

8

Higher Education and the Labour Force

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Macao and Hong Kong have greatly benefited from economic links between China and other countries, acting as entrepôts and service bases for foreign investments. During the restructuring of their economies from dominance of manufacturing to dominance of services, a large supply of highly educated personnel was needed. Recently, the governments of both Special Administrative Regions (SARs) signed agreements for Closer Economic Partnership Arrangement (CEPA) with the national government in Beijing. These agreements aimed to forge even stronger economic cooperation between the two SARs and mainland China.

In Macao, educational enrolments expanded rapidly after the late 1980s. However, the need for overseas graduates remained strong because of the previous neglect of local higher education, and because of constraints in the number of specialist forms of training which could be offered in a small society. The main destinations for Macao's external students were mainland China and Taiwan. Hong Kong had greater training capacity than Macao, but even in Hong Kong local universities met less than 60 per cent of the territory's needs for highly educated personnel. Hong Kong depended on North America, the United Kingdom (UK), Taiwan and Australia for much higher education and training.

This chapter begins with a broad conceptual framework which shows why Macao and Hong Kong are instructive places for study and comparison of links between education and the labour force. Discussion then turns to the development of Macao's economy, the effects of that development, and the supply of skilled personnel. The chapter then provides similar commentary on Hong Kong, which sets the stage for identification of similarities and differences. The final section draws out the conceptual implications of the analysis.

Education, Development and Technological Change

Concerning the general relationship between the economy and education, a widespread perspective is that the investment of public money in 'human capital' is the one of best ways to promote economic development (McMahon 2002; Little 2003). Many human capital theorists (e.g. Becker 1975; Psacharopoulos 1995; Psacharopoulos & Patrinos 2002) have investigated the contribution of education to economic growth, and have endeavoured to measure rates of return to schooling. These theorists have focused on inputs and outputs, rather than on what actually happens in the processes of education.

Such analysts have also emphasised the value of systematic predictions of demand for skills. Manpower planning has been linked to educational provision with the goal of maximising rates of return from investment in human capital. In many situations, manpower planning has led to expansion of investment in tertiary and technical education (Maglen 1993; Bray 2004a). However, an alternative set of explanations for economic progress emphasises cultural forces. In East Asia, analysts have focused on the Confucian ethic, which is believed to have fuelled and motivated both labour and management (Tai 1989).

Most advanced industrial countries have moved from economies largely based on manufacturing to economies largely based on services. This change has affected demands on education and training systems. In general, skill requirements are higher in the service sector than in the manufacturing sector. Harris (1995) pointed out that more highly educated labour produces more output, and that the larger the stock of human capital, the more likely labour will find ways to improve production processes and to develop new and profitable products.

In both Hong Kong and Macao, the existence of a literate and numerate workforce has contributed to economic development (Bray 1995a; Sweeting 1995). However, as the second half of the 20th century progressed, mere literacy and numeracy rapidly ceased to be an adequate underpinning for continued growth. One new element became the link between technology and education. Carnoy's (1995) review of the effects of information technology highlighted the increased demand for highly skilled labour because of the more complex requirements of information systems and flexible production. Carnoy further pointed out that intensified global competition and the development of new information technologies altered the international division of labour. Competition in the production of the most advanced technologies sharply increased among the highly industrialised economies, shifting manufacturing jobs from these economies to a group of newly developing countries in Asia and elsewhere. Training of highly skilled labour became an important public policy issue in both industrialised and less developed economies.

Although Macao and Hong Kong both had fast-growing economies during the 1980s and 1990s, their governments' higher education and skill-training policies were rather different. Comparison brings into focus questions about the quantity of higher education, the types of higher education, and its planning. The labour market in each place has differed significantly. Hong Kong moved from an economy largely based on manufacturing in the 1970s to an economy largely based on tourism and other services in the 1980s. It then moved again in the 1990s to an economy strongly based on financial services. Macao's economy has also depended on tourism, but it has a large gambling sector not found in Hong Kong. Since skill requirements are generally higher in the service sector than in the manufacturing sector, the growth of service employment has tended to increase the average skill demands of work. These and other patterns are best discerned by considering each territory in turn.

