The Weakening Position of University Graduates in Singapore's Labor Market: Causes and Consequences

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DURING THE THIRD QUARTER of 2001, 29 percent of workers in Singapore who lost their jobs were university graduates (Ministry of Manpower 2001). Because university graduates comprised 16 percent of the work force, this implies they were approximately 80 percent more likely than average to be laid off. During the same quarter, 40 percent of persons under age 30 years who were unemployed held tertiary degrees. Again, the burden fell disproportionately on the highly educated. The number of persons with post-secondary qualifications who were unemployed was almost as high as the number of those with less than secondary school qualifications. Although university graduates who lost their jobs were more likely to find new jobs than those with lower qualifications, the re-employment differential has since decreased and has possibly reversed (Ministry of Manpower 2003a). A university education no longer ensures the secure position in the work force that it once did. Faced with increasing competition from lower-wage countries, Singapore, like other "Asian Tigers," is beginning to face globalization worries of its own. In fact, those who are ostensibly most fully prepared for the "new economy" are almost as negatively affected by recent economic developments as the low-skilled workers who are the supposed victims of globalization.

Although the employment situation has improved since 2001, professionals, managers, and technicians still constitute a large proportion of those who have been laid off. The weak position of educated labor in the work force is a puzzle for both economic and political reasons. First, Singapore's economy has expanded at a rapid rate over the last several decades, suggesting benefits for all—often through explicit redistributive mechanisms such as near-universal public housing and other public services (Chua 1997; Rodan 1989; Tremewan 1994).

Second, faced with escalating land and labor costs, Singapore has begun to spin off or "regionalize" low-wage industries, as the state has attempted to develop a knowledge-based economy by upgrading into higher value-added manufacturing, business services, and scientific research (Chia 2001), suggesting additional advantages for those with the skills, such as a command of abstract knowledge, essential for these expanding sectors. Singapore's system of stratification has long relied heavily on educational credentials, particularly in the large state-controlled sector; but with the sectoral shift in the economy, one could expect university graduates to be the primary beneficiaries of an increase in knowledge-based production. At the same time, those without a high level of human capital could be expected to be increasingly disadvantaged.

Third, Singapore's middle class is often held to be the special client of the ruling People's Action Party, suggesting economic protection for this group. Because political leaders seek to maintain the support of their constituents and because, as countries industrialize, the middle class necessarily plays a central role in development, that class will increase in power and capture greater rewards (Kerr, Dunlop, Harbison, and Myers 1960). That prediction appears to hold in Asia, with ample documentation of the growing spending power (Robison and Goodman 1996) and political influence (Koo 1991) of the middle class. Rodan has claimed that the People's Action Party rules as a "dictatorship of the middle class" and that its leadership "has actively promoted the interests and cultivated the privileged social power of that class" (1992: 370).

We can derive four specific predictions by extrapolating from the preceding discussion. First, the real wages of persons with sought-after skills will increase faster than the wages of those with a lower level of education; those age groups that occupied critical positions immediately before the sectoral shift are expected to benefit the most. Second, the high level of demand will result in a decline in the level of qualifications held by those in the sought-after occupations as those less qualified also get employed to perform needed tasks. (Drawn in by the immediate rewards of overheated labor markets, young people often forgo additional schooling during boom times.) Third, in the absence of sufficient numbers of persons with adequate skills, auxiliary occupations—paralegals in place of lawyers, nurses' aides in place of nurses, and so on—can be expected to expand. Fourth, inter-occupational income inequality will rise because those with needed skills will see their wages rise while those without higher educational qualifications might experience a decline in wages. These predictions, however, have not been borne out in Singapore over recent decades. In fact, as the opening discussion suggests, much the opposite has occurred.

Perhaps adding to the confusion, Singapore stepped up its overseas recruitment of educated persons even as the domestic labor market for uni-

versity graduates soured. In 1997, citing the expected benefit to Singapore, the Minister for Information and the Arts replaced overseas student advisory offices with Contact Singapore, an information and resource center funded by the Ministry of Manpower and charged with recruiting "foreign talent" from North America, Australia, and Europe. With economic growth slowing in 2000, Singapore, which has come to rely increasingly on foreign labor since the mid-1980s, intensified its overseas recruitment efforts by placing high-profile advertisements in publications such as the *Financial Times* in London and *Time* magazine in the United States. These print advertisements were paralleled by a broadcast campaign on cable television. Even as economic growth stalled and the unemployment of university graduates rose, new Contact Singapore offices were established in China and India. Despite the apparent surplus of graduates, Singapore's government clearly believes the economy is suffering from a shortage of skills and it has persisted in its recruitment efforts despite pressure to the contrary.

Concern about a surplus of university graduates in the United States and their potential "proletarianization" (Mills 1951: 269–270) dates back to the efforts following World War II at formal "manpower" analysis (Durand 1948) meant to ensure an adequate supply of educated labor. Singapore may offer an extreme case because of its small size, but the existence of overeducation (Rumberger 1981) alongside skill shortages (Cohen and Zaidi 2002) appears to be endemic to many developed countries and even some developing countries (Oxenham 1984). The situation is puzzling because perusal of the literature suggests that the countries with the highest extent of overeducation (an increase in average years of schooling over time that is not rooted in the technical requirements of occupations) also show the most concern about skill shortage.[1] While one may be tempted to conclude that the conundrum can be resolved by separating technical from nontechnical skills, such is not the case. Those trained in the natural sciences and engineering also suffer from the symptoms of overeducation (Batenburg and de Witte 2001; NSF 1995). Singapore's skill needs, as I show below, appear to be most pressing in the fields where its universities are the strongest. At the same time, the government is also actively recruiting talented persons in arts and entertainment from overseas.

Two roles of education: Politics and productivity

I begin by considering two views of education: technical-functional and political-cultural. States play a central role in economic development by providing a framework in which investment and production occur, by directing such investment (often by providing incentives when opportunities are not yet evident to the market), and by providing long-term capital for large projects (Gershenkron 1962; Johnson 1982; North 1990). Accordingly, de-

velopmental states are a characteristic of nearly every major case of rapid national economic growth, especially in the newly industrializing countries (Appelbaum and Henderson 1992). Singapore is no exception (Castells 1988). However, before states can act on long-term goals, they need to establish legitimacy, in part by creating a middle-class clientele capable of implementing development (Evans 1982). This is often accomplished through the expansion both of educational systems and of state employment based on meritocratic recruitment (Klitgaard 1986).

Formal education is often the means for certifying merit and has been useful in creating a culture of inclusion, establishing an aura of modernism, and thereby building state legitimacy. Berg (1971), Bowles and Gintes (1977), Cookson and Persell (1985), and others have suggested that the primary effect of schooling is to impart status culture. Moreover, the employment of university graduates continues to be an important expression of modern values (Meyer, Ramirez, and Soysal 1992). Education is a token of an individual's degree of social inclusion. Schools and bureaucratically organized work places make us "modern" (Inkeles and Smith 1975).

