCQ; 1997 computer assisted coding; 2001 ASCED.
 Source: ABS Education and Work, Australia, (cat. no. 6227.0).

LEVEL OF HIGHEST NON-SCHOOL QUALIFICATION, BY SEX, PERSONS AGED 15-64 YEARS



Break in series, 1993 ABSCQ; 1997 computer assisted coding; 2001 ASCED.

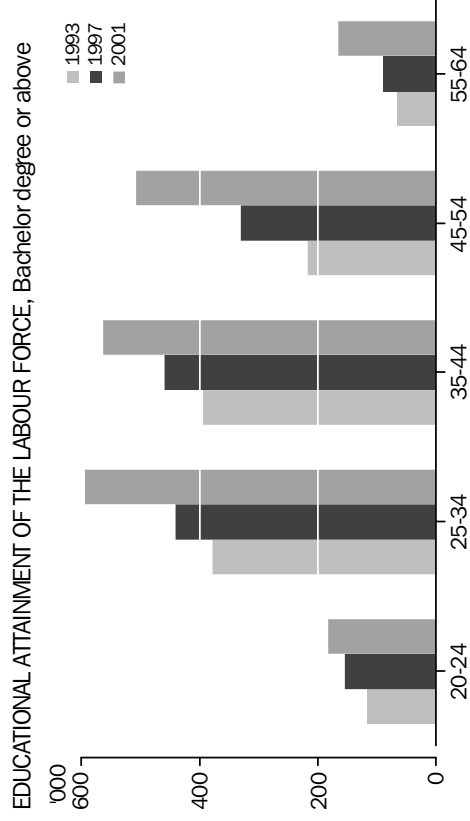
Source: ABS Education and Training Indicators Australia, 2002 (cat. no. 4230.0).

Higher Educational Attainment of the workforce by age group

EDUCATIONAL ATTAINMENT OF THE LABOUR FORCE, Bachelor degree or above

	Age Group (years)				
	20-24	25-34	35-44	45-54	55-64
	'000	'000	'000	'000	'000
1993	117.3	378.7	394.2	216.8	66.8
1997	155.1	440.2	459.1	330.4	90.2
2001	182.2	593.2	563.2	507.7	165.3

Source: ABS Education and Training Experience, Australia (cat no. 6278.0).



Source: ABS Education and Training Experience, Australia (cat no. 6278.0).

Graduate outcomes by qualification, employment status

Of the 158,200 recent university graduates in 2001, 67% were employed four months after completing their qualification. This proportion has remained relatively constant in recent years, after falling below 60% between 1992 and 1994. Since 1991, the proportion of university graduates unemployed four months after their course ended has declined (from 15% in 1991 to 11% in 2001), while the proportion of those not in the labour force remained relatively constant (23% in 1991 and 22% in 2001).

LABOUR FORCE STATUS OF RECENT UNIVERSITY GRADUATES

	Employed		Employed Total	Unemployed	Not in labour force
	full-time	part-time			
	%	%	%	%	%
	1991				
Postgraduates	70.7	6.3	77.0	12.7	10.2
Bachelor graduates	53.4	4.0	57.4	16.3	26.3
All university graduates	57.5	4.6	62.0	15.4	22.5
	2001				
	%	%	%	%	%
Postgraduates	71.9	9.8	81.6	7.9	10.5
Bachelor graduates	55.6	6.0	61.6	12.0	26.4
All university graduates	60.0	7.0	67.0	10.9	22.1

Source: ABS Education and Training Indicators Australia, 2002 (cat. no. 4230.0). Original source: Graduate Careers Council of Australia (GCCA).

Main field of highest educational attainment by labour force status

The percentage of persons employed part-time varied from 34% for those whose highest educational attainment was in the field of health, to 9% for those whose main field of highest educational attainment was engineering and related technologies. Females experienced a higher percentage of part-time employment in all fields of highest educational attainment.

PERSONS IN MAIN FIELD OF HIGHEST EDUCATIONAL ATTAINMENT BY LABOUR FORCE STATUS 2001(a)

Main field of highest educational attainment	Employed full-time %	Employed part-time %	Unemployed %	Not in the labour force %
Natural and physical sciences	63.4	17.4	3.6	15.6
Information technology	69.9	12.1	6.6	11.4
Engineering and related technologies	76.9	8.6	3.2	11.3
Architecture and building	77.0	9.3	3.0	10.7
Agriculture, environmental & related studies	69.6	14.3	5.6	10.5
Health	48.3	34.0	2.4	15.3
Education	56.9	26.4	1.0	15.7
Management and commerce	67.1	16.3	4.2	12.4
Society and culture	56.1	24.4	2.8	16.7
Creative arts	52.9	26.1	5.5	15.5
Food, hospitality and personal services	54.2	22.2	3.7	19.8
Mixed field programmes(b)	42.5	23.4	6.0	28.1

(a) Labour force status as a proportion of all persons with each main field of highest educational attainment.

(b) Consists mainly of persons whose highest educational attainment was Year 12 or below.

Source: ABS Education and Training Experience, Australia, 2001 (cat no. 6278.0).

FEMALES IN MAIN FIELD OF HIGHEST EDUCATIONAL ATTAINMENT BY LABOUR FORCE STATUS 2001(a)

Main field of highest educational attainment	Employed full-time %	Employed part-time %	Unemployed %	Not in the labour force %
Natural and physical sciences	49.0	27.9	2.5	20.6
Information technology	48.4	24.6	12.6	14.4
Engineering and related technologies	48.4	20.7	4.3	26.6
Architecture and building	49.0	41.9	3.5	5.6
Agriculture, environmental & related studies	51.5	24.7	6.9	17.0
Health	39.6	40.6	2.0	17.8
Education	48.5	31.8	1.1	18.6
Management and commerce	53.5	23.8	5.3	17.4
Society and culture	43.6	32.7	3.2	20.5
Creative arts	43.2	30.7	5.1	21.0
Food, hospitality and personal services	37.5	31.7	4.1	26.7
Mixed field programmes(b)	27.1	31.1	4.4	37.4

(a) Labour force status as a proportion of all females with each main field of highest educational attainment.

(b) Consists mainly of females whose highest educational attainment was Year 12 or below.

Source: ABS Education and Training Experience, Australia, 2001 (cat no. 6278.0).

MALES IN MAIN FIELD OF HIGHEST EDUCATIONAL ATTAINMENT BY LABOUR FORCE STATUS 2001(a)

Main field of highest educational attainment	Employed full-time %	Employed part-time %	Unemployed %	Not in the labour force %
Natural and physical sciences	74.7	9.1	4.5	11.7
Information technology	80.2	6.2	3.7	10.0
Engineering and related technologies	78.6	7.9	3.1	10.3
Architecture and building	78.1	8.0	2.9	10.9
Agriculture, environmental & related studies	76.4	10.4	5.1	8.1
Health	78.8	10.6	3.8	6.8
Education	77.7	13.0	0.9	8.3
Management and commerce	82.8	7.6	3.0	6.6
Society and culture	77.5	10.2	2.2	10.0
Creative arts	67.4	19.1	6.2	7.3
Food, hospitality and personal services	76.8	9.5	3.3	10.5
Mixed field programmes(b)	61.7	13.7	7.9	16.6