Macao

The Economy and Labour Force

According to government statistics, the real average annual growth rate of Gross Domestic Product (GDP) in Macao rose from 5.7 per cent in 1986, reached a peak of 13.4 per cent in 1992, dropped to negative figures in 1996, and again increased slightly to positive figures in 2002 (Table 8.1). The main factor in growth was a construction boom in 1992 and 1993. A surge in public investment helped to sustain GDP growth early in the decade, but after the completion of Macao's airport fixed investment dropped. In 2002, tourism and gambling together accounted for 40 per cent of Macao's GDP and over 70 per cent of government revenue. Manufacturing output, largely textiles and clothing, accounted for about a third of GDP.

Table 8.1: Major Economic Indicators, Macao, 1986-2002

	1986	1990	1992	1994	1996	1998	2000	2002
Real GDP growth %	5.7	5.0	13.3	4.6	-0.4	-7.1	4.6	9.5
Population (thousand)	426	340	381	410	416	425	431	441
Consumer price inflation %	1.9	9.6	7.7	6.3	6.5	n.a.	-1.6	-2.6
Exports MOP million	8,630	13,638	14,080	14,854	15,898	17,083	20,380	18,925
Imports MOP million	7,318	12,343	15,684	16,925	15,930	15,596	18,097	20,323
Trade balance MOP million	1,312	1,295	-1,604	-2,071	-32	1,487	2,282	-1,398

Sources: Macao, Department of Statistics & Census, *Yearbook of Statistics*, various years.

During the 1980s, diversification of exports had short-lived success. Toys, artificial flowers, textiles and garments were the major export products to the USA and the European Union in the mid-1990s. Textiles and apparel were still locked in by the requirements of the Multi-Fibre Arrangement (MFA). With the phasing out of the MFA, the textile industry faced difficulties. Toy exports resumed their long-term decline in 1995, but footwear exports showed a steady increase. Electronics showed the best performance, but demand then fell, especially for computer components in the USA and the European Union. To promote domestic economic growth, the government formulated various strategies including increased infrastructure investment through public funding, reform of the gambling industry, and development of Macao's tourist appeal through large scale cultural and sport activities.

In 1996, 206,000 people, representing 66.7 per cent of the population, were said to be economically active. This was a proportionate as well as an absolute increase on the situation in the 1980s, though the figure declined again to 62.3 per cent in 2002 (Table 8.2). These figures included an estimate of the many outside workers on short-term contracts. Unemployment was moderate at 4.3 per cent in 1996, but reached 6.8 per cent in 2000 and remained high in the following years. Manufacturing, hotels, restaurants and personal services were the largest employers. As the structure changed among the various sectors, between 1989 and 2002 the proportion of workers in manufacturing declined from 35.9 to 20.4 per cent, but the share of workers in service sectors (restaurants & hotels, financial & business services, and public, social & private

services) grew from 47.8 to 50.8 per cent. Less than 0.1 per cent of the labour force was employed in primary industries. The median monthly earnings of workers reached a peak of MOP5,050 in 1998 but dropped to MOP4,670 in 2002.

Table 8.2: Macao Labour Force Characteristics, 1981-2002

	1981	1989	1994	1996	1998	2000	2002
Labour force participation rate (%)	n.a.	50.8	63.9	66.7	65.3	64.3	62.3
Unemployment rate (%)	n.a.	1.5	2.5	4.3	4.6	6.8	6.3
Median monthly earnings (MOP)	1,741	2,382	4,476	4,925	5,050	4,822	4,672
Share of employment (%)							
Manufacturing	45.0	35.9	22.9	20.6	21.1	19.4	20.4
Construction	8.0	9.6	7.5	7.5	10.4	8.3	7.5
Restaurants & hotels	18.5	19.0	26.1	27.5	11.5	10.8	11.5
Financial & business services	1.7	4.0	6.3	6.6	6.9	8.9	8.5
Public, social & private services	15.4	24.8	30.4	30.5	32.1	31.7	30.8
Others	11.4	6.6	6.8	7.3	n.a.	n.a.	n.a.
Cultural recreation, gambling & other services	n.a.	n.a.	n.a.	n.a.	10.0	11.0	11.5

Note: Data after 1998 are not totally comparable with those in and before 1998 because industries were classified differently.