Because establishing nationhood is problematic, the nascent Singapore state may have preemptively established an educated bureaucratic middle class in order to maintain and strengthen the electoral position of the People's Action Party. Sixty percent of Singapore's economy is accounted for by the government, including the civil service, government-linked corporations, and statutory boards; another 25 percent is taken by multinational corporations dependent upon the state for incentives (Peebles and Wilson 1996). Extensive state-sponsored employment with secure careers at perhaps artificially high wages—including predictable salary increments depending on seniority, particularly for university graduates (Mak 1993)—ensured loyalty because the returns to steady government employment tend to far outweigh returns to entrepreneurship and to private-sector employment (*Straits Times* 2000). Moreover, the People's Action Party, facing difficulties in the polls beginning in the late 1980s (reversed since the 1997 Asian financial crisis), became increasingly attentive to the demands of the electorate (Rodan 1992; Tremewan 1994). The costs of maintaining political control appear to have risen at least through the late 1990s.

Several factors can lead to overeducation. Balancing skill production and skill needs in modern societies is problematic, and a slight oversupply appears to be necessary to ensure that demand is met (Bartholomew and Forbes 1979; Keyfitz 1985; Pinfield 1995). Young people may also misread labor market signals and temporarily overinvest in education (Freeman 1976; Manski 1995). However, the degree and persistence of overeducation suggest that the primary reason is the competition for scarce, highly desired jobs (Thurow 1975). To the extent employers look upon education as an indicator of intelligence and socialization (Arrow 1973), higher education

has a greater value as a credential than as a transmitter of skills (Shockey 1989: 863). By using education as a criterion in job allocation, organizations "maintain both the prestige of their own managerial ranks and the relative respectability of their middle ranks" (Collins 1971: 1015). These practices lead to what some have termed the "diploma disease" (Dore 1976), wherein higher education becomes necessary but no longer sufficient for obtaining a good job (Smith 1989).

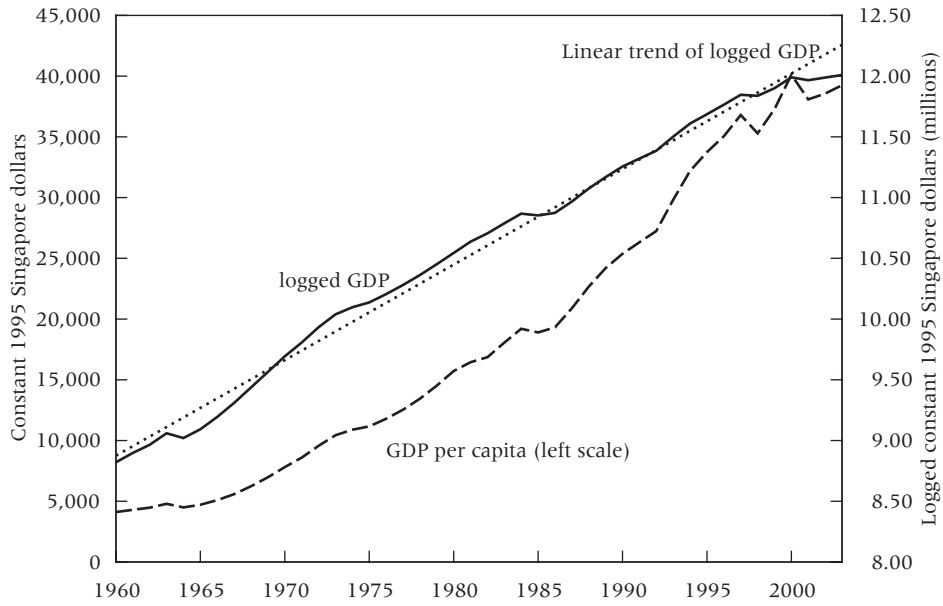
Whatever the inefficiencies of the formal education system, few doubt that skills are necessary for economic production and that schools are an important source of these skills for most people (Welch 1970). A system of queuing for desirable careers requires careful calibration with the labor market. As long as the expected rewards are high, students will be willing to invest considerable effort in obtaining a favorable position in the labor queue; but as the expected reward decreases, students will be less willing to invest in the work required for the certification establishing an entitlement to income (Coleman 1990: 136–142, 706–713, 716–717). The expected level of reward may decrease because the overexpansion of higher education forces universities to fight for "warm bodies" (Smith 1989: 96), diminishing the cachet of the educational certification because a greater proportion of entrants "survive the educational gauntlet" (Dresch 1975: 562). Under these conditions, many jobs will not require the particular skills that were learned while earning a degree; hence the transmission of skills may erode to the point that growing numbers of graduates will neither receive a graduate's job nor have expected or prepared for one in the first place (Smith 1989: 96–97).[2]

Recent social and economic trends in Singapore

Until recently, the pace and constancy of Singapore's economic growth have been remarkable. Figure 1 shows the trend in GDP per capita and logged GDP (both in constant 1995 Singapore dollars). The linear trend of logged GDP is also shown for comparison. Singapore's gross domestic product has more than doubled over each of the last four decades. The economic crises of the mid-1980s and late 1990s appear as small pauses in the nearly constant rise of national GDP (logged to show the rate of increase). GDP per capita showed a development similar to GDP, but it has been uneven since 1997. Nevertheless, in 2003 GDP per capita was higher than it was before the Asian financial crisis, and there are signs of a return of economic growth.[3]

Table 1 shows several indicators of Singapore's economic and social development over the past two decades.[4] Population increased by one-quarter during the 1980s (from 2.4 million to 3 million) and by one-third in the 1990s (to 4 million in 2000). The table shows three categories of persons: citizens, permanent residents, and nonresidents (the latter two represent-

FIGURE 1 Singapore GDP and GDP per capita, 1960–2002



SOURCE: Logged GDP and GDP per capita computed from Department of Statistic's website on historical statistics «http://www.singstat.gov.sg/keystats/economy.html»

ing noncitizens). Nonresidents are a diverse group including employment pass holders (generally managers and professionals), work permit holders (generally the less skilled), and dependents.[5] The resident population increased by approximately 20 percent in each decade (from 2.3 million in 1980 to 2.7 million in 1990 and 3.3 million in 2000). Singapore's fertility has been below replacement level for over a generation, implying that migration has been an important component of population growth. Although still smaller than the resident population, the nonresident population has grown much more rapidly than the former since 1980. While the nonresident population decreased temporarily in response to the economic slowdowns in the mid-1980s, late 1990s, and early 2000s, it nevertheless increased approximately 2.4 times each decade (from 132,000 in 1980 to 311,000 in 1990 and 755,000 in 2000). Accordingly, the fraction of the population who are citizens declined from approximately 91 percent in 1980 to 86 percent in 1990 and 74 percent in 2000. Just under two-thirds of the 2000 population were Singapore residents by birth (a decrease from three-fourths in 1990). As a point of comparison, Singapore has as large a share of foreign-born residents as New York City (*Statistical Abstract of the United States* 2003).