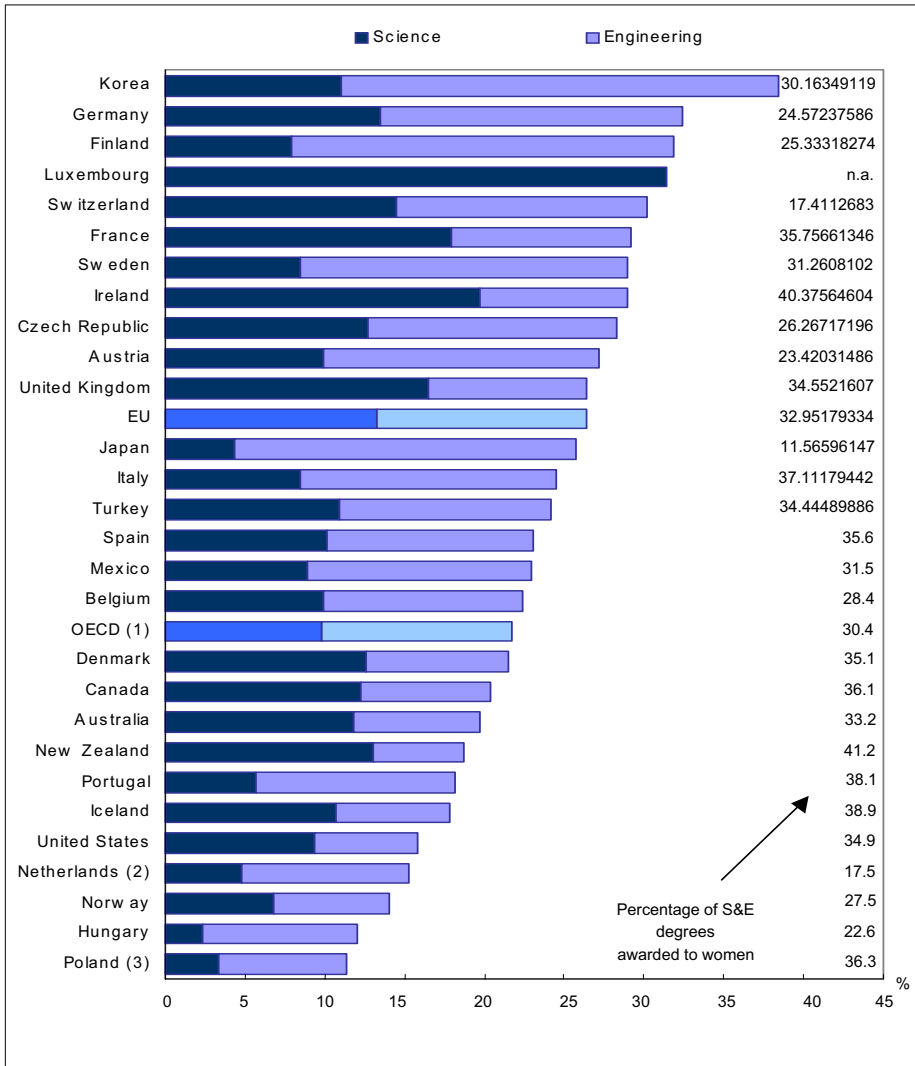
(a) Labour force status as a proportion of all males with each main field of highest educational attainment.

(b) Consists mainly of males whose highest educational attainment was Year 12 or below.

Source: ABS Education and Training Experience, Australia, 2001 (cat. no. 6278.0).

OECD Indicators

Science and Engineering Degrees as a percentage of new degrees 2000



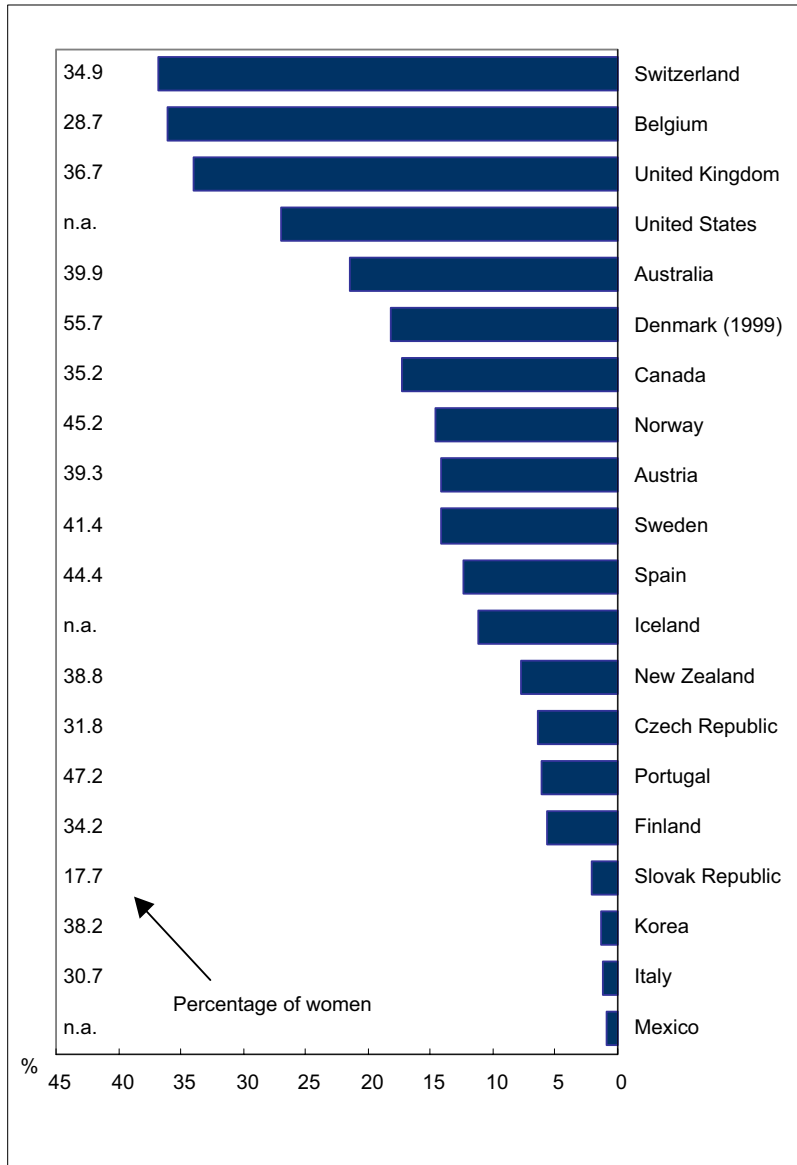
1. Average of the available countries

2. Excludes advanced research programmes

3. Excludes tertiary-A second degree programmes and advanced research programmes.

Source: OECD Science, Technology and Industry Scoreboard 2003, Towards a knowledge-based economy, OECD Education database May 2000

Foreign PhD students as a percentage of total enrolment, 2000



Source: OECD Science, Technology and Industry Scoreboard 2003, Towards a knowledge-based economy, OECD Education database May 2000

Footnotes

¹ (www.abs.gov.au)

International Mobility of the Highly Skilled: An Australian Perspective*

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Abstract

In the last two decades the labour markets for highly skilled people have become increasingly international. The barriers to the movement of the highly skilled between countries have been progressively reduced so that they now can move freely across national borders. With the recognition that skilled human resources, especially in science and technology, are essential to maintaining and enhancing the competitiveness of national economies in a globalising world, an increasing number of countries are implementing measures to facilitate the recruitment of foreign skilled workers. This paper charts the growth in emigration of skilled workers from Australia and attempts to put it in the context of overall migration changes influencing Australia. It also presents results of a survey of highly skilled Australians currently living and working overseas. It examines the characteristics of this expatriate community and the extent to which they maintain linkages with, and intend to return to, Australia. The policy implications which flow from these findings are then examined. It is argued that while Australia unequivocally experiences a 'net brain gain' there is no room for national complacency on this issue. There is room for the development of a judicious national policy toward highly skilled people which is a carefully considered mix of the three 'r's – retention, recruitment and return as well as developing innovative ways for the more effective engagement of the diaspora in Australian activity.

*Tables and figures pp 88 - 97

Introduction

There has been a substantial increase in global population mobility both within and between countries (United Nations 2002). One of the main characteristics of this mobility is that it is selective of the highly skilled. This has influenced Australia as much as any nation with 23 percent of its population born overseas and an immigration policy highly selective of skilled people. Less discussed is the fact that Australia is one of the world's major origins of migrants. Certainly in Australia there has been some discussion of 'brain drain' but other commentators can demonstrate that Australia's active immigration program means that there is a substantial net gain of skilled migrants. This paper attempts to assess the scale, characteristics and patterns of migration of highly skilled people out of Australia. At the outset, however, it is necessary to make some remarks about the massive shifts, which have occurred in both global and Australian international migration and to draw attention to some of the difficulties in measuring the flow of migrants out of Australia.

A New Paradigm of International Migration

The last two decades have seen a major increase in the scale and diversity of international migration. The United Nations (2002) estimates that over 180 million people live outside their country of birth. However, there has been an enormous increase in transnationalism as Glick Schiller, Basch and Szanton Blanc (1995, 48) point out:

'several generations of researchers have viewed immigrants as persons who uproot themselves, leave behind home and country, and face the painful process of incorporation into a different society and culture ... A new concept of transnational migration is emerging, however, that questions this long-held conceptualisation of immigrants, suggesting that in both the US and Europe increasing numbers of migrants are best understood as "transmigrants" '.