Source: Macao, Department of Statistics & Census, *Yearbook of Statistics*, various years.

A 1994 survey showed that 44.9 per cent of Macao's employed persons had attained only primary education, and that 44.7 per cent had attained only secondary education. Just 4.9 per cent possessed university degrees, and another 1.7 per cent had non-degree tertiary qualifications (Macao, Direcção dos Serviços de Estatística e Censos 1994, p.98). In 2001, 31,425 persons, or 7.4 per cent of Macao's employed population, held higher education qualifications (Macao, Public Administration & Civil Service Bureau 2002). The figures showed that the stock of higher education qualifications was still very low, and that more resources were needed for training of vocational, technical and professional workers. Moreover, Feitor & Cremer (1991) and Sit et al. (1991) pointed out that some holders of tertiary qualifications were not working in sectors which made use of those qualifications. Many immigrants had gained their qualifications in mainland China and elsewhere from institutions which were not recognised by the Macao authorities, and therefore had to adjust to labour-market niches which did not use their formal qualifications.

The civil service also needed more local personnel with appropriate skills, especially to replace the Portuguese expatriates in the top echelons and to reduce the over-representation of Macanese (mixed-race Portuguese-Chinese) in middle-level positions. During the period of political transition between 1987 and 1999, the Macao government greatly increased local recruitment and promotion in the civil service. The goal was to meet the requirements of the Sino-Portuguese Joint Declaration and the Basic Law, which indicated that the government of the Macao SAR would be composed of local inhabitants and that the principal officials would be Chinese citizens who had been permanent residents of Macao for at least 15 years. Hence the supply of qualified

local top-ranking administrators was an emergency issue for the Macao government. As shown in Table 8.3, the pace of localisation had been slow between 1987 and 1992. However, the proportion of locally-born people in top ranking positions increased from 43.7 per cent in 1992 to 75.8 per cent in 1999, and the proportion of people born in Portugal declined from 45.4 to 6.3 per cent in 1999. This was a remarkable change, though continued attention to higher education and training was still needed because in 2002 over 17 per cent of top ranking officials did not hold higher education qualifications (Macao, Direcção dos Serviços de Administração e Função Pública 2004).

Table 8.3: *Place of Birth of Top-ranking Civil Servants, 1987-99 (%)*

Year	Place of birth			Total
	Macao	Portugal	Others	
1987	48.6	42.4	9.0	100.0
1989	44.6	44.9	10.5	100.0
1992	43.7	45.4	10.9	100.0
1994	55.5	33.1	11.4	100.0
1999	75.8	6.3	17.9	100.0

Source: Macao, Government of, *Human Resources in the Macao Public Administration*, various years.

Stock of Highly-Educated Personnel

The foundation of the University of East Asia (UEA) in 1981 gave Macao a university for the first time in the modern period. In 1988, the university was purchased by the Macao Foundation with funds provided by the government. In 1991 the UEA was renamed the University of Macau, and it has since operated as an autonomous, not-for-profit public institution. In the early 1990s, the university was joined by two other institutions of higher education: the Asia International Open University (AIOU) and the Macao Polytechnic Institute. All courses were employment-oriented, and included both two-year, full-time diploma programmes and three-year bacharelato (professional degree) programmes. By 2002, Macao had 12 higher education institutions under different modes of financing. The four public institutions were the University of Macau, the Macao Polytechnic Institute, the Institute for Tourism Studies, and the Macao Security Force Superior School. The eight private institutions were the AIOU, the Inter-University Institute of Macau, the Kiang Wu Nursing College of Macau, the Macau Institute of Management, the Macau Millennium College, the Macao University of Science & Technology, and the United Nations University International Institute for Software Technology (Bray et al. 2002).