The number of working persons increased by approximately 43 percent during the 1980s (to somewhat over 1.5 million) and by approximately

TABLE 1 Selected social and economic indicators, Singapore, 1980, 1990, and 2000

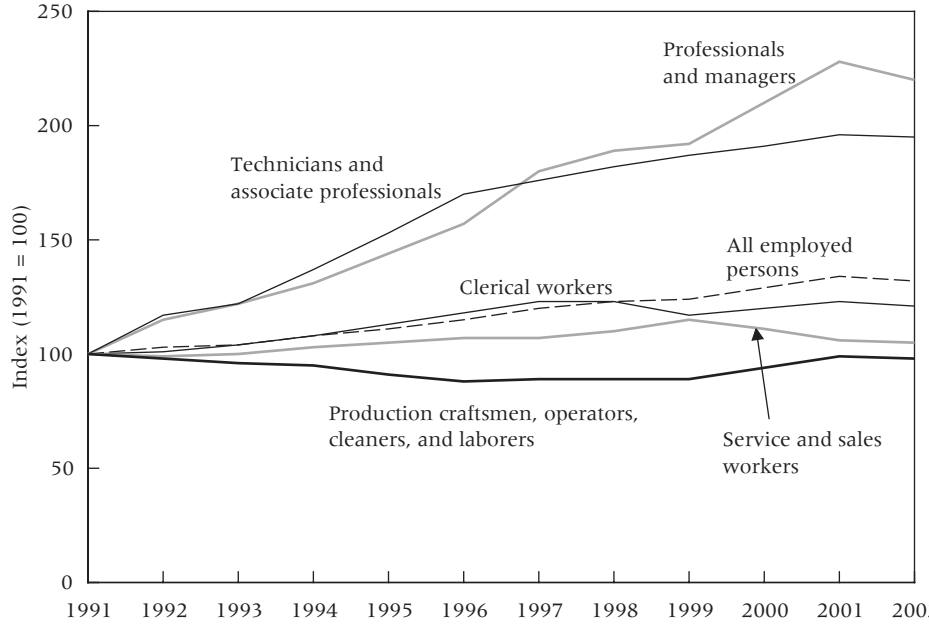
	1980		1990		2000		Ratio of increase	
	Number (000)	Percent of total	Number (000)	Percent of total	Number (000)	Percent of total	1980–90	1990–2000
Population								
Total population	2,414	100.0	3,016	100.0	4,018	100.0	1.25	1.33
Citizens	2,194	90.9	2,595	86.0	2,973	74.0	1.18	1.15
Permanent residents	88	3.6	110	3.6	290	7.2	1.25	2.64
Residents	2,282	94.5	2,705	89.7	3,263	81.2	1.19	1.21
Nonresidents (includes students, foreign workers and others)	132	5.5	311	10.3	755	18.8	2.36	2.42
Noncitizens	220	9.1	421	14.0	1,045	26.0	1.92	2.48
Residents born in Singapore			2,293	76.0	2,647	65.9		1.15
Working persons								
Total working persons	1,077	100.0	1,537	100.0	2,095	100.0	1.43	1.36
Resident working persons	998	92.6	1,290	83.9	1,483	70.8	1.29	1.15
Citizens	958	88.9	1,233	80.2	1,318	62.9	1.29	1.07
Noncitizen residents	40	3.7	57	3.7	164	7.8	1.42	2.89
Nonresidents	79	7.4	248	16.1	612	29.2	3.13	2.47
Noncitizens	119	11.1	305	19.9	777	37.1	2.55	2.55
Selected occupations								
Managers			132	8.6	249	11.9		1.89
Professionals			64	4.2	187	8.9		2.91
Managers and professionals combined	52	5.1	196	12.8	436	20.8	3.78	2.22
Technicians and associate professionals	95	9.4	176	11.5	313	14.9	1.85	1.77
Total	147	14.5	373	24.2	749	35.8	2.53	2.01
GDP in 1995 Singapore dollars (millions)	37,959		77,299		161,143		2.04	2.08

SOURCE: Population and labor force data from *Census of Population*, 1980, 1990, and 2000; GDP data from Department of Statistic's website on historical statistics «http://www.singstat.gov.sg/»

36 percent in the 1990s (to 2.1 million in 2000). The resident work force increased by approximately 30 percent in the 1980s (from almost one million in 1980 to 1.3 million in 1990) and by 15 percent in the 1990s (to 1.5 million in 2000). The nonresident work force more than tripled in the 1980s (from 79,000 in 1980 to 248,000 in 1990) and increased almost 2.5-fold in the 1990s (to 612,000 in 2000). Accordingly, the fraction of the work force who are citizens declined from approximately 89 percent in 1980 to 80 percent in 1990 and to 63 percent in 2000. (A somewhat lower proportion would be native-born.) As in other countries, the representation of nonnatives in the work force is higher than in the overall population, but because work permit holders, who comprise approximately 80 percent of the nonresidents (Hui 2002), are not permitted to bring families, their degree of over-representation in the work force is accentuated.

Occupational change accompanied the increase in work force size, with the overall growth of the labor force being outpaced by the growth in the number of managers, professionals, and associate professionals. Table 1 shows that the number of jobs in those three categories increased 2.5-fold in the 1980s and doubled in the 1990s, reaching 749,000 in 2000. The portion of the work force holding those positions increased from 15 percent in 1980 to 24 percent in 1990 to 36 percent in 2000. Figure 2 shows the growth

FIGURE 2 Employment by selected broad occupational categories, Singapore, 1991–2002

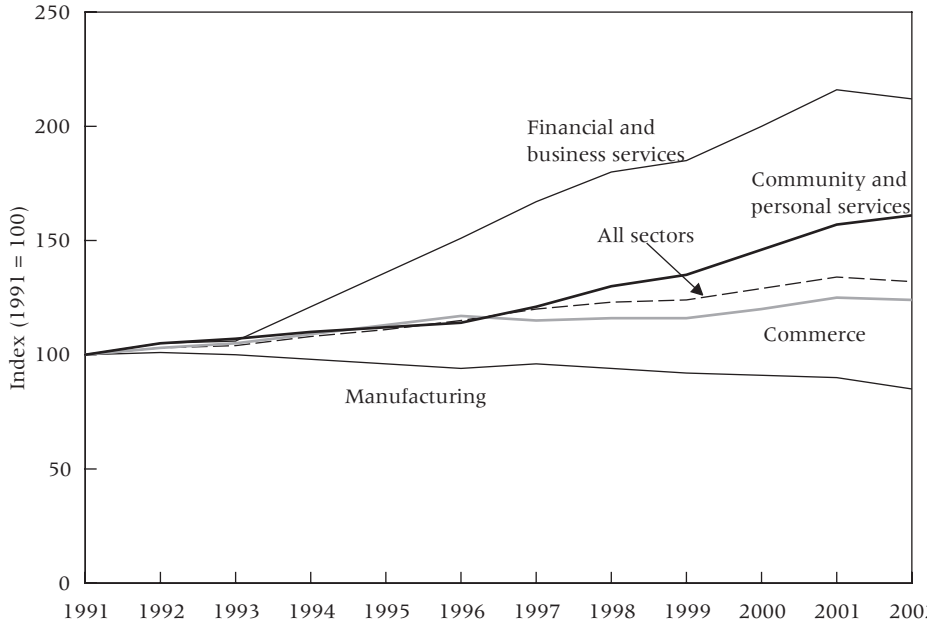


NOTE: Midyear estimates from June labor force survey.
SOURCE: Index numbers computed from Ministry of Labour/Ministry of Manpower *Report on the Labour Force Survey of Singapore*.

of selected broad occupational categories relative to their numbers in 1991 calculated using data from the Ministry of Manpower's labor force surveys.[6] Both 1995 and 2000 are imputed because the 1995 General Household Survey and the 2000 census report mainly on the resident population only. The categories of "professionals and managers" and "technicians and associate professionals" grew substantially more rapidly than average. Given the rapid increase in employment for professionals, managers, and technicians, the slack growth in clerical employment and in service and sales workers is surprising. Although, even in the 1990s, managerial and professional employment grew more rapidly than the labor force as a whole, overeducation occurred as the expansion of such opportunities decelerated.