The new concept of transnational migration emphasises the two-way and circular nature of many flows between countries (Blanc, Basch and Glick Schiller 1995; Basch, Glick Schiller and Blanc 1996). Moreover, there has been a bifurcation in international migration. On the one hand there has been a massive increase in the international transfer of highly skilled managerial and professional workers (e.g. OECD 2002; Salt 1997; Peixoto 2001; Koser and Salt 1997). For such groups movement between nations has become much easier. On the other hand, there has been a big increase in the awareness of unskilled workers in the possibilities for them in other countries but the barriers to their movement have been increased. There has hence been an increase in undocumented migration.

With the greater movement of skilled migrants there has been a return to the discussions of brain drain that occurred in the 1970s. The internationalisation of labour markets has meant concerns that the movement of skilled persons from less developed and smaller nations to larger well-developed nations is hampering the development of the former. However, there have been some indications that emigration can, in some contexts, have a positive impact on development through the

influx of remittances, their possible return to their home country and the potential to harness the diaspora to assist economic growth at home (Hugo 2003).

Australia, along with the United States, Canada and New Zealand, is seen as a 'traditional migration country' - one of the few nations to have a formal immigration programme. These were the main nations to be heavily involved with international migration in the early post-war years. Now, however, almost all nations are influenced significantly by migration. Nevertheless, Australian international migration has undergone some massive changes in the last decade. Almost all Australian research and discussion is based on a model of migration whereby people move to the country permanently and settle in the nation. However, an increasing number of people coming to the nation do so to work temporarily and there have been a number of changes in entry policy to allow this to happen. Related to this, an increasing proportion of Australian 'immigrants' (almost a third) are 'onshore' in that they are already in Australia when they apply for permanent settlement. Australia has had an extensive and active refugee program but in recent years Australia has been influenced by asylum seekers to an extent that has never occurred before. The migration program has also changed in that the focus on selection on the basis of skill has increased while the proportion made up of family and humanitarian migrants has decreased. Finally, there has been an increase in the numbers of Australians leaving the country on a more or less permanent basis - the topic of the present paper.

Counting Australia's Population and the Stock of Australians Overseas

The increased mobility of Australians raises some fundamental questions about who should be counted as being among Australia's population. Traditionally, the national population has been counted as those resident on the night of the census and there is provision for those who are temporarily overseas to be identified and included by members of their household remaining in

Australia. But what of Australian citizens living on a long term or permanent basis in other countries? These were estimated to be 858,886 on 31 December 2001 by the Department of Foreign Affairs¹ equivalent to 4.3 percent of the 2001 resident population. In addition, they identified a further 264,955 shorter term ‘visiting citizens’. Moreover, they are a selective group in terms of age, education, income and skill. In a globalising world it may be that we should be seeking alternative conceptualisations of what constitutes the national population.

With globalisation an increasing proportion of nationals are likely to be absent for considerable periods, while there will be larger numbers of foreign nationals present in the country. This raises the question as to whether national censuses should seek to include nationals who are living and working overseas on a permanent or long-term basis. Should we be attempting to count the population who identify themselves as Australians regardless of where they happen to be on the night of the census?

The issue as to whether the national censuses should seek to include nationals who are living and working overseas on a permanent or long-term basis is undecided. Indeed, the United States of America will hold a special census of its citizens based in foreign countries and there are suggestions that the 2010 US census will not only include all people resident in the United States but all of its citizens abroad (US Census Bureau 2002a). It is interesting to note in Table 1, however, that the USA diaspora is smaller than that of Australia when it is considered in relation to the resident national population. However, the Australian diaspora is significantly smaller than that of New Zealand and the Philippines.

The DFAT estimates of the number of Australians residing in foreign countries provide an opportunity to examine their distribution between different countries. The 31 December estimates are shown in Figure 1 which indicates that almost half (48.4 percent) were in European Union (EU) nations and nearly half of these (200,000) were in the United Kingdom. The UK is clearly a major destination of Australians going overseas on a long term or permanent basis, partly reflecting the strong Australia-UK-linkages forged during colonial times and during the era of the British Commonwealth

but also the role of London as a global city (Sassen 1991) which has meant that it has the head offices of a wide array of multinational companies and organisations. There are a number of groups in this movement:

- a large number of young Australians who are on working holiday – an increasing rite of passage for young Australians;
- workers, mainly in managerial and professional areas, on transfer with their employer;
- high skill workers who have sought employment in the UK; and
- returned former settlers.

The second largest community of Australian citizens overseas evident in Figure 1 is Greece, with 135,000. This group of Australian citizens is quite different to those in the UK. Undoubtedly, many of these are Greece-born return migrants rather than Australia-born citizens. Hence there has been a significant amount of return migration to Greece. There also is some evidence that young second generation Australians of Greek heritage are part of this flow. The third largest Australian expatriate community is in the United States (106,410). It is clear that whereas the UK is a traditional destination of emigrants from Australia, the USA has been increasing in importance over the last decade. The fourth largest expatriate community is in New Zealand (68,000). This is interesting in the context of the large Trans-Tasman migration in the direction of Australia (Rapson 1996, 1998; Birrell and Rapson 2001; Catley 2001). Some of the flow involves the Australia-born children of New Zealand return migrants from Australia. There is a significant flow of skilled Australians across the Tasman, perhaps indicating that for many jobs Australians and New Zealanders form a single labour market. At the 2001 New Zealand census, 56,259 persons were enumerated who indicated they were born in Australia (Ho and Muntz 2003). The fifth largest community of Australian citizens overseas is in Hong Kong (46,000). This is the largest of a number of expatriate communities in Asia based in Indonesia (12,000), Japan (10,651), Singapore (12,000) and Malaysia (4,700).

Recent Developments in Australian Emigration

Australia recognises the following categories of international population movement for statistical purposes:

- Permanent movement – persons migrating to Australia and residents departing permanently.
 - Long term movement – visitors arriving and residents departing temporarily with the intention to stay in Australia or abroad for twelve months or more, and the departure of visitors and the return of residents who had stayed in Australia or abroad for twelve months or more.
 - Short term movement – travellers whose intended or actual stay in Australia or abroad is less than twelve months.
- A changed global security situation following the September 11th, 2001, New York and Washington incidents and the 2002 Bali bombing. This especially will have had an effect on the young Australians travelling overseas in rite of passage migration.
 - A substantial increase in value of the Australian dollar against the U.S. dollar. This will have influenced work related migration.

Trends in permanent emigration from Australia are depicted in Figure 2. A key distinction is between former settlers who subsequently leave Australia returning to their home country or moving to a third country and Australia-born persons. This group has been discussed in some detail elsewhere (Hugo, Rudd and Harris 2001) and the focus here will be on the Australia-born component of the outflow. It is apparent from Figure 2 that the number of Australia-born leaving permanently have increased in recent years. Indeed in each year in the 1990s the numbers have increased. The last year for which data are available (2002-03) saw a record number of Australia-born emigrants (25,578) and in the proportion that they make up of the total departures (50.7 percent).

It is necessary to also examine the patterns of long term out movement to get a comprehensive picture of the flows of emigration. Figure 3 shows the pattern of long term out movement of Australian residents. It will be noticed that this peaked at 116,217 in 2000-01 (92,945) but subsequently fell to 92,071 in 2001-02 and 86,200 in 2002-03. This fall seems to have been as a result of two factors.

Putting together the permanent departures of Australia-born and long-term departures of Australian residents, Table 2 shows that the last decade has shown a progressive annual increase in the numbers of Australians departing until 2001-02. Over the decade the number of permanent departures increased by 146 percent and long term departures by 41 percent. However, this underestimates the outflow to the extent that some Australians are effectively working and living overseas but return to Australia at least once a year and still regard Australia as a permanent place of residence but are regarded by DIMIA statistics as 'short-term' departures. Anecdotal evidence would suggest that this phenomenon is increasing, especially in the United States and Asia. The fall in 2002-03 is due to a decrease in the number of Australians travelling overseas on a long term basis, especially those on working holidays.

Characteristics of Australian Emigrants

All migration is selective in that migrants are never a representative cross-section of the populations they leave or move to and emigrants from Australia are no different. Like all migration the movement is selective by age (Hugo 1994, 67-73). This is evident in Figure 4 and Figure 5, which show the age-sex distribution of the Australia-born permanent emigrants and the Australian resident long-term departures. It is clear that in both cases there is a preponderance of young adults, especially among the long term Australian departures. The very low representation of dependent children among the latter reflects the fact that many long term departures are young singles and couples, especially those who are intending to take extended working holidays.