Before 1981, all personnel with higher education had obtained their qualifications abroad. Even in the late 1990s, external sources provided the greatest supply of skilled personnel in Macao, and it is likely that this will continue to be the case. No official statistics were compiled on the number of Macao citizens studying abroad, but information was available on the number of official scholarships for external study. The government commenced provision of such scholarships in 1981. At first the main intention was to support Macao students for study in Portugal; but in 1983 the scheme

was extended to include studies in Macao, and in 1991 the scheme was further extended to provide loans and grants for overseas study (Rangel 1991; Bray 1993). Table 8.4 shows that the number of Macao students receiving assistance had increased markedly since 1981/82. The number of students who went to Portugal was always modest and peaked in 1991/92. However, larger numbers went to mainland China and Taiwan, and those numbers continued to rise as the 1990s progressed. Particularly dramatic was the increase in the numbers going to mainland China, from 17 in 1981/82 to 1,130 in 1999/00, though the figure fell to 891 in 2002/03. A large proportion of Macao secondary schools used Chinese as the medium of instruction, and mainland China became a politically more acceptable destination for study. Also, universities in mainland China and Taiwan were generally less expensive than universities in English-speaking countries. The numbers of Macao students in Hong Kong were always modest, chiefly because Hong Kong institutions were unwilling to allocate places. As the 1990s progressed Hong Kong's tertiary sector expanded, but the numbers of Macao students fell because they had alternative destinations.

Table 8.4: Numbers of Macao Students Receiving Government Assistance, by Place of Study, 1981/82-2002/03

Destination	1981/82	1984/85	1987/88	1990/91	1993/94	1996/97	1999/00	2002/03
Macao	0	23	178	716	1,092	1,023	1,208	1,651
Mainland China	17	31	128	210	313	745	1,130	891
Portugal	54	86	74	91	68	55	36	12
Hong Kong	8	21	32	22	17	4	8	9
Taiwan	25	141	252	338	432	575	475	465
USA	1	10	34	30	17	18	26	17
Canada	0	10	14	9	0	2	4	4
Australia	0	2	6	10	0	4	9	7
Others	4	9	13	5	6	8	9	5
Sub-total	109	310	553	715	853	1,411	1,697	1,410
Total	109	333	731	1,431	1,945	2,434	2,905	3,061

Source: www.dsej.gov.mo.

While these figures are an indicator of the numbers of students going abroad, statistics were not available on the numbers who chose not to return home, or who chose to work in fields other than those for which they had been trained. Planners thus faced major difficulties in getting the balances right when trying to match supply with demand. The task for planners in small economies is even more difficult than for their counterparts in larger societies, because the arithmetic demands such fine tuning (Bray 1992c; Bray & Kwo 2003). Small size also requires a different approach to training. Even in the long run, it is not conceivable that Macao will provide local training in all specialisms that will be needed by the economy. This contrasts with mainland China, for example, which is so huge that whole universities can be devoted specifically to agriculture, medicine, aeronautics, and various other specialisms. Small states may also find it more sensible for specific tasks, particularly ones with short durations, to recruit expatriates who are already skilled rather than to try to train locals.

Characteristics of University Graduates

In the absence of detailed figures on courses of study by local and external students, it is not easy to be precise about changing patterns. Nevertheless, some data are available from a 1993 study of university graduates in Macao (Ma 1994). Also, data have been compiled by some host countries in which Macao citizens are studying.

These studies indicate that business was the most popular specialisation both in Macao and abroad, though the popularity of other courses differed according to the destination of students. Ma's (1994) survey of local graduates indicated that 57.8 per cent had studied business, 18.8 per cent science and computer science, and 15.6 per cent arts and social science (Table 8.5). On the other hand, one quarter of the external graduates had chosen business administration, 22.2 per cent had studied engineering, and 19.3 had chosen science or computer science. The 1996 and 2002 surveys of Macao students in Australia showed a similar pattern: around one third to half of students had chosen business administration, 18 to 26 per cent had chosen science or computer science, and 10 to 17 per cent had chosen engineering.