Figure 3 shows the trends in relative employment by selected industry sector since 1991 based on similar index numbers. All sectors grew except manufacturing, which registered an absolute decline. With employment more than doubling in a decade to approximately 350,000, financial and business services was the fastest-growing sector and a possible refuge for those affected by economic restructuring. With close to 200,000 new jobs, the largest absolute increase in employment occurred in community and personal services, suggesting a continued expansion of public-sector and quasi-public-sector employment in the 1990s to absorb excess labor.

FIGURE 3 Employment by selected economic sector categories, Singapore, 1991–2002



NOTE: Midyear estimates from June labor force survey.
SOURCE: Index numbers computed from Ministry of Labour/Ministry of Manpower *Report on the Labour Force Survey of Singapore.*

University graduates in Singapore: The development and consequences of overeducation

Many of the statistics just presented suggest a rapidly developing country successfully moving up the value chain of the global economy, and these data are consistent with the thesis about knowledge-based economies that was outlined above. Other statistics point to increasing pressure and decreasing career opportunities for those with university degrees. Even though the employment of managers, professionals, and associate professionals increased sharply between 1980 and 2000, Table 2 shows that the supply of educated labor increased significantly faster than the demand. The number of those with postsecondary qualifications (polytechnic and university) increased 2.5-fold in the 1980s (from 59,000 in 1980 to 150,000 in 1990) and 2.7-fold in the 1990s (to 408,000 in 2000). The number of graduates increased 2.5 times in the 1980s (from 33,000 in 1980 to 85,000 in 1990) before accelerating to a greater than threefold increase in the 1990s (to 267,000 in 2000). In 1980 graduates comprised 2 percent of the resident nonstudent population, in 1990 4 percent, and by 2000 12 percent.

Although the average income of Singaporean residents has improved over the last 20 years, university graduates have fared less well than other groups. In 1980, the median income of university graduates was 4.9 times higher than the median income of employed residents as a whole (and three times higher than for those who had a secondary school diploma). By 1990

TABLE 2 Number of university graduates in the Singaporean economy and their relative income advantage, 1980, 1990, and 2000

	1980		1990		2000	
	Number (000)	Percent of residents	Number (000)	Percent of residents	Number (000)	Percent of residents
Resident nonstudents						
Total	1,556	100.0	1,910	100.0	2,277	100.0
With university degrees	33	2.1	85	4.4	267	11.7
With degrees and polytechnic diplomas combined	59	3.8	150	7.9	408	17.9
Median monthly income (constant 1995 Singapore dollars)						
All those employed	$441		$1,204		$2,382	
Secondary school leavers	$692		$1,396		$2,259	
University graduates	$2,175		$3,857		$4,827	
Ratio of university graduate income compared to:						
All those employed	4.93		3.20		2.03	
Secondary school leavers	3.14		2.76		2.14	

SOURCE: Population and income data from *Census of Population*, 1980, 1990, and 2000.

the ratio had declined to 3.2 times higher than the overall median and 2.8 times higher than for those with secondary school diplomas. By 2000, the median earnings for university graduates were just over twice that of the labor force as a whole and 2.1 times higher than for those with secondary school diplomas. The median (real) income of those with university degrees rose only by a factor of 1.25 times during the 1990s, while the average incomes for the employed residents doubled.

With a median monthly income of S$4,800 (US$2,700) in 2000, university graduates continue to earn more than those with lower levels of education (Ministry of Manpower 2004b). But, as is shown in Table 2, contrary to the expectation based on the theory outlined at the beginning of the article and contrary to popular perception, the income disparity between professionals and blue-collar workers has narrowed over the past several decades (on this topic see also Ho 2000). The rising absolute income inequality, documented by the Department of Statistics (2000), is, therefore, not necessarily attributable to the differences in education. Evidence from the United States indicates that much of the increase in wage inequality in recent years has taken place among those with equivalent levels of education and experience (John, Murphy, and Pierce 1993), while other research suggests that, across fields of study, the majority of American universities do not improve the earnings of their graduates over the levels expected for secondary school graduates (Calhoun 1999: 14). Unfortunately, the data needed to fully evaluate the possibility that a similar pattern holds in Singapore are not available. Reports on the starting salaries of graduates of universities in Singapore suggest more substantial variation by level of degree (three- versus four-year) than by field of study,[7] and, as in the United States, data on average salaries may mask substantial differences in labor market experience among university graduates.

At the same time as the rise of average salaries was leveling off, a university degree became increasingly necessary to enter managerial and professional occupations. Table 3 shows the share of university graduates in the labor force and in key occupations for selected recent years. Data for 2000 are taken from the census; information for the other years are from the Ministry of Manpower's annual reports on the labor force surveys. In 1990, 21 percent of managers were university graduates; by 2000, the proportion had risen to 34 percent. In 1990, 69 percent of professionals held degrees; by 2000, 73 percent did so and associate professional positions increasingly required degrees. By 2002, 18 percent of the labor force were university graduates—up from 8 percent a decade earlier. The proportion of professionals with university degrees increased by 10 percentage points over the 1992–2002 decade; for managers the proportion increased by 16 percentage points. (Both of these occupational groups expanded substantially more rapidly than the labor force as a whole during this period.) The proportion of technicians and associate professionals with degrees doubled during the same period.

TABLE 3 Percentage of the labor force and of selected occupational groups that are university graduates, Singapore, 1990–2003

	Population covered	Total (percent)	Legislators, senior officials, and managers	Professionals	Technicians and associate professionals	Clerical workers
1990	working persons	6.0	20.6	69.1	9.5	0.0
1992	working persons	8.1	21.7	63.8	12.2	0.8
1994	working persons	9.7	24.8	67.3	13.8	0.9
1996	working persons	11.6	27.3	67.4	15.5	1.0
1998	working persons	14.1	32.2	68.7	17.0	1.6
2000	residents	15.8	33.6	72.9	16.4	1.3
2002	working persons	17.9	38.0	70.3	23.8	2.2
2003	working persons	19.3	40.4	73.8	24.6	2.7
Ratio of percentage graduates between selected years						
2003/1992		2.4	1.9	1.2	2.0	3.3
2002/1992		2.2	1.8	1.1	1.9	2.7
2002/1990		3.0	1.8	1.0	2.5	—

SOURCE: Created from *Census of Population*, 1990 and 2000 data and Ministry of Labour/Ministry of Manpower *Report on the Labour Force Survey of Singapore*, various years.

