

## **Singaporean University Graduates in the New Century: Over-educated but Under-skilled?**

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Pulled along by global developments, Singapore is rapidly developing a “knowledge-based economy.” Between 1990 and 2000, GDP more than doubled (in 1990 dollars) and the number of managerial and professional jobs almost doubled. Such advances should be a boon to the Singaporean middle class but, instead, they find themselves under increasing economic pressure despite the increased need for educated labor and the surplus of manual labor. On the basis of analysis of available data, I document the deteriorating position of the well-educated and explore the role of migration in the labor market. I suggest that both the need for highly-educated immigrant labor and the deteriorating situation of university graduates is due to stresses on a system of political rent-seeking that cannot be sustained as the need for productive educated labor increases and the national advantage of labor price arbitrage declines.

## **Singaporean University Graduates in the New Century: Over-educated but Under-skilled?**

During the third quarter of 2001, 29.1 percent of those who had been retrenched in Singapore had university qualifications (Ministry of Manpower, 2001). Since university graduates comprised 16 percent of the work force, this implies they were approximately 80 percent more likely than average to be retrenched. During the same period, 40 percent of those under 30 who were unemployed held tertiary degrees. Again, the burden fell disproportionately on the educated. The number of those with post-secondary school qualifications who were unemployed was almost as high as the number of those with less than secondary school qualifications. Retrenched university graduates were somewhat more likely to find new jobs than those with lower qualifications but 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. Nonetheless, in some respects, those who are ostensibly prepared for the “new economy” are almost as negatively impacted by recent economic developments as the low-skill workers who are the supposed victims of globalization.

Although, as will be shown below, the employment situation has since improved somewhat, professionals, managers, and technicians (the category reported by the Ministry of Manpower in this case) still constitute a large proportion of those retrenched. The weak position of educated labor in the labor market is a puzzle for both economic and political reasons. First, the Singaporean 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 and 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 benefits for those with the skills, such as a command of abstract knowledge, essential for these expanding sectors. According to Bell, “the university which once reflected the status system of the society, has now become the arbiter of class position. As the gatekeeper, it has gained a quasi-monopoly in determining the future stratification of the society (1973: 410).” Singapore’s system of stratification has long placed a heavy reliance on educational credentials, particularly in the large state-controlled sector, but with the sectoral shift in the economy, we could expect the well-educated – university graduates – to be the primary beneficiaries of an increase in knowledge-based production. At the same time, those without the high level of human capital needed could be expected to be increasingly disadvantaged.

Third, the Singaporean middle class is often held to be the special client of the ruling People’s Action Party (PAP), suggesting economic protection for this group. Because all political leaders need to maintain their political legitimacy in order to hold the support of their constituents and because, as countries industrialize, the middle class necessarily plays a more central role in development, the middle class will increase in power and claim greater rewards (Kerr, Dunlop, Harbison, and Myers, 1960). That prediction appears to hold in Asia, with ample documentation of their growing spending power (Robison and Goodman, 1996) and political influence (Koo, 1991). Rodan claimed that the PAP 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).”

Four specific predictions could be derived. *First*, the real wages of those with sought-after skills could be expected to increase faster than the wages of those with a low level of education; those age-groups and cohorts that occupied critical positions immediately prior to the sectoral shift should be expected to benefit the most. *Second*, the high level of demand would result in the level of certification of those in the sought-after occupations to decline as those less-qualified were drawn into performing needed tasks. (Drawn in by the immediate rewards of over-heated labor markets, young people often forego additional schooling during boom times.) *Third*, in the absence of sufficient numbers of those with adequate skills, auxiliary occupations – para-legals in places of lawyers,

nurses' aides in place of nurses, etc. – could be expected to expand. *Fourth*, inter-occupational income inequality would rise because those with needed skills would see their wages bid up while those without education might even experience a decline in wages. These predictions, however, were not borne out in Singapore over recent decades. In fact, as the opening paragraph suggests, much the opposite has occurred.