Table 8.5: Macao Local and External University Graduates and University Students in Australia by Courses of Study (%)

Courses of study	Survey in 1993		Student enrolment in Australia	
	Local	External	1996	2002
Architecture/Building	0	0	6.3	2.5
Arts, Humanities & Social Science	15.6	12.5	6.3	3.8
Business Admin. & Economics	57.8	25.0	47.6	37.8
Education	0.0	1.9	0.8	2.1
Engineering	0.0	22.2	16.7	9.8
Health, Community Services	0.0	0.0	3.2	11.1
Science, Computer Science	18.8	19.3	18.3	25.7
Law	0.0	1.8	0.0	0.0
Others	7.8	17.3	0.8	7.2
Total	100.0	100.0	100.0	100.0

Note: The 1993 survey assumed that the respondents were local Macao people, because only Macao residents were included. The survey used a questionnaire to collect information about local and overseas university graduates in the local labour market. Out of 1,407 sent questionnaires for which mailing addresses were supplied by the government, 212 responded. Zero in this table means that there was no such sample in the surveys.

Sources: Ma (1994); Australia, Department of Employment, Education, Training & Youth Affairs (1997; 2003).

The survey of university graduates in Macao (Ma 1994) showed that professional, technical, administrative or managerial positions seemed to be the target for the majority (67 per cent of local graduates and 71 per cent of external graduates). Only a small proportion were attracted by clerical, agricultural, production and related jobs. Figures for the first and present jobs showed movement to the government sector by both local and external graduates (local from 12 to 27 per cent, and external from 16 to 46 per

cent). Graduates generally preferred the government to the private sector. Data on salaries revealed that 27 per cent of external graduates earned more than MOP300,000 per annum, with 23 per cent of them earning over MOP500,000 per annum. Table 8.2 showed median monthly earnings in 1994 of MOP4,476 or MOP53,712 per annum. Thus the university graduates enjoyed substantially higher salaries than the general workforce.

Hong Kong

The Hong Kong Economy and Labour Force

During the 1980s and 1990s, the Hong Kong economy shifted significantly from manufacturing to services (Table 8.6). In 1981, manufacturing industries employed 42.6 per cent of the labour force; but by 2002 the proportion had declined to 8.1 per cent. In contrast, the employment share of service industries, which included restaurants, hotels, financial & business services, and community, social & personal services, increased from 40.1 per cent in 1981 to 80.8 per cent in 2002.

Table 8.6: Hong Kong Labour Force Characteristics, 1981-2002 (%)

	1981	1986	1991	1995	2001	2002
Labour force participation rate	66.3	65.1	63.5	62.0	61.5	62.0
Unemployment rate	3.9	2.8	1.8	3.2	5.1	7.3
Share of employment						
Manufacturing	42.6	35.8	26.0	18.4	8.9	8.1
Construction	8.2	6.2	8.2	7.9	3.4	2.9
Restaurants and hotels	19.8	22.3	26.6	28.4	43.6	43.5
Financial & business services	4.9	6.4	8.3	11.8	19.0	19.5
Community, social & private services	15.9	18.4	19.5	21.0	16.8	17.8
Others	8.6	10.9	11.4	12.5	8.3	8.2

Source: Hong Kong, Census & Statistics Department, various years.

At the same time, a general upgrading of the occupational structure within individual industries was anticipated, shifting the employment demand in favour of highly skilled workers. Administrative & managerial workers and professional, technical & related workers were expected to account for increasing shares of employment across industries. Upgrading of occupational structure was expected in other services, and even within the declining manufacturing industries.

The rapid growth of employment in highly skilled jobs was expected to increase demand for better educated workers, in particular those with university education (see Table 8.7). While only 6.2 per cent of those employed in 1991 were graduates, 14 per cent of the workforce was expected to need a first degree or higher qualifications by 2005. Global and local events in the initial years of the 21st century changed the scenario from that which had been projected, but the general trend of upgrading workers to more skilled and knowledgeable levels was still expected to account for increasing shares of workers across employment sectors.