It is interesting to examine the age-specific net migration of Australians leaving on a permanent or long term basis. Table 3 depicts these patterns. It will be noticed that the net losses are strongly concentrated in the young adult age groups. In the long term movement the pattern of Australian residents leaving in their 20s and returning in their 30s is apparent. There is also some evidence of people returning in the retirement ages. There are some variations between destinations in the age structure of emigrants (Hugo, Rudd and Harris 2003).

- Those going to the U.K. are dominated by the 20-34 age group (76.4 percent of long term emigrants and 37.9 percent of permanent emigrants) reflecting the strong involvement of young Australians on extended working holidays.
- The USA destined group are older reflecting the fact that many move there as part of the career cycle and to gain upward mobility in their profession (33.7 percent of long term departures and 57.4 percent of permanent migrants are aged 35-54).
- Those going to Asia are older still, indicating many going there do so after several decades of work experience.

One of the most prominent issues relating to emigration from Australia is the fact that it is undoubtedly selective of the more highly educated, more skilled parts of the population.

The workforce participation rates of emigrants, both permanent departures of the Australia-born and long-term departures of Australian residents, are higher than both for the total Australian population and permanent settler arrivals. This holds for males and especially for females.

Table 4 also indicates that emigrants also have very low levels of unemployment.

Table 5 shows that over two thirds of all Australia-born permanent departures and Australian resident long-term departures are managers, administrators, professionals and para-professionals. This is clearly much higher than among the Australian-resident workforce, indicating a high degree of

selectivity. Table 5 also indicates that the Australian emigration is more selective of some high-level occupations than is the in-movement of settlers to Australia.

The Australian Emigration Survey 2002

Investigation into the Australian expatriate community is quite difficult because there is no comprehensive listing available of the group. Indeed, we know little of their characteristics because they are, unlike the population resident in Australia, not at present included in the Australian population census. Research into the group is made difficult by the lack of a sampling frame from which a random sample could be selected to provide a representative profile of expatriates. The present study, in facing this problem, examined a number of possibilities involving incomplete sampling frames and adopted a dual strategy. In doing this it was decided at the outset that it would concentrate on highly skilled expatriates. This was done for the following reasons:

- Much of the concern about emigration from Australia relates to ‘brain drain’ issues and the loss of skills and human resources which are important for economic, social and cultural development of the nation.
- The previous section has demonstrated the fact that almost three quarters of Australia-born emigrants are in managerial, administrative and professional occupations.

The first part of the research strategy was to attempt to sample a cross-section of recent graduates from Australian universities. Australian universities are increasingly improving their records of alumni and it was decided to ask a group of universities to send questionnaires to recent graduates whose current address in alumni records is not in Australia. Accordingly, a sample of universities was approached and questionnaires with a covering letter to a sample of their members who could be identified as both Australia-born/citizens and living overseas were sent. A second part of the strategy has involved a snowball technique whereby a number of relevant

groups have agreed to publicise the survey on their websites/newsletters. Overall 2,072 useable questionnaires were returned. Of these, 1,327 were returned from alumni. This represents a response rate of 33.5 percent that was considered to be a relatively high response, especially considering the fact that many questionnaires were returned because the address was not correct.

Table 6 shows the distribution of respondents by where they were living at the time of the survey. Some two thirds were living in the USA (34.6 percent) or in the UK and Ireland (31.9 percent), about 20 percent were in Asia (9.8 percent) and in other European countries (9.9 percent), with roughly 10 percent in Canada and New Zealand, leaving only a small representation of less than 5 percent in the rest of the world.

The particular characteristics of the sampled expatriates and their variation between some of the main destination areas are shown in Table 7. Like the total population, around 80 percent were Australia-born with a similar percentage holding Australian citizenship. Almost two thirds of respondents had left Australia between 1990 and 2002, although a higher percentage of those now living in the UK and Ireland and also in Asia had left in that period than was the case for respondents in the USA and Canada. This is reflected in the younger age structure of the UK respondents with 53 percent aged under 35 years and a more even balance in the number of males and females. Moreover, proportionately there were more married respondents in the USA and Canada (74.6 percent) compared with the UK and Ireland (62 percent) where there was a larger unmarried population. This clearly impacts on family structure and only a quarter of the respondents in the UK and Ireland lived in family households with children compared with 36-37 percent in the other destination countries.

Table 7 also shows the exceptionally high labour force participation of respondents (89.2 percent), with slightly higher rates in the UK and Ireland, and also in Asia due primarily to a lower percentage of older respondents. Virtually all of the respondents were employed on a full-time basis but it is interesting to note that almost a quarter (23.5 percent) were on fixed-term contracts,

indicating perhaps a high degree of future potential mobility among the group. Many of the Australians moving to Asia do so on fixed-term contracts (40.8 percent) but the proportion in the USA and Canada (16.2 percent) are lower. As expected, most (88.9 percent) of employed respondents were in professional occupations in all destinations and a high percentage have postgraduate degrees (42 percent). This was most notable for respondents living in the USA and Canada with 47.2 percent to 34 percent in the UK and Ireland. Home ownership was also notably higher for respondents in the USA and Canada and lowest for those in Asia. However, respondents earning income in excess of \$200,000 (Australian dollars per year) were over represented in the USA and Canada (29.6 percent) as well as in Asia (24.4 percent). There was a much lower representation of high-income earners among respondents in the UK and Ireland (16 percent) and also the other group of overseas destinations (12.1 percent).

Table 8 shows that most of the respondents were in professional occupations (90.3 percent of males and 86.8 percent of females) with a quarter in education, some 9.1 percent of these in universities and higher education. Women are more represented in health and community services, while men are more represented in finance, insurance, manufacturing, construction and transport. While education was the main employment sector for both males and females there were differences evident within that sector. Males were much more likely to be in higher education, some 11.4 percent compared with 5.9 percent of females. This meant that 20 percent of females were in education compared with only 13 percent of males.

Survey Results

Examination of the causes for any form of migration is difficult. The responses given to question such as 'Why Did You Move?' often tell only part of the story. They may reflect, to some extent, the thing that triggered the movement rather than the underlying causes. *Post hoc* rationalisation of the reasons for movement can also occur. Survey respondents were asked to respond to a list of specified reasons and were given the opportunity of responding to several reasons.

In Table 9, the responses to each of the reasons are ranked by popularity of the total response and clear differences are evident in the ranking of male and female responses. However, the most favoured response for both males and females for leaving Australia is ‘*better employment opportunities*’, although somewhat higher for males (49.3 percent) than for females (34.2 percent). Indeed the four most popular responses given by males were all related to better employment aspirations in respect to professional development, promotion and higher income. This was similar for females but not to the same extent as for males with a much higher response to both ‘*marriage/partnership*’ and also ‘*partner’s employment*’. The responses to ‘*lifestyle*’ were very similar for males and females at about 23 percent, and as such the only major response not showing a significant difference between them.

It is important to realise that in the early postwar era almost all Australians operated within labour markets bounded by a state so that they would see the capital city of the state as the centre of gravity of that labour market. Increasingly, those labour markets were extended to encompass the nation with the centre being in Sydney and, to a lesser extent, Melbourne. However, in the globalising world of the last decade the boundaries of labour markets have extended further so that many look to global cities such as London and New York as the centre of gravity of their labour market. Table 9 reflects a strong element of the ‘pull’ of overseas countries influencing the decision to emigrate. However, in detailed responses and in discussions with expatriates a minority expressed a ‘push’ factor also in their decision to leave Australia. This was expressed as an aversion to the so-called ‘tall poppy syndrome’ in Australia. This related to a perception that there was a failure for Australia to fully acknowledge and reward high achievement.

In the reawakening of global interest in diaspora, one of the main issues relates to the extent to which expatriates identify with, relate to and keep links with their homeland. These issues were addressed in the Australian survey and one of the striking findings in the survey and in discussions with expatriates has been the depth of feeling in many expatriates about Australia. In order to

establish the extent to which expatriates continue to identify with Australia they were asked whether they still called Australia home. Table 10 indicates an extremely positive response with some with some 79 percent of respondents claiming it to be ‘home’. There was a notable difference between males and females with 85 percent of females saying Australia was still ‘home’ compared with 75 percent of males.