Perhaps adding to the confusion, the Singapore state stepped up its overseas recruitment of educated persons even as the domestic labor market for university graduates soured. In 1997, citing the benefit to Singapore, the Minister for Information and the Arts replaced overseas student advisory offices with *Contact Singapore*, 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 had come to rely increasingly on foreign labor since the mid-1980s, intensified its overseas recruitment efforts by moving high-profile advertisements beyond the pages of publications such as *Science* to the *Financial Times* in London and *Time* magazine in the U.S. The print advertisements were paralleled by a broadcast campaign on cable television. As economic growth stalled and the unemployment of university graduates expanded, new *Contact Singapore* offices were established in China and India. Such outreach efforts would seem to violate both economic and political imperatives. Despite the apparent surplus of graduates, the Singaporean government clearly feels the economy is suffering from a shortage of skills and it has persisted in its recruitment efforts despite pressure to the contrary.

Concerns about a surplus of university graduates (Mills, 1951: pp. 269-270) and their resulting proletarianization date back as far as the efforts at the formal “manpower” analysis (Durand, 1947) meant to ensure an adequate supply of educated labor but these two anxieties are rarely voiced together. Singapore offers a possibly extreme case because of its small size but the existence of over-education (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 a puzzle because at least an informal observation of the literature suggests that the

countries with the highest degree of over-education are those that also show the most concern about skill shortage.<sup>1</sup> The mystery is increased because both literatures concentrate on the same set of people: university graduates. While it may be tempting to conclude that the conundrum can be resolved by separating out technical from non-technical studies, that is not the case. Those trained in the natural sciences and engineering suffer from the symptoms of overeducation at least as seriously as those in other fields (Batenburg and de Witte, 2001; NSF, 1995). Singapore's skill needs, as will be shown below, appear to be the most pressing in the fields its universities are the strongest. At the same time, the government is also actively recruiting those in arts and entertainment.

The argument in this paper begins by considering two views of education: technical-functional and political-cultural. In pursuit of political support and legitimacy, states actively expand systems of (higher) education. Because student effort is directly related to the exclusivity of schooling, the quality of training declines resulting in increasing skill shortages, which are addressed, in part, through migration. Migration is both determined by and, therefore, works as a safety valve for, the shortcomings of domestic educational institutions. Such arrangements may continue indefinitely until an exogenous shock, such as increased international competition, upsets the emergent middle class social compact.

### **Two roles of education: Politics and productivity**

States have had a central role in economic development by providing a framework in which investment and production can occur, by directing such investment (often by providing incentives when the opportunities are not yet apparent to the market), and by providing long-term capital for large projects (Gershenkron, 1962; Johnson, 1982; North, 1991). Accordingly, developmental states characterize nearly every major case of economic growth, especially in the Newly Industrializing Countries (Appelbaum and Henderson, 1992). Singapore is no exception (Castells, 1988). However,

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<sup>1</sup> Examples of concern about over-education see, for example, Livingstone (1998), Brymin (2002), and Hartog (2000) while concerns over skill shortages include NSF (2004), Bosworth, Dutton, and Lewis (1992), and de Grip, van Loo, and Mayhew (2002), for the U.S., U.K., and the Netherlands, respectively.

before states can take action 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 of educational systems and state employment based on meritocratic recruitment (Klitgaard, 1986).

Because bureaucracies are formalized systems of patrimonialism, wherein retainers are supported by “living from the lord's table (Weber, 1978: 235),” meritocratic systems tend to increase loyalty to the elite that sponsors them because job-holders are dependent upon the granting of offices for their livelihood (Weber, 1978: [sect 13]) rather than family resources or market forces.

Accordingly, large modern organizations are sometimes termed bureaucratic patrimonies (Jackall, 1988). While some portion of the wages paid to educated labor is undoubtedly due to human capital (Becker, 1975), efficiency wage theory suggests that another portion may be payment to ensure compliance with the wishes of the employer (Williamson, 1975). Some employees may then, essentially, be over-paid for their services for part (Lazear, 1981) or all of their careers (Shapiro and Stiglitz, 1984). Meritocratic systems tend to create loyalty by over-paying some while generating an acceptance of inequality by sorting persons according to objective criteria (Young, 1958).