The smooth trend in increase indicates that neither the Asian financial crisis nor the post-2000 economic malaise has had a dampening effect on the requirements for university credentials. The data are consistent with a continued gradual downward filtering of university graduates within occupational categories. In this process, university graduates first fill the most desirable positions, followed by the progressively less desirable positions. While the downward filtering of graduates could indicate skills upgrading, informal examination of the educational credentials of university graduates of different ages with the same job title within the same organization provides evidence of the "credential inflation" found in many countries (Berg 1971). Instead of a shortage of educated labor brought about by the demand for those who can manipulate symbolic knowledge, these figures suggest an increasing demand for certification driven in part perhaps by an affinity to "modern" culture. And, in combination with the large size and continued expansion of community and personal services, the figures lend credence to Baumol's hypothesis that service employment has grown not as a response to an exogenous demand for services but rather in response to excess labor supply (Baumol, Blackman, and Wolff 1989).

The soft trajectory of the trend in incomes and the deeper penetration of those with advanced degrees indicate uncertainty in the careers of graduates that developed through the boom years of the 1990s. The unemployment and job loss rates of the late 1990s and after were tied to external shocks, but the erosion of the relative income advantage of educated labor appears to have proceeded even while the economy was growing.[8] Table 4 shows the

trends in involuntary separation from employment since 1995. Such job losses peaked in 1998 and 2001. Despite the fluctuating movement in the rate of job losses, professionals, managers, executives, and technicians (the most relevant category for which data were reported) comprise an increasing proportion of those being laid off. In 2002 they were over one-third of those who lost their jobs involuntarily, up from less than one-fifth in 1995. Moreover, this same group makes up an increasing proportion of those on short-term layoff and of those whose employment contracts were terminated. Persons who were laid off from these high-skill occupations were barely more likely to be rehired than those without qualifications. Whereas professionals and managers were formerly often thought of as "trusted" employees, they appear to be increasingly treated like proletarianized labor.

As of mid-2002, for example, the unemployment rate (which includes but is not limited to those who have been laid off) was twice as high for graduates under age 30 years as it was for those who were older. On the other hand, while young graduates tended to find employment quickly (median period of unemployment five weeks), the median duration of unemployment for those in their 30s exceeded three months and for those in their 40s and 50s it approached six months. Approximately one-sixth of the unemployed graduates had been out of work for as long as 40 weeks or more. Calculation of the time to re-employment does not include those who have voluntarily withdrawn from the labor force. In the United States being laid off is a significant contributor to retirement (Shapiro and Sandell 1985). The table suggests this may be true in Singapore also.

The number of university graduates has increased in part because of the expansion of higher education in Singapore. Singapore produced approximately 80,400 university graduates between 1991 and 2000 (Yeo 2001). Table 5 provides information on cohort size, enrollment in preuniversity courses, and local university intake for the last four census years. Population aged 20 is a proxy for cohort size. Almost all students finish preuniversity courses before age 20, and most women begin their university studies before that age. (Men generally perform their national service obligation before entering university and some enter polytechnics for preuniversity training after their service.) Universities have been accepting substantially larger proportions of progressively smaller birth cohorts since 1970. In 1980, universities accepted about 5 percent of the relevant cohort. By 2000, that proportion had risen to 27 percent. A progressively larger proportion of those completing preuniversity courses have been accepted for university study since 1980. Moreover, the proportion of the population enrolling in preuniversity courses also progressively increased until the early 1990s. Singaporeans increasingly looked overseas for higher education as well. Degrees granted to Singaporeans by foreign institutions added another 16,000 for a total of approximately 96,400 local graduates.

The major source of university graduates during the 1990s, however, has been recruitment of graduates from universities outside Singapore. An

TABLE 4 Involuntary employment termination among professionals, managers, executives, and technicians, Singapore, 1995–2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Termination rate (per 1,000)	10.2	11.9	10.1	29.0	15.2	11.5	24.7	18.2	15.8
Professionals, managers, executives, and technicians		2.6	2.5	13.6	4.6		9.9	8.3	16.7
(percent of total)		22.3	24.7	46.9	30.2		39.9	45.8	105.7
Number of terminations	8,788	10,956	9,784	29,086	14,622	11,624	25,838	19,086	16,400
Professionals, managers, executives, and technicians	1,479	1,725	1,779	5,830	3,489	2,778	8,455	7,007	5,945
(percent of total)	16.8	15.7	18.2	20.0	23.9	23.9	32.7	36.7	36.3
Reemployment rate (percent reemployed within 6 months)						64.8	60.2	60.8	62.4
Degree-holders						67.9	65.8	58.4	56.3
Professionals, managers, executives, and technicians						65.6	66.3	59.8	61.2
Number temp. layoff/ short week		575	607	4,452	798	542	12,496	5,542	4,471
Professionals, managers, executives, and technicians		26	83	740	85	64	3,247	1,331	1,048
(percent of total)		4.5	13.7	16.6	10.7	11.8	26.0	24.0	23.4
Number released early from contract				3,716	907	329	1,733	1,044	862
Professionals, managers, executives, and technicians				270	164	40	264	144	274
(percent of total)				7.3	18.1	12.2	15.2	13.8	31.8
Professionals, managers, executives, and technicians(average monthly percent)									
Recruitment rate	2.4	2.5	2.5	1.8	2.1	2.8	2.0	1.7	1.7
Resignation rate	1.8	1.8	1.9	1.4	1.6	2.0	1.5	1.4	1.3
Vacancy rate			3.9	1.8	2.5	3.2	1.8	1.4	1.1

SOURCE: Data from Ministry of Manpower *Labour Market Report,* various years.

TABLE 5 Proxy birth cohort size, preuniversity course enrollment, and university intake, Singapore, 1970–2000

	1970	1980	1990	2000
Population aged 20 (proxy birth cohort size)	45,802	61,018	42,007	41,079
Enrollment in last year of preuniversity course				
Number	4,679	7,692	13,375	12,382
Percent of proxy birth cohort (aged 20)	10.2	12.6	31.8	30.1
With polytechnic graduates included				
Number	5,115	10,245	19,574	26,441
Percent of proxy birth cohort (aged 20)	11.2	16.8	46.6	64.4
University intake[a]	2,075	3,002	6,928	11,232
Percent of proxy birth cohort (aged 20)	4.5	4.9	16.5	27.3
Eligibles: percent of preuniversity enrollment				
Preuniversity course	44.3	39.0	51.8	90.7
Polytechnic graduates included	40.6	29.3	35.4	42.5

[a]By three universities: National University of Singapore, Nanyang Technological University, and Singapore Management University.
SOURCE: Population and labor force data from *Census of Population*, 1980, 1990, and 2000; enrollment data from Ministry of Education interactive website «http://www.moe.gov.sg/»

estimated 147,000 such graduates (permanent residents and nonresidents) were added to Singapore's labor force during that decade.

Young and qualified: The distribution of migrants in the high-skill work force

As suggested above, the reliance on foreign labor increased during the 1990s, especially for the jobs near the top of the educational and occupational scale. That conclusion is supported by an examination of educational credentials by residence status for working persons compiled from the census and labor force surveys. In 1980, 2.8 percent of working citizens held university degrees compared with 8.3 percent of working permanent residents and 10.7 percent of working nonresidents. In 1990, 5.1 percent of working citizens held university degrees compared with 17.6 percent of employed permanent residents and 7.9 percent of nonresidents. By 2000, those figures had jumped to 12.1, 71.2, and 13.3, respectively so that, with the increasing presence of migrants, noncitizens comprised almost half of the working university graduates in the country.