Respondents were asked a set of questions relating to what they thought were the benefits to Australia of them living overseas. There was a very high positive response with 79.6 percent of respondents perceiving their presence overseas had benefits for Australia. When asked specifically about the benefits, Table 11 shows that the most popular responses given by about two thirds of respondents were ‘creating goodwill towards Australia’ and ‘skills transferable back to Australia’ which was similar for males and females. Over 50 percent of respondents thought that contacts they had made would be useful for other Australians, while others saw benefits arising from linkages between Australia and the countries in which they were currently living. The lowest ranked response related to the creation of business and trade links with Australian companies with 26 percent of males and only 13 percent of females indicating this as a benefit. Moreover, when providing other reasons than those listed it is interesting that 43 percent of respondents claimed that they were being ‘good ambassadors for Australia’ while a further 26 percent indicated that they invested and spent money in Australia earned overseas.

A key question in considering a diaspora is the extent to which expatriates remain in a foreign country. From a policy perspective, of course, the rate of return is crucial. Respondents were asked in the survey about their intentions to return to Australia to live and Table 12 shows that 50 percent of the 2,072 respondents definitely intended to return with a third of the remainder being undecided. There was only a small difference between males and females in response with a higher proportion of females undecided about returning to Australia at this stage. Some 19.3 percent of males indicated that they would not return compared with 14.6 percent of females.

In examining return migration it is also important to examine the reasons given by emigrants for intending not to come back to Australia. Table 13 shows that employment, career and income related factors were deterrents to returning to Australia. The fact that many were established in their current location was also a major reason for not intending to return as was having a non-Australian partner. This was especially the case for females, with 37.3 percent of females indicating this as a reason for not returning compared with 18 percent of males. By contrast, males were much more likely to indicate personal tax and business opportunities than was the case for females. Other reasons such as 'children grown up here' and 'family and friends here' showed very little difference between males and females. It is interesting that the 'cost of relocating back to Australia' and also the response to 'no equivalent jobs in Australia' had a relatively low response as factors in the decision not to return. It is apparent that the attraction of employment and the associated benefits, opportunities to earn higher income and perceived better career development feature strongly in the decision to stay overseas.

Policy Considerations

Australia experiences a substantial net gain of both people and skilled people through international migration. This has been interpreted by some to indicate that the increasing flow of young Australians, most of them with high levels of skills in demand in the national labour force as has been demonstrated here, is not a matter of concern nor should it be the subject of any policy intervention. An alternative position could be taken for the following reasons:

- While there is a net gain of skilled people, the evidence is largely in terms of the paper qualifications of immigrants and emigrants. Could it be that emigration is selective of the 'best of the best'? Could it be that it is the top flight researchers, innovators, business people etc. that go, while those who come are, while highly qualified and significant assets to the labour force, not the 'highest flyers' in their areas of expertise? In a world

where innovation, being at the leading edge of technological development and application etc., are crucial there may be concerns.

- Similarly, in a highly competitive market for skilled people, why shouldn't Australia both have the advantages of immigrant, as well as home grown talent? Moreover, if the Australians have the added advantage of having spent time in foreign countries enhancing their skills, making useful connections etc. then they can contribute even more.
- Australia has been highly successful in its ability to attract highly skilled people to Australia, both as permanent settlers (Richardson, Robertson and Ilsley 2001) and temporary residents (Khoo, Voight-Graf and Hugo 2003). However, all OECD nations now are active in recruiting such people and the competition is becoming even fiercer. Why, then, shouldn't part of Australia's immigration program be to attract Australia's expatriates, with the types of skills being recruited in the immigration program, to return to their homeland? They have the experience, knowledge and networks to successfully settle in Australia!!
- Globally there is an emerging awareness and appreciation 'that a highly skilled diaspora may play several important roles in promoting development at home' (Lucas 2001, i). This has been achieved through remittances and providing a source of foreign investment, especially investments which generate employment. Moreover, they can 'act as middlemen, enhancing information flows, lowering reputation barriers and enforcing contractual arrangements, resulting in an expansion of capital inflows from foreigners as well as from the diaspora and of trade links too' (Lucas 2001, i).
- Several nations, especially the fast growing economies of Asia, have developed policies to encourage the

return of skilled expatriates. Return migration has always been important but there may be policies which can facilitate and enhance this type of flow.

The argument here is that Australia has a substantial diaspora in comparative global terms and that its position in the world economy would suggest that this diaspora will grow rapidly. It is definitely in Australia's interests, both in terms of its duty to its national citizens and its economic, social and cultural development, to have policies which encourage brain circulation rather than brain drain among Australia's young people. Policies relating to emigration and the diaspora can take the following forms:

- policies relating to the recruitment of highly skilled foreign workers;
- policies relating to expatriates living abroad on a permanent or long-term basis;
- policies designed to encourage expatriates to return; and
- policies designed to keep talented Australians in Australia.

Clearly, there are relationships between the four areas but it is useful to distinguish between the broad areas of policy. They are dealt with in some detail elsewhere (Hugo, Rudd and Harris 2003). It is useful here to mention a couple of examples which relate to the researcher/scientist/academic sector.

In terms of both the retention of high quality scientists, the return of expatriate Australians and the recruitment of highly skilled foreigners, it is important to have appropriately-resourced positions. Total factor productivity growth in OECD countries has been shown to be related to the stock of scientists and engineers available and to the rate of expenditure on research and development (Lucas 2001, 29). Hence competition for the skills and intellectual resources needed for nations to compete in the global economy, especially the OECD nations, is increasing (Hamlin 2000). Australia's most talented young people will increasingly be offered the opportunity to earn more than they can in Australia by emigrating. This is not necessarily a bad thing for Australia if they can maintain strong

linkages with Australia and eventually return. However, if it is true that the people who are leaving are not just selectively more highly-skilled and highly-educated but include many of the key researchers and innovators who are most likely to place Australia in a competitive position in the global economy there needs to be concern.

The solution to this problem is partly financial and partly cultural. As indicated earlier, some respondents in the country indicated that Australia is not as good at recognising talent and high achievement among its scientists and innovators as it has been in other areas such as sport. In Canada, which experiences heavy emigration to the United States and a heavy immigration from elsewhere in the world, a study concludes that there are issues of concern in Canada with respect to brain drain despite the huge net gain of skilled persons (Zhao, Drew and Murray 2000). This study points out that Canada suffers a net loss in a variety of knowledge-based occupations to the United States and although the numbers are small, they are in areas that are thought to be important to the economy and society. A study by DeVoretz and Laryea (1998) estimated that in Canada the net value of the movement of Canadian managers and professionals to the United States over the 1982-96 period was \$6.7 billion (in 1993/94 dollars), more than half of which is publicly funded post-secondary education. They also make the important point that ... 'it is not appropriate to assume that the emigration of skilled and professional people to the US can be replaced one for one without cost by immigrants to Canada from other countries. New immigrants impose administrative and settlement costs for themselves and their families. In addition, these are more subtle 'churning costs' for Canada, since there is at least an initial quality of difference between Canadian emigrants to the US and US immigrants to Canada as reflected by the difference in earnings' (Glass and Choy 2001, 43).

One group of emigrants to which particular attention needs to be given are the researchers, scientists and engineers who are necessary for technological innovation and progress and quick and effective technology

transfers and application (Eaton and Kortum 1996; Lucas 2001: 15). There is discussion in the Australian science community about the loss of the highest-quality Australian researchers and teachers to emigration, especially to the United States and Europe. Indeed, the introduction of Federation Fellowships through the Australian Research Council was expressly to dissuade such people from emigrating and to attract back top scientists who had emigrated. The Federation of Australian Scientific and Technological Societies (FASTS) has been vocal in this area. For example, an investigation into mathematical sciences in Australia (Thomas 2000, 2002) found that it was in decline, which is a matter of substantial concern partly because so many areas of science and technology are dependent on advanced level mathematics (e.g. biostatistics, advanced computing, security systems, financial services etc.). While there are several reasons for the decline, one particular area identified related to brain drain issues. Thomas (2002, 1) found, from an analysis of data collected from the mathematics and statistics departments of Australian universities, that:

- a brain drain of experienced researchers continues;
- a trickle of experienced researchers into Australia continues;
- there is an unfavourable balance between those coming in and out; and
- new researchers from overseas are showing less of a tendency to stay in Australia.

Another study of 173 senior university researchers for the Chifley Research Centre (Boyd 2001) concluded that there was an overall attitude of gloom and despair in the academic research community regarding the recruitment and retention of talented research staff. Respondents identified low salaries, increased administrative loads, limited research funding and facilities, increased teaching loads, lack of strong research teams, lack of career opportunities and lack of tenure-track positions as key problems in universities. There would be considerable value in undertaking comprehensive and systematic studies of the migration in and out of Australia's universities to establish the

extent to which the pattern identified in the mathematics case are evident elsewhere. Such an analysis should not only be of numbers but also an assessment of the 'quality' of those moving in and out. Such a study would not be difficult or expensive and is needed if the arguments being made in the Australian scientific and research communities that low funding levels have resulted in a substantial brain drain out of Australian universities, especially in areas crucial to the national economy.