Formal education is often the vehicle for establishing merit and has been useful in creating a culture of inclusion, establishing an aura of modernism, and, thereby, building state legitimacy. Recognizing the tentative connection between formal education and workplace productivity (Berg, 1971), Bowles and Gintis (1976), Cookson and Persell (1985), and others have suggested that the primary effect of schooling is to impart status culture. According to Collins, “education may thus be regarded as a mark of membership in a particular group not a mark of technical skills or achievement (1971: 1008).” Moreover, the employment of university graduates continues to be an important symbol of modernization and an 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 Singapore state may have preemptively

established such an educated bureaucratic middle class in order to maintain and strengthen the electoral position of the Peoples' Action Party. Sixty percent of the Singaporean 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 seniority increments, particularly for university graduates (Mak, 1993), ensured loyalty because the returns to secure government employment far outweighs those to entrepreneurship and of private sector employment (Straits Times, 2000). Moreover, the PAP faced difficulties in the polls beginning in the late 1980s (reversed since the 1997 Asian crisis) and has needed to be increasingly attentive to the demands of the population (Rodan, 1992; Tremewan, 1994). The costs of maintaining control appears to have risen over time.

Several factors can produce over-education. Balancing skill production and skill needs in modern societies is problematic and a slight over-supply is almost assuredly needed in order to ensure that needs are met (Bartholomew and Forbes, 1979; Keyfitz, 1985; Pinfield, 1995). Young people might also misread the labor market and temporarily over-invest in education (Freeman, 1976; Manski, 1995). However, the degree and persistence of over-education suggest that the primary reason for over-education is the competition for scarce, highly desired jobs (Thurow, 1975). To the extent employers use education as a signal of skill and socialization (Arrow, 1963), higher education has a greater value as a credential than as a transmitter of skill (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 important and necessary for economic production and that, while skills may not be always or even ever completely learned there, schools are an important source of these skills for some people (Welch,



1970).<sup>2</sup> A system of queuing for rents 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 over-expansion 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, because much of the employment will not require the exact skills needed to earn a degree, the transmission of skills may erode to the point that growing numbers of graduates not only will not receive a graduate’s job but will never have expected one nor have prepared for one (Smith, 1989: 96-97).<sup>3</sup> Therefore, over-education is no longer linked to the under-utilization of skills (Halaby, 1994).

The two views of education are not quite the polar opposites they are sometimes held to be. The cultural-political view of education assumes the existence of a surplus of technical-functional (including social) skills, whether produced by the education system, early family socialization, or elsewhere, and so is almost unavoidably tied to the phenomenon of “overeducation.” On the other hand, when task requirements are ill-defined and employee discretion is high (as they are in the incomplete contracts characterizing much managerial and professional employment [March and Simon, 1958]), social similarity can serve as a basis for the trust that allows organized cooperation (Kanter, 1977) providing a technical-functional mandate for cultural reproduction (Bourdieu and

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<sup>2</sup> Advanced reading and writing skills are needed to support the administration of large organizations. Computer programming skills are needed to write software. Analysis skills are needed to develop pharmaceuticals. An understanding of story development is needed to create television programs. Education is a form of social control that appears to be extremely difficult to accomplish. (How do you “make” someone learn a skill?) Therefore, we should not be not surprised if the yield (acceptable output divided by input) is low.

<sup>3</sup> Berg and Kalleberg (2001: 17) cite estimates that half of U.S. university graduates will soon be working in jobs that were until recently performed by those with high school diplomas only. Skills upgrading accounts for only a small portion of educational upgrading within occupations (Berg, 1971).

Passeron, 1990). When the set of needed skills changes, the cultural-political arrangements can come under stress – which may partly explain why the rise of new occupations and industries facilitates the occupational mobility of immigrants and previously socially-excluded demographic groups (Baltzell, 1994).

All societies need to reconcile the group maintenance and task performance functions of education. While it is possible to belittle the cultural-political functions of education, state and society making, including the formation of a loyal bureaucratic middle class, is an important, indeed, critical task of newly-independent states, essential to national survival and correlated with economic growth (Evans and Rauch, 1999). Certainly, not all states (or societies) have managed to survive, much less thrive. Distributing desired social positions on the basis of merit not only provides a defensible rationale for the allocation, the competition entailed also establishes the work motivation and political commitment of job recipients.<sup>4</sup> Moreover, the social and technical skills needed for the administrative oversight of an entrepot port and the regulation of manufacturing, by and large managed by multinational firms wherever any real technology is involved, are probably sufficiently common that not selecting personnel strictly on skill would not have harmed economic growth prospects (Goode, 1967; David Jacobs, 1981).