Table 8.7: Employed Persons by Educational Level, Hong Kong (Thousands)

	1991		1996		2001*		2005*	
	No.	%	No.	%	No.	%	No.	%
Lower secondary or below	1,469.6	53.3	1,484.3	49.9	1,410.8	45.4	1,202	36
Upper sec. & matriculation	949.0	34.4	1,021.9	34.4	1,080.8	34.8	1,120	33
Craft level	13.1	0.5	25.7	0.9	3.4	1.1	32	1
Technician level	46.0	1.7	64.3	2.1	80.1	2.6	n.a.	n.a.
Non-degree	106.8	3.9	43.2	4.8	180.2	5.8	536	16
First degree & above	173.0	6.2	235.4	7.9	320.8	10.3	485	14
All levels	2,757.5	100.0	2,974.8	100.0	3,106.1	100.0	3,375	100.0

* projected

Source: Hong Kong, Education & Manpower Branch (1994); Hong Kong, Education & Manpower Bureau (2000).

Compared with Macao, the pace of localisation of the civil service had been more effective. The Hong Kong government began a strong localisation policy in the 1980s. It would only consider non-local recruitment if no suitable local candidates were available, and even then expatriates were only recruited on contract terms. Of directorate officers, the most senior ranks in government, the share of local appointees was 62 per cent in 1991. At the secretariat level, nine of the 16 Secretaries were locals (A.B.L. Cheung 1991). At the end of 1995, only three branches or departments were headed by non-local officers. Localisation of the Hong Kong policy secretary team and department heads was basically completed in 1995 (K.K. Leung 1995).

The Stock of Higher Education Graduates

According to census data, in 1995 19 per cent of Hong Kong's working population held higher education qualifications (Table 8.8). This was about the same level as Taiwan, but was substantially higher than Macao. On the other hand, the stock of graduates in Hong Kong was considerably lower than that in Australia and the USA.

Table 8.8: Working Population with Higher Education Qualifications

	Hong Kong	Macao	Taiwan	Australia	USA
Year	1995	1995	1995	1994	1995
%	19.0	5.5	20.6	49.1	56.1

Sources: Australia, Bureau of Statistics (1994) p.5; US Bureau of the Census (1996) Section 13, no.618, p.395; Hong Kong, Census & Statistics Department (1996), p.18; Taiwan, Director General of Budget, Accounting & Statistics (1996), p.55; Koo (1997), p.229.

This situation partly reflected the fact that local university education was very restricted until the mid-1980s. However, restricted local supply was eased by an outflow of Hong Kong students for university studies elsewhere. The most popular destinations

were Australia, Canada, Taiwan, the UK and the USA. In 1975, 26,206 Hong Kong students were studying in these locations – a figure which was more than twice the number of students in local tertiary education (Table 8.9). By 1994 the proportion had changed, but these five destinations still hosted 42,650 Hong Kong students, who were equivalent in number to 80 per cent of full-time tertiary students in Hong Kong. In 1998, the overall number of Hong Kong overseas students dropped to the level of the early 1990s and then slightly increased to around 40,000 in 2000.

Most Hong Kong overseas students went to English-speaking industrialised countries. The main reason was that they had competence in English from their schooling in Hong Kong, and considered it a valuable language in which to gain further competence. Industrialised countries had more prestige than less developed countries, and some courses provided skills that could not be obtained in local universities. Some industrialised countries vigorously marketed their services in Hong Kong. This is the major explanation for the large numbers of students in Australia.

Table 8.9: Enrolments of Hong Kong Tertiary Students, Various Countries, 1975-2000

	1975	1984	1986	1988	1990	1992	1994	1998	2000
Australia	572	1,658	1,687	1,889	*3,864	*6,707	*11,932	17,135	20,739
Canada	6,644	7,723	6,730	5,840	6,372	6,600	+6,589	5,000	5,000
Taiwan	2,626	3,817	#3,854	3,850	3,633	3,450	2,663	1,487	1,171
UK	4,434	6,500	6,935	7,300	7,700	7,600	7,400	5,450	5,200
USA	11,930	9,000	9,720	9,160	12,630	14,018	12,940	8,730	7,545
Sub-total	26,206	28,698	28,926	28,043	34,199	38,375	41,524	37,752	39,455
Local enrolment	11,575	21,538	25,995	29,591	34,556	42,721	52,494	59,528	59,408

* Full-fee Overseas Students; + figures for 1992/93 only; # applies to 1987

Notes: (1) Local enrolment refers to the enrolments on full-time courses in institutions funded by the University [& Polytechnic] Grants Committee. (2) Figures for mainland China are not shown because before 1994, the number of Hong Kong students in mainland China was small compared to other countries.