Table 6 provides estimates of the occupational distribution by residential status. Because of varying categories and changing patterns of reporting, information is not consistent across decades. Complete data were reported by the census for 1980 only; 1990 and 2000 figures were partially estimated from supplemental census and Ministry of Manpower reports. In 1980, 19 percent of administrative and managerial jobs were filled by noncitizens (permanent residents and nonresidents), as were 12 percent of professional and

TABLE 6 Working population by broad occupational groups and by residential status and citizenship, Singapore, 1980, 1990, and 2000

	Number	Percent				
Year	Total (000)	Residents	Citizens	Permanent residents	Non-residents	Non-citizens
1980						
Total	1,077	92.6	88.9	3.7	7.4	11.1
Administrative and managerial	52	87.0	81.4	5.6	13.0	18.6
Professional and technical	95	91.8	87.7	4.1	8.2	12.3
Clerical	167	99.2	97.7	1.4	0.8	2.3
Sales	132	97.9	93.9	4.0	2.1	6.1
Service	112	92.7	87.4	5.3	7.3	12.6
Agricultural workers and fishermen	21	97.1	92.9	4.2	2.9	7.1
Production and related workers	435	88.2	84.0	4.2	11.8	16.0
Others	62	99.2	98.2	1.0	0.8	1.8
1990						
Total	1,537	83.9	80.2	3.7	16.1	19.9
Administrative and managerial	132	91.7	84.4	7.2	8.3	15.6
Professional	75	90.7	70.8	19.9	9.3	29.2
Technical and related workers	166	94.7	90.6	4.1	5.3	9.4
Clerical	200	97.4	96.5	0.9	2.6	3.5
Sales and service	195	95.1	93.5	1.5	4.9	6.5
Production and related workers	473	75.4	71.8	3.6	24.6	28.2
Cleaners and laborers	231	60.9	60.5	0.4	39.1	39.5
Others	66	99.5	95.7	3.8	0.5	4.3
2000						
Total	2,095	70.8	63.1	7.7	29.2	36.9
Senior officials and managers	249	85.0	72.6	12.4	15.0	27.4
Professionals	187	80.5	62.1	18.5	19.5	37.9
Associate professionals and technicians	313	90.5	79.5	11.0	9.5	20.5
Clerical workers	231	92.3	83.4	8.9	7.7	16.6
Service and sales workers	212	86.3	80.2	6.1	13.7	19.8
Production and related workers	512	55.8	52.4	3.4	44.2	47.6
Cleaners, laborers, and related workers	336	30.1	28.4	1.7	69.9	71.6
Others	55	98.5	90.0	8.4	1.5	10.0

SOURCE: Reported from and calculated from *Census of Population,* 1980. Data for 1990 and 2000 were estimated from Ministry of Manpower reports.

technical jobs. In 1990, there was little change in those percentages, with 16 percent of the jobs in each category filled by noncitizens. By 2000, however, the change was substantial: 27 percent of managerial jobs, 38 percent of professional jobs, and 20 percent of technical jobs were filled by noncitizens. While permanent residents supplied only 8 percent of the labor force in 2000, they comprised 12 percent of the managers (almost half of the proportion occupied by noncitizens) and 19 percent of the professionals (again, almost half the proportion occupied by noncitizens). The table also shows that by 2000 an estimated 47 percent of production and related workers and 72 percent of cleaners and laborers were noncitizens. Employment in these occupations actually grew between 1990 and 2000 but noncitizen labor was substituted for domestic labor, resulting in substantial employment dislocation.[9] As with other high-immigration countries such as the United States, Singapore has come to rely increasingly on immigrants, who are concentrated in the jobs at both ends of the occupational spectrum.

The age distribution of migrants more closely describes their impact on natives, and it suggests the degree to which work experience is required by the host (Singaporean) economy. Because the census does not report age data for nonresidents, the discussion in the remainder of this section excludes nonresidents. Nevertheless, the census information suggests the age distribution of educated nonresidents because a large proportion of permanent residents and naturalized citizens were initially nonresident workers. The actual number of citizens in 2000, nearly 3 million, was 4 percent higher than it would have been without immigration. Given that both fertility and mortality have declined and emigration has escalated, the population increase suggests sizable net naturalization. There have also been noticeable net increases (immigration minus emigration minus deaths) in cohort sizes in the younger prime working ages, particularly among residents. The two largest five-year birth cohorts in Singapore's history (born in 1955–59 and 1960–64) increased in size by 7 and 14 percent, respectively. Nevertheless, the overall effect of the immigration and naturalization of residents has been to even the age distribution of the population, making the baby boom bulge less noticeable while increasing the relative size of the baby bust cohorts that immediately follow.

That overall smoothing, however, contrasts to the effects of migration on educated labor. Table 7 shows the age distribution of nonstudent, resident university graduates in 1990 and 2000. In the top panel the age distribution of 2000 is shifted upward to facilitate comparisons within cohorts. In the bottom panel the age distributions are even to allow comparisons of the experience of successive cohorts.

The top panel of Table 7 shows that as a group, the size of this broad cohort of university graduates increased by two-thirds—much more than the corresponding cohort in the population at large (excluding nonresidents, who fill a sizable proportion of graduate-level jobs). The size of individual cohorts

TABLE 7 Resident university graduates by age, Singapore, 1990 and 2000

1990			2000			Increase within	
Age	Persons	Percent	Age	Persons	Percent	Net	Percent
Cohort-based comparisons							
Total	84,919	100.0	Total	266,631	100.0	181,712	214.0
25–29	22,740	26.8	35–39	46,940	17.6	24,200	106.4
30–34	18,388	21.7	40–44	29,618	11.1	11,230	61.1
35–39	13,891	16.4	45–49	19,041	7.1	5,150	37.1
40–44	9,833	11.6	50–54	12,093	4.5	2,260	23.0
45–49	5,051	5.9	55–59	5,883	2.2	832	16.5
50–54	3,469	4.1	60–64	3,686	1.4	217	6.3
25–44	64,852			107,692		42,840	66.1
Age-based comparisons							
Total	84,919	100.0	Total	266,631	100.0	181,712	214.0
25–29	22,740	31.0	25–29	66,793	25.1	44,053	193.7
30–34	18,388	25.1	30–34	62,522	23.4	44,134	240.0
35–39	13,891	18.9	35–39	46,940	17.6	33,049	237.9
40–44	9,833	13.4	40–44	29,618	11.1	19,785	201.2
45–49	5,051	6.9	45–49	19,041	7.1	13,990	277.0
50–54	3,469	4.7	50–54	12,093	4.5	8,624	248.6

SOURCE: Data from *Census of Population*, 1990 and 2000.

of university graduates has grown unevenly over the past ten years. For example, while the cohort of citizens and permanent residents aged 40–44 in 1990 grew by only 1.5 percent (3,107), almost all of those were university-educated so that the number in that cohort who are graduates increased by 23 percent. The number of university graduates in the two baby boom cohorts (those aged 35–44 in 2000) increased by over 60 and 100 percent, respectively. Although baby boomers often have difficulties in the labor market, given Singapore's rate of economic growth they might not have felt a squeeze without immigration. The economic stress among the graduates, as measured by the implied increased competition in the labor market, is concentrated among those who should have benefited the most—those who attained the requisite education just as the knowledge-based economy and occupational upgrading gathered steam. This group is also the peak of the baby boomers, placing them in a double demographic jeopardy—from immigration and from their own cohort size.