Extensive loyalty and legitimation mechanisms may have been necessary in the initial years of the Republic when gaining ideological loyalty and disciplining the population were salient concerns (Chua, 1997; Rodan, 1989; Tremewan, 1994) and, as in all societies, those tasks continue to be important. However, educationally-defined status groups become distributional coalitions that make special claims on societal resources resulting in a system of reward for the bureaucratically-based middle class that becomes institutionalized and hampers adjustments (Olson, 1982). Economic

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<sup>4</sup> Meritocracies differ from performance-based systems of remuneration in that in the former, the performance to be rewarded takes place *before* any employment is offered. In Singapore, the most desirable government employment is reserved for those who won scholarships before even attending university. Similarly, merit differs from the “Protestant Ethic” in that in the former, the desired identity is established early in life. It then becomes the task of society to properly recognize the person’s qualities. (See Weber [1978: Ch. 14] for his discussion of the election of kings.) Singapore’s education system is arguably oriented toward the discovery, rather than development, of talent.

stress due to the slowing of growth or increased international competition or a shift in technical skill needs or work attitudes towards the pro-active involvement required by a knowledge-based economy (Girard and Stark, 2003) can unsettle the social arrangements but, at least until recently, Singapore's economy appeared to generate a surplus sufficient to mollify its distributive coalitions.

### **Overview of Recent Social and Economic Trends: The context of over-education**

(Figure 1 about here)

Until recently, the pace and constancy of Singapore's economic growth has been remarkable. Figure 1 shows the trend in logged GDP (constant Singaporean dollars) and GDP per capita (current Singaporean dollars). Singapore's gross domestic product (GDP) 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). Since 2000, GDP has been stagnant, however. GDP per capita showed a similar development 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 an immanent return of economic growth. The economic and social bases of Singaporean 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).

(Table 1 about here)

Table 1<sup>5</sup> shows several indicators of Singaporean economic and social development over the past two decades. Population increased by one-quarter during the 1980s (from 2.4 million to 3 million) and one-third in the 1990s (to 4 million in 2000). The table shows three categories of people: citizens, permanent residents, and non-residents. Non-residents are a diverse set including employment pass holders (generally managers and professionals), work permit holders (generally the

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<sup>5</sup> The numbers reported in this paper are a combination of statistics reported by the Singaporean Department of Statistics and estimates based on those statistics. Many of the statistics estimated in this paper are unavailable even to Members of Parliament. Census data is not always reported in a consistent manner and figures do not always agree. In such cases, I have chosen the number that I have the most faith in. In the absence of micro-data, all estimates will remain tentative.

less skilled), and dependents.<sup>6</sup> 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). Since Singapore's fertility has been below replacement-level for over a generation, that implies that migration has been an important component of population growth. Although still smaller than the resident population, the non-resident population has grown much more quickly than the former since 1980. Although non-resident population decreased temporarily in response to the economic slowdowns in the mid-1980s, late 1990s and early 2000s, the non-resident population increased approximately 2.4 times each decade (from 132 thousand in 1980 to 311 thousand in 1990 and 755 thousand in 2000).

Accordingly, the percentage of the population that are citizens declined from approximately 91 percent in 1980 to 86 percent in 1990 and to 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 is approximately as populous as the Atlanta MSA but more geographically compact and has proportionally as many foreign-born as New York City (Statistical Abstract of the United States, 2003).

The number of working persons increased by approximately 43 percent during the 1980s (from 1.1 million to 1.5 million) and by approximately 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 non-resident work force approximately tripled in the 1980s (from 79 thousand in 1980 to 248 thousand in 1990) and increased almost 2.5-fold in the 1990s (to 612 thousand in 2000).