Sources: The British Council, *Statistics of Students from Overseas in the United Kingdom*; Hong Kong, Census & Statistics Department, *Hong Kong Annual Digest of Statistics*; Australia, Department of Employment, Education & Training, *Overseas Student Statistics*; United Kingdom, Department of Education & Science, *Statistics on Education*; Institute of International Education, *Open Doors*; Taiwan, Ministry of Education, *Educational Statistics of the Republic of China*.

Through comparison with other societies, policy-makers may gain insights into the functioning of their own societies. Economically advanced countries, such as Australia and the USA stand out for the fact that 50 per cent or more of their workers have higher education qualifications. During the mid-1990s, about one-fifth of employed persons in Hong Kong and Taiwan had higher education qualifications.

Rates of Return

Psacharopoulos (1994), McMahon (2002) and others have argued that the concept of

rates of return in education may be an important guide for decision makers in allocating resources to education by different levels. Advocates of rate of return analysis suggest that both private and social rates of return should be considered. The former views the calculation from the viewpoint of the individual, whereas the latter views the calculation from the viewpoint of the whole society. When societies subsidise education, individuals get the benefit of education without having paid the full cost. In this case, the private rate of return is higher than the social rate, unless individuals have to pay very heavy taxes on their extra earnings.

However, rate of return analysis in education has been subjected to criticism (e.g. Bennell 1996; 1998). Among the criticisms are:

- The rates are calculated on past data. They are not necessarily a good guide to the future.
- It is not always clear how much differences in earnings can be attributed to differences in education, and how much is due to other factors such as natural ability, socio-economic background, and labour force status.
- Some figures were not gained from a large or representative samples across all economic sectors and geographical locations.

Moreover for Macao, no detailed studies were available. In Hong Kong the most recent data during the late 1990s were from a study using Hong Kong Census and By-census data sets to estimate rates of return to various education qualifications (Hong Kong, Education & Manpower Bureau, 1999). Both the private and social rates of return to first degree had experienced an increase in the 1980s but started to decline in the late 1990s, which might be a result of the fast expansion in higher education from the late 1980s to the early 1990s (Table 8.10). Most of the estimated social rates of return to education were close to 10 per cent – a very attractive return to investment – and both the private and social rates of return were generally higher than those for OECD countries. In part because of these high returns demand for university education in Hong Kong remained strong in the late 1990s.

Table 8.10: Rates of Return to Education in Hong Kong (First Degree over Matriculation Level) %, 1981-96

	1981	1986	1991	1996
Private	13.5	16.0	19.6	14.5
Social	9.3	9.9	12.1	10.0

Source: Hong Kong, Education & Manpower Bureau (1999), Tables A.3.1, A.3.2.

Nevertheless, it was clear that in Macao arts graduates generally enjoyed high earnings compared with graduates in other disciplines. Overseas graduates in this category tended to be at the upper end of the income range. One reason may have been that the category included some Macao Portuguese who had studied overseas and then entered high ranks in the government sector. In general, the average annual earnings of overseas graduates were 16 per cent higher than those of the local graduates. However, patterns varied in different occupations.

The situation in Hong Kong appeared somewhat different. Overall, overseas graduates had lower earnings than local graduates: 24 per cent lower in 1986, and 14 per cent lower in 1991. However, differences in earnings depended on fields of study and employment. Generally, overseas graduates had lower earnings in professional fields such as medicine and education. They had higher earnings in computer studies, construction, civil engineering, accountancy, business, and finance. Differences were more pronounced in 1991 than in 1986 (Chung & Ma 1997). Furthermore, 1986 data showed that male overseas and local graduates working for the government had earnings about 38 per cent higher than their counterparts in private sector, while overseas graduates working in the same sector had an earnings advantage of only 17 per cent.