While the top panel of Table 7 traces cohorts over time, the bottom half allows comparisons between persons of a given age (at a similar point in their careers) but a decade apart. The bottom panel of Table 7 shows that while the number of university graduates in each age group approximately tripled, some age groups were more heavily affected than others. I use 1990 as a base and propose a simple experience-graded model of the need for

university-educated labor at various levels of seniority in an economy that was 2.1 times as large a decade later. I conjecture that the positions at each level increase in proportion and that employment expands in direct proportion to economic expansion. Normally, the increased opportunity that accompanies economic expansion should result in a windfall for everyone. Examining the data shows that this has not been the case in Singapore. The most overcrowded age group is 45–49 years (comprising the early baby boom cohorts), followed by those in their 30s. Those in their late 20s fare somewhat better, possibly because immigration may have temporarily slowed in the late 1990s. Overall, however, the increased numbers and consequent competition suggest significant downward pressure on wages as is found in the United States (Borjas 2003).

Table 8 shows the mean age of selected subpopulations in 1990 and 2000. If migration were driven by the need for experienced labor, the large

TABLE 8 Mean age of selected subpopulations, Singapore, 1990 and 2000

	1990	2000	Difference
Residents	31.2	34.0	2.8
Citizens	31.1	34.1	3.1
Permanent residents	33.9	32.8	–1.1
Residents born in Singapore	27.5	31.2	3.7
Working persons aged 15 and older	34.8	36.6	1.8
Legislators, senior officials, and managers	41.5	41.5	0.0
Professionals	35.3	35.1	–0.1
Technicians and associate professionals	33.3	35.5	2.2
Clerical workers	31.5	35.8	4.4
Service workers, shop and market sales workers	37.6	38.8	1.3
Production craftsmen and related workers	34.2	35.1	0.9
Plant and machine operators and assemblers	33.7	39.2	5.5
Cleaners, laborers, and related workers	36.8	34.8	–2.0
Manufacturing	32.4	36.0	3.7
Construction	34.2	34.3	0.1
Commerce	37.5	39.3	1.8
Transport, storage	38.1	40.0	1.9
Business, financial services	35.4	37.0	1.5
Community, personal services	33.2	34.2	1.1
Resident nonstudents aged 15 years and older	40.2	43.4	3.3
No qualification	52.4	58.4	6.0
Primary	36.6	48.0	11.4
Secondary	33.0	39.6	6.6
Upper secondary	33.1	37.1	4.0
Polytechnic	29.9	31.5	1.6
University	35.2	36.0	0.8

SOURCE: Data from *Census of Population*, 1990 and 2000.

influx of migrants would increase the average age of workers in the most affected occupations. Singapore's resident population is aging. Contrary to expectation, however, migration helped maintain or reduce the age profile of some subpopulations. Permanent residents are younger than citizens and their average age decreased over the decade. In part because of the influx of foreigners, professionals have decreased slightly in age and managers have maintained their age. The university educated have aged only slightly. The increasing education of women and their progressive penetration of the labor force have also been factors holding down the average age of certain occupations. Occupations in the middle of the skill distribution, such as clerical work, that are less affected by immigration have been aging more quickly than the population as a whole despite the expansion of service industries.

Educated foreign labor by sector: The search for skill

During the 1990s, non-native labor made substantial inroads in occupations at both ends of the skill distribution in Singapore. The analysis that follows attempts to measure the need for educated foreign labor—and thus their role in the economy—by projecting employment forward to 2000 on the basis of the 1990 occupational structure and then examining the sectoral distribution of nonresident labor. Tables 1 and 6 showed substantial occupational change in Singapore between 1990 and 2000. Sectoral change is a major reason for occupational change (Singelmann 1978). Some of the sectoral change is due to a shift out of manufacturing. Despite a substantial growth in the size of the total labor force, absolute employment in manufacturing declined during that decade while government policy promoted Singapore as a business service and financial hub. My aim here is to provide a crude baseline measure of the number of university graduates that were needed in the economy in 2000 and, therefore, a measure of the excess supply.

Table 9 supplies occupational projections based on assumptions of observed total employment change and of a constant 1990 occupational distribution.[10] On that assumption, in 2000, there would be a total of 178,867 managers, 96,419 professionals, and 252,215 associate professionals employed. As it was, there were 70,423 more managers, 90,180 more professionals, and 60,846 more associate professionals employed. The employment deficits among clerical workers and sales and service workers, along with the aging of those occupations, suggest that certain occupations have been upwardly reclassified: a task that was previously performed by a salesperson may now be accomplished by a "sales executive." Relying on the estimates for 2000 shown in Table 6, the corresponding numbers of noncitizens in those occu-

TABLE 9 The working population of Singapore by broad occupational groups in 2000 compared with projected figures for 2000 based on the observed total employment change between 1990 and 2000 and constancy of the 1990 occupational distribution

	Occupational groups in 2000		
	Actual	Projected (on basis of 1990 data)	Difference
Total	2,094,814	2,094,813	—
Senior officials and manager	249,290	178,867	70,423
Professionals	186,599	96,419	90,180
Associate professionals and technicians	313,060	252,215	60,845
Clerical workers	231,472	287,934	–56,462
Service and sales workers	211,929	272,613	–60,684
Production craftsmen and related workers	266,443	263,097	–3,346
Plant and machine operators and assemblers	245,234	316,815	–71,581
Cleaners, laborers, and related workers	336,030	330,616	5,414

NOTE: Agricultural and fishery workers and "workers not classifiable" have been omitted.
SOURCE: Calculated on the basis of *Census of Population,* 1990 and 2000 data.

pations are 68,280, 70,787, and 64,145, respectively. Non-Singaporeans have, to a large extent, made occupational upgrading possible and, consequently, may have been the main beneficiaries of that upgrading.

Building on the occupation projections shown in Table 9 and assuming the same educational distribution within occupations that held in 1990 (not shown), there would be a need for some 125,000 university graduates in the work force in 2000. That number is substantially fewer than the 316,047 actually employed. Local graduates added to the 1990 base, even allowing for full retirement at age 55, still would result in an estimate of 36,320 more than the number needed. As is, the excess number of university graduates was 112,000. Since most university graduates were employed, that implies that a place was somehow found for them in the gradual downward filtering of graduates illustrated in Table 3.