Accordingly, the percentage of the work force that are citizens declined from approximately 89 percent in 1980 to 76 percent in 1990 and to 63 percent in 2000. (A somewhat lower proportion would be native-born.) As in other countries, the representation of non-natives in the work force is higher than in the population but because work permit holders, who comprise approximately 80

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<sup>6</sup> Residency in Singapore is classified on a *de jure*, rather than *de facto* basis. Some persons have been awarded a "permanent resident" status without ever actually living in the country. On the other hand, some individuals may live in the country for a decade or more but only be awarded a "social visit" pass.

percent of the non-residents (Hui, 2002), are not permitted to bring families, their degree of over-representation in the work force is accentuated.

(Figure 2 about here)

Occupational change accompanied the increase in work force size with the growth of the labor force being outpaced by the growth in managers, professionals, and associate professionals. Table 1 shows that the number of jobs in those three categories increased two-and-a-half-fold in the 1980s and doubled in the 1990s until there were 749 thousand in 2000. The portion of the work force holding those positions increased from 14 percent in 1980 to 24 percent in 1990 to 35 percent in 2000. Figure 2 shows the relative growth of broad occupations based on 1991 index numbers calculated using data from the Ministry of Manpower's labor force surveys.<sup>7</sup> Both 1995 and 2000 are imputed because the 1995 General Household Survey and the 2000 Census report mainly on the resident population. 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 service and sales workers is surprising. Although even in the 1990s, managerial and professional employment grew more rapidly than the labor force, as in other countries, over-education occurred as the expansion of such opportunities decelerated..

(Figure 3 about here)

Figure 3 shows the trends in relative employment by industry since 1991 based on similar index numbers. Note that all sectors grew faster than average except manufacturing which registered an absolute decline. With employment tripling in a decade to over 80 thousand, commerce was the

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<sup>7</sup> It is unclear whether all non-residents living in Singapore are included in the published labor force survey figures. Those non-residents who have been in Singapore for less than a full year are not included in the sampling frame for the surveys that generate much of the information used in this paper (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 non-residents employed in low-skill occupations and manufacturing. Work permit holders are generally limited to a four-year stay so the exclusion may lead to a substantial under-estimate of the number of non-residents. Employment pass holders are not limited to a short stay but some multinational firms put managers on three-year rotations. Those individuals would be under-counted. Those on short-term assignments, such as visiting professors and those selling financial products, would also be excluded.

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 was in community and personal services, suggesting a continued expansion of public and quasi-public sector employment in the 1990s

### **University Graduates in Singapore: The development and impact of over-education**

Many of the statistics presented above suggest a developing nation successfully moving up the value chain of the global economy and they are consistent with what could be called the “knowledge-based economy thesis” that was outlined above. But other statistics point to increasing pressure and decreasing career opportunities for those with university degrees. Although the demand for educated labor increased dramatically between 1980 and 2000, Table 2 shows that the supply of educated labor has increased significantly faster than the demand. The number of those with post-secondary qualifications (polytechnic and university) increased two and a half-fold in the 1980s (from 59 thousand in 1980 to 150 thousand in 1990) and 2.7-fold in the 1990s (to 408 thousand in 2000). The pace of growth among university graduates was more substantial. The number of graduates increased two and a half-fold in the 1980s (from 33 thousand in 1980 to 85 thousand in 1990) before accelerating to a greater than three-fold increase in the 1990s (to 267 thousand in 2000). In 1980 graduates comprised two percent of the resident non-student population, in 1990 four percent, and by 2000 they were 12 percent. The supply of educated labor increased even faster than the rapidly expanding demand.

(Table 2 about here)

Not surprisingly given the more rapid growth of supply than demand, although most resident Singaporean’s income has improved over the last 20 years, university graduates as a group have fared less well than some other groups. In 1980, the median income of university graduates was almost six and a half times as high as the median income for the work force as a whole (and over three times as high as those who had a secondary school diploma). By 1990 the ratio had declined to 3.2 times as much as the overall median and 2.76 times as high as those with secondary school diplomas. By 2000, the median earnings for university graduates was just over twice that of the labor force as a

whole and 2.14 times as high as those with secondary school diplomas. The median income of those with university degrees rose 1.42 times during the 1990s; that of those without any formal education at all – those frequently held to be most disadvantaged by economic restructuring and by globalization – rose 1.47 times. The position of university graduates in the labor market is significantly less elevated than it was when expectations were formed in adolescence and at the beginning of many graduate's careers. These trends, while interpretable, do not support a human capital interpretation of education.