Neoclassical economic theory assumes that shortages or surpluses of manpower are only temporary, and that in the long run the labour market operates in equilibrium. Competition in the labour market for limited expertise will tend to increase wages. As wages rise, the quantity demanded falls since employers substitute other types of expertise or other factors of production. Then the system reaches a short-run equilibrium stage. At the same time, the high wage rate increases the supply of skilled personnel. The adjustment process continues until the system is in long-run equilibrium with a new wage rate and employment level (Ahmad & Blaug 1973; Hinchliffe 1995). In both Hong Kong and Macao, overseas graduates in construction, civil engineering and computer studies may have had short term benefits from the massive airports constructed in each territory during the 1990s. The airports demanded outside connections, international standards and high technology. In such aspects, Hong Kong and Macao needed professionals from overseas or with overseas higher education qualification in those areas. However, this was not a sustained need.

In the real world, moreover, many inflexibilities and rigidities obstruct the efficient operation of markets. The government may use monetary incentives to bring about equilibrium in the labour market. Paying higher salary to attract expatriates and overseas graduates to return to Hong Kong has been one government policy to meet the needs of labour market. Other strategies include protection of the market by local professional bodies for medical practitioners, architects, engineers, etc..

Conclusions

What conclusions can be drawn concerning the pool of skills in the two territories? Higher education in Macao expanded rapidly during the late 1990s and immediately after the change of sovereignty. The sector included many private institutions, and even the public ones were closely tied to the demands of the market (Bray et al. 2002). The increased supply caused the volume of higher education to resemble that in Hong Kong. To meet future needs, government may consider carrying out periodic manpower surveys. This would provide more information for decision-makers to reduce the imbalance between labour supply and demand, such as an expansion or contraction of the public sector, the adaptability of skills in one occupation to another, and the mobility of the labour force.

Turning to Hong Kong, previous analysis suggests that workers will require higher skills to cope with their jobs as the economy becomes more knowledge- and technology-intensive. Hence there will be heavy demand for higher educational qualifications. Overseas sources of supply are subject to a number of factors, including

economic and political conditions both locally and overseas. Any change in these factors will affect these inflows of graduate workers. Countries experiencing political uncertainty are likely to lose particularly large numbers of students overseas. Estimates showed that the proportion of overseas graduates who returned to Hong Kong was quite high, ranging from 72 per cent between 1962 and 1976 to over 90 per cent in 1994 (Huang 1988; Hong Kong, Education & Manpower Branch 1994).

The motives for migration of students and highly skilled workers are complex. For the case of Hong Kong, it is clear that the higher the level of education, the higher the tendency to emigrate. The major reason is that well-educated people have a better knowledge of the consequences of emigration, and are more adaptable to life in foreign countries, partly because of their better language skills. Also, the tendency to emigrate increases with income.

The demand for highly skilled workers has been on the rise since the 1970s. In the future, Hong Kong will continue to expand the rail network in the north-west of the New Territories. This will require many professionals in the fields of construction and civil engineering. In the financial sector, the Hong Kong stock exchange aims to attract listings from companies operating in China and elsewhere in Asia. More accountants, business and finance professionals will be acquired to match the needs of expanding services, particularly in information technology and entertainment (Hong Kong, Financial Secretary 1999). Although Hong Kong expanded the local higher education sector in the first half of the 1990s, demand for tertiary graduates, at least up to the late 1990s, increased faster than local supply. In consequence, overseas universities remained major suppliers of high-level personnel for Hong Kong.

Prior to the changes of sovereignty, the Hong Kong and Macao governments often gave preference to individuals with qualifications from the United Kingdom (or selected Commonwealth countries) and Portugal. The change of sovereignty brought increased attention to the possibilities for study in mainland China. In both cases, external studies helped Hong Kong and Macao students to act as a bridge in the external knowledge network.

Finally, as mentioned at the beginning of the chapter, the governments of both SARs have signed agreements for Closer Economic Partnership Arrangement (CEPA) with the national government in Beijing. Economic integration has long been significant, and seems set to become ever stronger. Together with this integration are flows of people which mean that labour forces become increasingly fluid. In some respects, the integration and personnel flows will cause Macao and Hong Kong to resemble each other more closely. However, differences will remain. They will be based on historical factors, the fact that Macao's economy is dominated by gambling as well as tourism, and continued differences in the government policies in education.