One of the enduring features of all diaspora is return migration to the homeland, although its incidence varies greatly. It is apparent that there can be significant dividends to the home country if expatriates return, especially when they are highly skilled in areas in demand in the labour market, they have extended their knowledge and experience while overseas and return with a network of overseas contacts which can benefit their work at home. It is clear from the survey that a majority of Australians currently overseas have the desire to come back to Australia to live and that many wish to come back when they enter the family formation stage of the life cycle. There is limited global experience of government policies and programs to encourage return migration (Hugo 1996). Most attempts to encourage return migration have come from Asian countries but the experience of Ireland is also instructive (Hugo, Rudd and Harris 2003).

There would seem to be scope to introduce programs that facilitate and encourage the return migration of Australian expatriates, those with skills and experience considered to be of national importance. The results from the survey reported on here give some clues as to such a program:

- It is clearly lifestyle, cost of living, family etc. factors which are most drawing Australians home. Hence development of data bases which 'match' Australians overseas with relevant job opportunities in Australia would seem to be one of the ways in which the pre-existing desire to return could be encouraged.
- There may be scope for a government program to provide some assistance to institutions and businesses who can

make a strong case for the ‘bringing home’ of absolutely outstanding Australian scientists, innovators etc. This should not be subsidisation of normal head hunting activity but be reserved for truly outstanding individuals who will make a major contribution to the economy and society.

- There is a need to investigate in some detail the ‘transaction costs’ of a return to Australia. Several respondents were concerned that on return to Australia their superannuation and accumulated wealth would attract taxation as income. There would seem to need to be investigation of ways in which this blockage could be overcome since it not only would assist return migration but be a gain of foreign exchange. Dixon (2002, 4) points out that the increased transfer of superannuation assets is also an issue for other immigrants to Australia.
- Australia has advanced systems that provide potential and intending settlers to Australia detailed and relevant information. It would seem appropriate to expand this to include relevant information to potential Australian returnees.
- Indeed, the development of part of the national immigration program to involve attracting back Australian expatriates would also send important psychological messages to Australians residing overseas that their experience and skills are greatly valued by the Australian community.

One striking finding of the survey was the widespread strong identification of expatriates to their homeland, even when there is no intention to return permanently to Australia. This raises a number of issues:

- To what extent should the diaspora be considered part of the nation and included in national activities? Should there be efforts to enhance their identification with Australia?
- To what extent should Australia have policies that take advantage of the diaspora to advance national economic, social and cultural interests?

While some traditional emigration nations like Italy have long had policies and programs for Italians living overseas, it is only in relatively recent years that there has been major consideration given to the possibility that these activities can be more than the maintenance of culture and a significant part of the economic development strategy of the origin country. Indeed, the World Bank is now examining in a substantial way how emigration can be beneficial to the development of poorer, less developed nations (Lucas 2003).

There is clearly great potential for the development and maintenance of scientific networks linking Australian expatriates with colleagues in Australia. There are some quite successful examples of the operation of such networks in other countries. In 1999, an UNESCO study identified 41 expatriate knowledge networks in 30 different countries (Meyer and Brown 1999). An interesting pilot program has come from the University of Sydney of ‘Foundation Return Fellowships’ that offers to expatriate Australians academics the chance to return to an Australian university for short recurring visits (e.g. 2-3 months per year for 5 years). This allows them to maintain full professional connections with Australia, it keeps the door open to an eventual return and allows Australia to benefit from their expertise. The pilot program in early 2003 attracted a large number of applicants.

Conclusion

In late 2003, the Australian Senate’s Legal and Constitutional References Committee set up an *Inquiry Into Australian Expatriates* with the following terms of reference:

- the extent of the diaspora;
- factors driving Australians to live overseas;
- costs, benefits, opportunities;
- needs and concerns of overseas Australians;
- policies/programs in other countries to respond to needs; and

- ways they can be better used to promote Australia's economic, social and cultural interests

It would seem that there is a strong case that Australia should develop a national *diaspora/expatriate policy*. The recognition that in a globalising world a nation's citizens and its human resources will not all be within national borders is only slowly gaining recognition. However, it is clear that in the twenty-first century a rethinking of these issues has begun. This is reflected in the fact that the World Bank is now focusing on emigration, diaspora and remittances as being perhaps the most effective mechanism of north-south technology transfer and wealth distribution. Australia's peripheral position in the emerging global economy has meant that it has experienced high levels of emigration in relation to its population size and as a result it has a substantial and dispersed diaspora. While the potential of diaspora to be a positive factor in national economic and social development is being realised by the World Bank and a handful of 'south' countries, no OECD nations with the exception of Ireland have developed policies and programs to harness this potential. Australia has the opportunity to be a world leader in this area as well as gain significant comparative advantage.

The elements to be included in an Australian diaspora/expatriate policy can be finalised only after wider community consultation and discussion but the following would seem to be relevant from the present study:

- the development of mechanisms for the greater inclusion of the diaspora into the national culture and the encouragement of the expatriate community to identify with and be involved in Australia;
- the protection of the security and the rights of Australians while they are living outside the national boundaries;
- increasing the strength of linkages between the diaspora and Australia, especially business and research linkages;
- increasing the involvement of the diaspora in the national economy; and

- the facilitation and encouragement of return migration.

In the contemporary global situation national prosperity is highly dependent on innovation and the quality of a country's human resources. Accordingly, there is now unprecedented competition among nations in attracting highly skilled workers as permanent or temporary settlers. All of the OECD nations and many outside the organisation now have active immigration policies to attract highly skilled workers. However, in the rush to attract immigrants the issue of attraction of skilled nationals overseas must not be totally overlooked. It is glib to simply state that Australia has a net brain gain so that one can ignore the outflow of skilled young Australians as a simple function of globalisation. Why can't the nation achieve the double bonus of attracting foreign skilled people while also retaining and regaining the best of our own talent? In considering such a policy we should not attempt to block the flow of young talent overseas. Indeed, the stock of skilled Australians overseas could be a major national asset and it may be possible to develop policies to develop and maximise this asset. Yet it is clear from our work that many highly skilled Australians overseas are keen to eventually return to their home country and there may also be policies which can facilitate this process. The possibility of Australia developing an emigration policy which is integrated with immigration policy and wider economic, social and human resources policies needs to be given consideration.

Public debate about emigration unfortunately seems to be polarised between exaggerated and often hysterical fears of 'brain drain' and oversimplified macro-presentations of aggregate immigration and emigration statistics that demonstrate a 'brain gain'. The emigration story is much more complex and nuanced than either of these pictures. This report has opened up some of these complexities and demonstrated that in the contemporary globalising world diasporas are not only growing substantially in size but their potential impacts on their homeland go far beyond the usual depiction of being unambiguously economically harmful (Glass and Choy 2001). Indeed, the analysis presented here would suggest that the most

important priority for Australia is not to initiate programs to stem the outflow of young skilled Australians but rather:

- Fine tuning its immigrant selection system so that we ensure that in the increasing global brain exchange Australia selects the best and most relevant skills for its labour market to counterbalance the outflow. Implicit in this too is that national systems that facilitate the effective absorption of immigrants into the labour market and into society more generally are also of the greatest importance.
- Facilitating the return of expatriate Australians to bring back their enhanced skills and experience so that expatriates become a significant part of the immigrant stream.
- Developing innovative approaches to better incorporating the diaspora into the mainstream of Australian life as well as to develop their potential, economic, social, political and cultural contribution to Australia.

As is the case with public debate relating to international migration in Australia more generally discussion on emigration needs to be more informed by objective reality and less by emotion, bigotry and self interest. We need a more sophisticated knowledge of emigration and its impacts. It is hoped this report is a step in this direction.

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Footnotes

¹ Published on the Southern Cross website:
<http://www.southern-cross-group.org>.