Housing costs help put the earnings growth in perspective. Housing has a tremendous variety of attributes but price indices for housing from the Housing Development Board (HDB), the main supplier of public housing, (accounting for 88 percent of all households and 59 percent of those headed by university graduates) and for private property show price increases that were several multiples of the approximately 40 percent increase in average salary. Since housing is the major expenditure in every country, the price increases imply a significant charge against nominal income gains. Moreover, the figures presented hide the bubble in housing prices in the mid-1990s. By 2000 property had already lost much of its mid-decade value. Those purchasing housing in that period were burdened with both the highest prices and the highest subsequent loss in value.

With a median monthly income of S\$4,700 (US\$2,700) in 2000, university graduates continue to earn more than those with lower levels of education (Ministry of Manpower, 2004b). Contrary to the expectation based on the theory outlined at the beginning of the paper and contrary to popular perception, however, the incomes of graduates are rising less rapidly than that of those without any education. The income disparity between professionals and blue collar workers has narrowed over the past several decades (Ho, 2000). Rising Singaporean income inequality is, therefore, not necessarily due to differences in education (Department of Statistics, 2000). Evidence from the U.S. indicates that much of the increase in wage inequality in recent years has taken place among those with equivalent levels of education and experience (Juhn, Murphy, and Pierce, 1993) while other research suggests that, across fields of study, the majority of U.S. universities do not

improve the earnings of their graduates over that 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. However, reports on the starting salaries of graduates of local universities suggest more substantial variation by level of degree (three- v. four-year) than field of study.<sup>8</sup> That is, as in the U.S., the average salaries for which we have information may be masking substantial differences in labor market experience among university graduates.

(Table 3 about here)

At the same time that the development of average salaries was soft, a university degree became increasingly necessary to enter managerial and professional occupations. Table 3 shows the penetration of university graduates into the labor force and 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 report on the labor force surveys (the exact titles and authorship change over the years). In 1990, 20 percent of managers were graduates; by 2000, the proportion had risen to 34 percent. In 1990, 69 percent of the professionals were degreed; by 2000, 73 percent were and associate professional positions increasingly required degrees. (Data were reported using different categories in 1980.) By 2002 18 percent of the labor force were university graduates – up from eight percent a decade earlier. The proportion of professionals with university degrees increased by ten percent over the 1992-2002 decade. For managers the proportion increased by three-fourths. (Remember that 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 almost doubled during the same period. The smooth trend in increase indicate that neither the Asian financial crisis nor the post-2000 economic malaise has had a clear effect on the requirements for university credentials. The data are consistent with a process of a continued gradual downward filtering of university graduates. In this process, the most desirable positions are filled by university graduates

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<sup>8</sup> 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 are built into government hiring practices.



first, followed by the progressively less desirable positions. While the downward filtering of graduates could indicate skills upgrading, informal examination of the educational credentials of those 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 exogenous demand for those who can manipulate symbolic knowledge, these figures suggest an increasing demand for certification driven partly by an affinity to “modern” culture and, in combination with the large size and continued expansion of community and professional services, lend credence to Baumol’s (Baumol, Blackman, and Wolff, 1989) hypothesis that service employment has not grown as a response to an exogenous demand for services but rather surplus labor supply.

(Table 4 about here)

The soft trajectory of income development and deeper penetration of degrees indicate a degree of stress in the careers of graduates that developed through the boom years of the 1990s. The unemployment and retrenchment rates were tied to external shocks but the proletarianization of educated labor appears to have proceeded even while the economy was growing.<sup>9</sup> Table 4 shows the trends in involuntary separation from employment since 1995 (prior to 1995, retrenchment was less of an issue). As particular phenomena became concerns, data were collected and made available. Retrenchments peaked in 1998 and in 2001. Despite the up and down trend in the rate of retrenchment, professionals, managers, executives, and technicians (the most relevant category for which data were reported) comprise an increasing proportion of those being retrenched. In 2002 they were over one-third of those retrenched, up from less than half that 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. Those retrenched from these high-skill occupations were barely more likely to be rehired than those lacking qualifications. In the past, professionals and managers were often thought of as “trusted” employees. They appear to be increasingly treated as

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<sup>9</sup> Non-residents can be retrenched but they cannot be “unemployed” because their visas depend upon continued employment.

proletarianized labor.