The sizable presence of migrants in the labor market indicates the possession of some sort of competitive skill advantage, whether based on training, experience, or work motivation. Yet, arguably, university-educated migrants are not needed in the Singapore labor market at all. Less controversially, they are not needed in the large number in which they are found. While shortages of persons with particular training or with specialized work experience do arise, such shortages do not appear to be the major reason for the importation of foreign educated labor. The reliance on foreign graduates is not necessarily the result of a shortage of specialized training. Nonresident graduates are overrepresented in sectors that are not expanding rapidly, such as manufacturing and construction, and they are overrepresented in sectors,

such as manufacturing, construction, and business services, that have well-developed domestic university programs meant to meet labor force needs.

Conclusion

Singapore's economy expanded rapidly between 1960 and 2000 while shifting from low-wage assembly labor toward manufacturing, services, and research requiring a highly skilled and educated work force. Despite the high employment growth, an expanding surplus of university graduates has been chasing the available jobs with the predictable effects: slower salary increases, the downward filtering of graduates into less-desirable jobs, and the erosion of the relative income advantage of educated labor. Nevertheless, university-educated migrants were actively recruited from abroad. Unlike the United States, which has restricted employment visas in response to a decline in labor market demand, Singapore continued recruitment even as the surplus became a political issue. At the same time, residents of two of the world's largest producers of human capital, China and India, were willing and able to leave their own countries for opportunities elsewhere, including Singapore. The disproportionate placement of the migrant graduates in high value-added sectors where wages were strong indicates that migrants enjoyed a favorable place in Singapore's labor market.

Overeducation in Singapore results in a diminishing value of each year of schooling, creating a ratchet effect. As access to higher education expands, the exclusivity is reduced, inducing a search for ever-higher credentials (Fussell 1984: Ch. 6). The equilibrating forces to discourage overeducation, predicted a generation ago (Freeman 1976), have not yet surfaced. University education continues to be popular even if many universities do not raise graduate earning power (Calhoun 1999). The fact that university education is widely discussed as a consumption good points toward continuing doubts about its productive value. In populous countries, competition among large numbers of educational institutions may force a role restructuring (White 1981) whereby some universities specialize in the transmission of particular skills in order to preserve their distinctiveness. But in smaller countries, such as Singapore, overeducation may result in a breakdown of national systems of skills development. The irony of educational expansion is that it defeats its own purpose of creating national unity as the more well-to-do and the more ambitious increasingly look to foreign institutions for a mark of individual distinction. Such needs have not been lost on universities, and many Australian, European, and North American universities have looked to Asia in search of the revenues their reputations can generate from a responsive educational market.

As Singapore's rising costs have rendered it less competitive for some sectors, the political arrangement of rewards afforded to a favored clientele may have begun to run up against the new realities of economic change.

That challenge led to a growing need for imported labor at both ends of the skill distribution—at the low end to preserve the competitive position of manufacturing (approximately one-fourth of the GDP) and at the high end to allow a national strategic thrust into the new economy of business services and research and development. The strain between political and productive concerns has become more acute with the last several years of stagnant growth—Singapore's longest in the last four decades—which has reduced the pool of resources that can be redistributed. As Singapore's international wage level advantage has declined, the inefficient organization of the highly interventionist economy has become more apparent, prompting increased calls for institutional reform (Economic Review Committee 2003). Despite the unemployment of university graduates, the need for highly skilled foreign labor does not appear to have slackened and the competition from non-natives in the labor market (and in the classroom) has become a contentious topic of discussion.

Emigration has also increased with sizable colonies of Singaporeans forming in several Pacific Rim cities. The number of emigrants is not high, probably less than 100,000. But many of those emigrating or wishing to are university graduates and the children of the most privileged—those who filled the upper reaches of an expanding state bureaucracy a generation ago—who now see little possibility of following in their parents' footsteps. A decade ago the middle class was self-confidently upwardly mobile (Mak and Leong 1993); today they are increasingly susceptible to a "fear of falling" (Ehrenreich 1989).

Singapore is perhaps the paradigmatic developmental state, having redistributed the benefits of its geographic advantage early on to encourage productive activity at a time when the promise of success was not apparent. Such redistribution of reward has its costs, however, in a system of induced incentives that has difficulty adjusting to the realities of higher wages and increased international competition because the pattern of subsidy is so closely tied to electoral support. The high level of dependence upon immigration to solve the dilemmas of patronage and productivity may be uniquely Singaporean. Still, Singapore's experience has relevance for a better understanding of the impact of demographic processes on developmental states and the labor market in maturing newly industrializing countries.

Notes

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1 For examples of concern about overeducation see Livingstone (1998), Brymin (2002), and Hartog (2000); concerns over skill shortages include NSF (2004), Bosworth, Dutton, and Lewis (1992), and de Grip, van Loo, and Mayhew (2002), for the United States, Britain, and the Netherlands, respectively.

2 Berg and Kalleberg (2001: 17) cite estimates that half of university graduates in the United States will soon be working in jobs that, until recently, were adequately performed by those with only high school diplomas. Skills upgrading accounts for only a small portion of educational upgrading within occupations (Berg 1971).

3 The economic and social bases of Singapore's growth are well documented—perhaps most concisely in Rodan (2001), who includes a discussion of the "new economy," and, more extensively, in Koh et al. (2002).

4 The numbers reported in this article are a combination of statistics reported by the Singaporean Department of Statistics, the Ministry of Manpower, the Ministry of Education, and my estimates based on those statistics. Many of the statistics estimated in this article are unavailable even to Members of Parliament. Census data are not always reported in a consistent manner and figures do not always agree. In such cases, I have chosen the number in which I have the greatest confidence. In the absence of micro-data, all estimates will remain tentative.

5 Residency in Singapore is classified on a de jure, rather than a de facto basis. A few persons have been awarded "permanent resident" status without ever actually living in the country. On the other hand, individuals may sometimes live in the country for a decade or more but only be awarded a "social visit" pass.

6 It is unclear whether all nonresidents living in Singapore are included in the published labor force survey figures. Those nonresidents who have been in Singapore for less than a year are not included in the sampling frame for the surveys that generate much of the information used in this article (no actual census was performed in 2000). More recently, the sampling frame appears to exclude those living in the dormitories that house many of the nonresidents employed in low-skill occupations and manufacturing. Work permit holders are generally limited to a four-year stay so their exclusion may lead to a substantial underestimate of the number of nonresidents. Although employment pass holders are not limited to a short stay, some multinational firms put managers on three-year rotations. Such individuals would be undercounted. Those on short-term assignments, such as visiting professors and those selling financial products, would also be excluded.

7 Singaporean universities have traditionally used a three-year model for a first degree, with high-performing students being invited for a fourth, honors, year. Recognition of different levels of performance is built into government hiring practices.

8 When their jobs are terminated, nonresidents do not become "unemployed" because their visas depend upon continued employment.

9 The Singapore Department of Statistics does not publish information on the number of daily commuters from Johore, just across the border with Malaysia, and they are not included in the employment figures. The Malaysian government estimated that 40,000 persons commute daily to jobs in Singapore. They included roughly 27,000 nonskilled workers, 10,000 skilled workers, and 2,800 professionals (*Straits Times* 2001). They may be important to manufacturing and other sectors.

10 While this is a strong assumption, US Bureau of Labor Statistics documents indicate that occupational change within industry is often projected on the simple assumption of continuation of historical trends.

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