Table 1: National Diasporas in Relation to Resident National Populations

USA:	7 million	– 2.5 percent of national population
Australia:	900,000	– 4.3 percent of national population
New Zealand:	850,000	– 21.9 percent of national population
Philippines:	7.6 million	– 9.4 percent of national population

Source: US Census Bureau, 2002a and b; Southern Cross, 2002; Bedford, 2001; Commission of Filipinos Overseas, personal communication, 4 February 2004

Table 2: Permanent and Long Term Emigration of Australians, 1992-2002

Year	Australia-Born Permanent Departures	Australian Residents Departing on a Long-Term Basis	Total
1992-93	9,803	65,446	75,249
1993-94	9,927	64,786	74,713
1994-95	10,092	68,377	78,469
1995-96	11,005	70,253	81,258
1996-97	11,698	73,777	85,475
1997-98	12,771	79,422	92,193
1998-99	17,250	82,861	100,111
1999-2000	20,234	84,918	105,152
2000-01	23,081	92,945	116,026
2001-02	24,146	92,071	116,217
2002-03	25,578	86,200	111,778

Source: DIMIA, unpublished data

Table 3: Australia: Net Migration of Australian Residents by Long Term Migration and of Australia-Born by Permanent Migration by Age, 2001-02

Age	Long Term (Residents)			Permanent (Australia-Born)		
	In	Out	Net	In	Out	Net
0-4	3,385	4,964	-1,579	171	2,385	-2,214
5-9	4,740	3,810	+930	69	1,637	-1,568
10-14	3,693	2,572	+1,121	76	1,033	-957
15-19	2,834	3,111	-277	46	597	-551
20-24	9,111	14,348	-5,237	30	1,293	-1,263
25-29	19,072	20,543	-1,471	22	3,841	-3,819
30-34	13,008	12,641	+367	12	4,389	-4,377
35-39	9,112	8,616	+496	3	3,012	-3,009
40-44	6,694	6,667	+27	2	2,183	-2,181
45-49	4,925	4,979	-54	2	1,515	-1,513
50-54	4,029	4,229	-200	2	1,132	-1,130
55-59	2,914	2,654	+260	2	639	-637
60-64	1,900	1,291	+609	1	255	-254
65-69	1,349	782	+567	-	121	-121
70-74	988	515	+473	2	73	-71
75+	844	409	+435	3	92	-88
Total	88,598	9,2071	-3,473	443	24,146	-23,703

Source: DIMIA Movements Data Base

Table 4: Percent of Workforce Unemployed, 2002: Australia-Born Permanent Departures, Australian Resident Long Term Arrivals and Departures, Permanent Settler Arrivals and Total Population

	Males	Females
Permanent Departures (Australia-Born)	0.5	1.1
Long Term Departures (Australian-Resident)	0.5	0.6
Permanent Arrivals	6.4	7.6
Long Term Arrivals (Total)	0.9	1.2
Total Population	8.0	6.6

Source: DIMIA Movements Data Base and ABS 2001 Census

Table 5: Percent of Workforce in Managerial, Administrative, Professional and Associate Professional Occupations, 2002

	Males	Females
Permanent Departures (Australia-Born)	77.0	66.3
Long Term Departures (Australian-Resident)	71.0	68.3
Permanent Arrivals	69.5	67.8
Long Term Arrivals (Total)	73.3	66.6
Total Population	40.8	39.1

Source: DIMIA Movements Data Base and ABS 2001 Census

Table 6: Male and Female Respondents by Country of Residence Overseas

Country/Region Currently Living	Number	Percent	Sex Ratios
USA	717	34.6	139.0
UK & Ireland	661	31.9	104.0
Other Europe	206	9.9	131.5
Northeast Asia	110	5.3	175.0
Canada	102	4.9	183.3
Southeast and South Asia	94	4.5	161.1
New Zealand	83	4.0	88.4
Other overseas	56	2.7	80.6
Other Oceania	43	2.1	163.6
Total	2,072	100.0	125.46

Source: Emigration Survey, 2002

Table 7: Selected Characteristics of Respondents by Major Destination Countries

	USA and Canada	UK and Ireland	Asia	Other Overseas	Total
Percent born in Australia	82.8	79.1	78.9	79.1	80.6
Percent with Australian citizenship	81.2	72.9	86.8	78.0	78.5
Percent left Australia 1990-2002	57.0	72.9	71.3	61.5	64.5
Percent aged <35 years	33.8	53.0	28.4	30.7	38.8
Percent male	59.0	51.0	62.7	52.8	55.6
Percent married (including de facto)	74.6	62.0	72.0	70.9	69.6
Percent families with children	36.0	25.9	37.3	35.9	32.9
Percent in the labour force	86.6	92.1	91.6	88.1	89.2
Percent in labour force full-time	90.7	89.5	90.3	88.3	89.8
Percent employed on contracts	16.2	23.6	40.8	28.9	23.5
Percent employed as professionals	86.5	90.9	90.8	89.1	88.9
Percent with postgraduate degree	47.2	34.0	42.6	42.9	41.7
Percent home owners	51.4	39.3	24.5	40.5	42.9
Percent Incomes >AUS\$200,000+	29.6	16.0	24.4	12.1	21.5

Source: Emigration Survey, 2002

Table 8: Industry Sector of Employed Male and Female Respondents

Industry Sector	Males (Percent)	Females (Percent)	Persons (Percent)
Education	24.4	26.2	25.1
Property and Business	18.1	20.4	19.1
Health and Community Services	7.3	16.4	11.1
Finance and Insurance	12.5	7.2	10.3
Manufacturing, Construction	11.6	6.3	9.4
Personal Services/Trade	8.4	10.5	9.3
Transport and Communication	8.1	6.7	7.5
Agriculture, Mining	5.7	3.3	4.7
Government/Defence	3.8	2.9	3.4
Total response	100.0 (n=1070)	100.0 (n=760)	100.0 (n=1830)

Source: Emigration Survey, 2002

Table 9: Reasons Given by Male and Female Respondents for Emigration (Percentage Indicating 'Yes' to a List of Specified Reasons)

Reasons Ranked by Popularity of Total Response	Males (n=1153)	Females (n=919)	Persons (n=2070)
Better Employment Opportunities	49.3	34.2	42.6
Professional Development	42.9	27.4	36.1
Higher Income	38.2	25.1	32.4
Promotion/Career Advancement	28.9	17.2	23.7
Lifestyle	22.2	23.8	22.9
Marriage/Partnership	17.0	29.1	22.3
Overseas Job Transfer	23.1	14.7	19.4
Education/Study	16.0	12.5	14.5
Partner's Employment	4.6	21.4	12.1
To be Close to Family/Friends	4.4	7.0	5.6
To Establish/Expand Business	4.3	.8	2.8
Separation/Divorce	1.2	2.1	1.6

Source: Emigration Survey, 2002

Table 10: Response Given by Male and Female Respondents to ‘Still Call Australia Home’

Still Call Australia Home	Males (Percent)	Females (Percent)	Persons
Yes	75.1	84.7	79.3
No	20.2	12.3	16.7
Undecided	4.7	3.0	4.0
Total	100.0 n=1153	100.0 n=919	100.0 n=2072

Source: Emigration Survey, 2002

Table 11: Reasons Given for Benefits to Australia for Presence Overseas by Males and Females (n=1650) (Percentage Indicating ‘Yes’ to a List of Specified Reasons)

Benefits to Australia of Being Overseas(Ranked by Popularity of Total Response)	Males (n=927)	Females (n=723)	Persons (n=1650)
Creating goodwill towards Australia	70.4	67.8	69.3
Skills transferable back to Australia	64.6	66.8	65.6
Contacts useful for other Australians	56.2	54.4	53.2
Linking two countries together	44.4	48.4	46.2
Creating business/trading links with Australian companies	26.3	13.0	2.5

Source: Emigration Survey, 2002

Table 12: Intentions of Male and Female Respondents to Return to Australia to Live

Intention to Return	Males (Percent)	Females (Percent)	Persons
Yes	50.0	51.6	50.7
No	19.3	14.6	17.2
Undecided	30.8	33.8	32.1
Total	100.0 n=1153	100.0 n=919	100.0 n=2072

Source: Emigration Survey, 2002

Table 13: Reasons Given by Male and Female Respondents Who Stated That They Were Undecided or Not Intending to Return to Australia to Live (n=1022) (Percentage Indicating 'Yes' to a List of Specified Reasons)

Reasons Ranked by Popularity of Total Response	Males	Females	Persons
Better employment opportunities here	51.5	37.5	45.4
Established in current location	44.5	36.2	40.9
Career and promotional opportunities here	45.9	34.2	40.8
Higher income here	46.3	32.8	40.4
Marriage/partnership keeps me here	34.0	43.1	38.6
Lifestyle more attractive here	32.4	28.3	30.6
Partners employment here	18.0	37.3	26.4
Family/friends here	25.0	24.7	24.9
More favourable personal income tax regime here	28.6	15.7	23.0
Children grown up here	22.7	22.9	22.8
No equivalent jobs in Australia	19.8	14.2	17.3
Cost of relocating back to Australia	15.1	19.1	16.8
Business opportunities here	22.0	9.2	16.4
Better educational institutions for training here	6.6	8.5	7.4
Better employer and work based training here	6.6	6.5	6.6
More favourable business tax regime here	8.7	2.5	6.0
Custody of children	2.4	3.1	2.7

Source: Emigration Survey, 2002

Figure 1: Australian Citizens Living broad, 31 December 2001

Source: Southern Cross, 2002

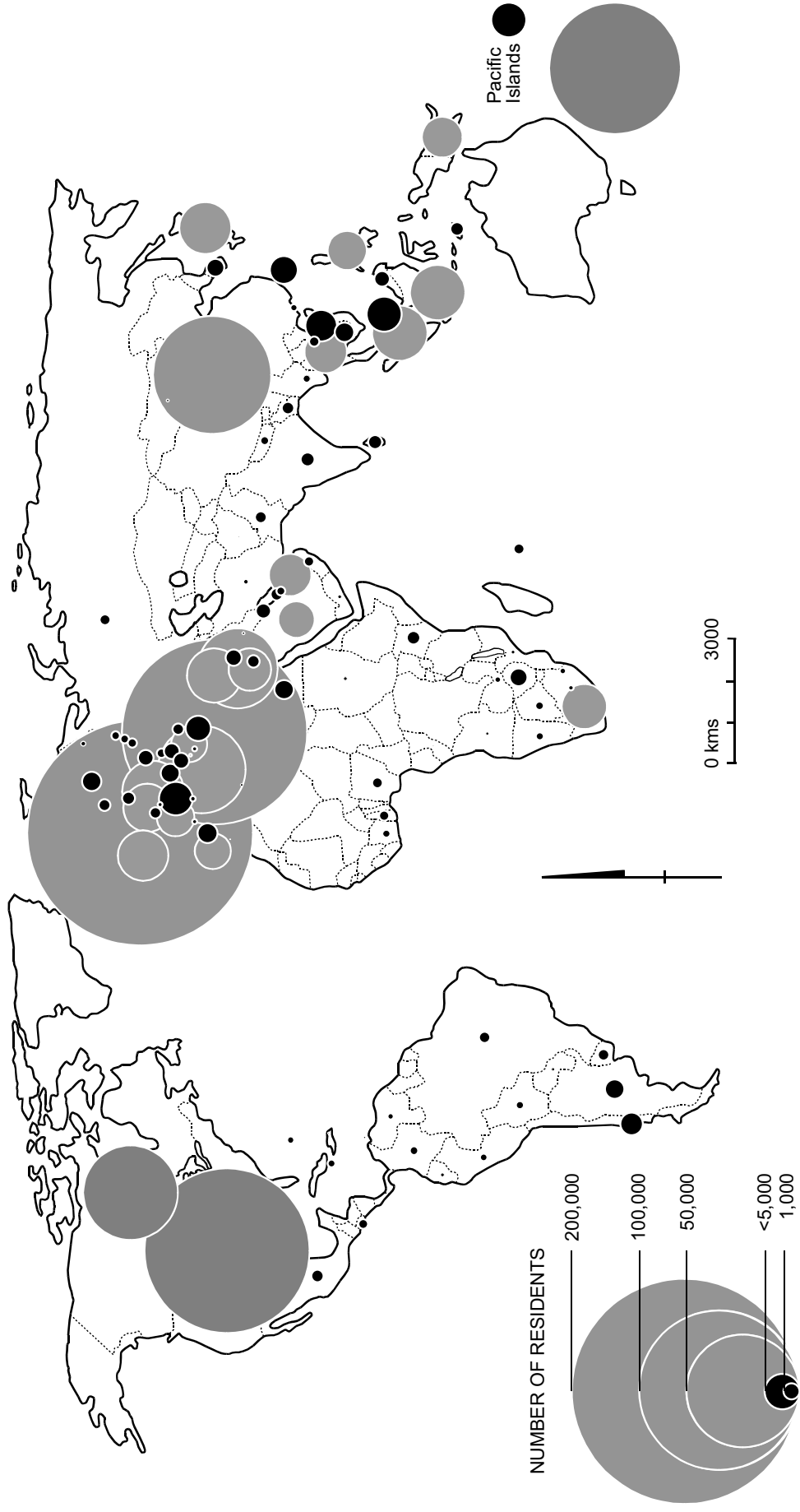
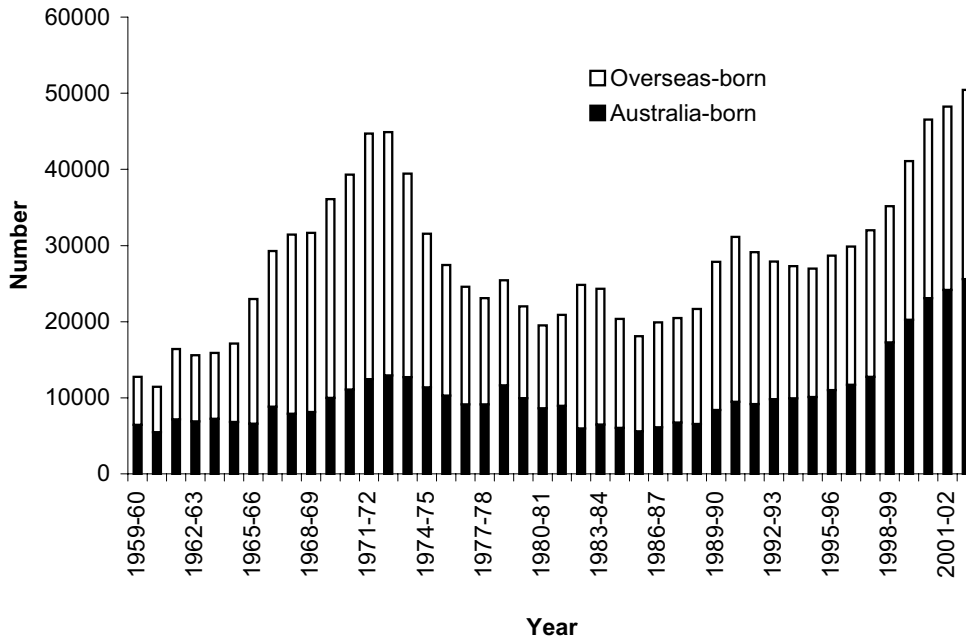
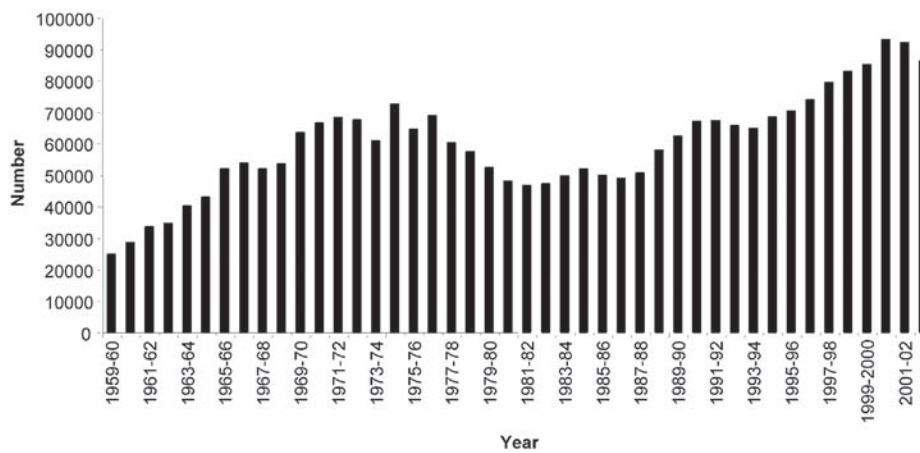


Figure 2: Permanent Departures of Australia-Born and Overseas-Born Persons from Australia, 1959-60 to 2002-3



Source: DIMIA, *Australian Immigration Consolidated Statistics and Immigration Update*, various issues; DIMIA unpublished data

Figure 3: Australian Resident Long Term Departures from Australia, 1959-60 to 2002-03



Source: DIMIA, *Australian Immigration Consolidated Statistics and Immigration Update*, various issues; DIMIA unpublished data