As of June 2002, for example, the unemployment rate (this includes but is not limited to those who have been retrenched) was twice as high for graduates under 30 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 was over three months and for those in their 40s and 50s it approached half a year. Approximately one-sixth of the unemployed graduates had been so for 40 weeks or more. The time to re-employment does not include those who have withdrawn from the labor force. In the U.S. being retrenched is a significant contributor to retirement (Shapiro and Sandell 1985). The table suggests that may be true in Singapore also.

(Table 5 about here)

The number of university graduates has increased in part because of the expansion of higher education in Singapore. Singapore produced approximately 80,410 university graduates between 1991 and 2000 (Yeo, 2001). Table 5 shows information on cohort size, enrollment in pre-university courses, and local university intake for the last four census years. Population aged 20 is an estimate of cohort size. Almost all students finish pre-university courses at a younger age and most females begin their university studies before that age. (Males generally perform their National Service before entering university and some enter polytechnics for pre-university training after National Service.) Universities have been accepting substantially larger proportions of progressively smaller birth cohorts since 1970. In 1980, Singaporean universities accepted less than five percent of the relevant birth cohort. By 2000, that proportion had risen five and a half-fold to 27 percent. A progressively larger proportion of those completing pre-university courses have been accepted for study since 1980. Moreover, the proportion of the population enrolling in pre-university courses also progressively increased until the early 1990s. Singaporeans also increasingly looked overseas for higher education. Degrees granted to Singaporeans by foreign institutions added another 16,060 for a total of approximately 96,470 local graduates.

The major source of university graduates during the 1990s, however, has been immigration. An estimated 147,000 graduates were added by the immigration of permanent residents and non-residents.

### **The Distribution of Migrants in the High-Skill Work Force**

(Table 6 about here)

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. Table 6 shows the distribution of educational qualifications by residence status for non-students and for working persons. Due to varying categories and changing patterns of reporting, not all information is consistent across decades. Some figures are reported in the census; others are estimated. In 1980, 1990, and 2000, permanent residents were substantially more likely to have a university degree than citizens. Non-residents are a diverse category with the majority being work permit holders, rather than employment pass holders. Nevertheless, non-residents contributed just over one-fifth of the university graduates in the work force in 1980 and 1990. By 2000, that proportion had risen to one-fourth with almost half of the university graduates in Singapore being non-citizens.

(Table 7 about here)

Table 7 provides estimates of the occupational distribution by residential status. Complete data were reported by the Census for 1980 only; 1990 and 2000 figures were partially estimated. In 1980, 12 percent of managerial jobs were filled by non-citizens (permanent residents and non-residents) and 12 percent of professional and technical jobs were filled by non-citizens. In 1990, there was little change in those percentages, 17 and 13 percent, respectively. By 2000, however, the change was substantial. Twenty-seven percent of managerial jobs, 38 percent of professional jobs, and 20 percent of technical jobs were filled by non-citizens.<sup>10</sup> While permanent residents supplied only seven

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<sup>10</sup> The heavier representation of non-natives in professional positions than in managerial jobs is consistent with Kanter's (1977) thesis on the function of social similarity in organizations.

percent of labor force, they comprised 12 percent of the managers (almost half of the proportion occupied by non-citizens) and 18 percent of the professionals (again, almost half of the proportion occupied by non-citizens). The table also shows that by 2000 an estimated 47 percent of production and related workers and 72 percent of cleaners and laborers were not citizens. Employment in these occupations actually grew between 1990 and 2000 but non-citizen labor was substituted for domestic labor, resulting in substantial employment dislocation.<sup>11</sup> Similar to other high-immigration countries such as the U.S., Singapore has come to increasingly rely on immigrants and those immigrants are concentrated in the jobs at both ends of the occupational spectrum.<sup>12</sup>

(Table 8 about here)

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. Unfortunately, the Census does not report age data for non-residents and all analyses in the remainder of this section exclude non-residents. Nevertheless, this information suggests the age distribution of educated non-residents because a large proportion of permanent residents and naturalized citizens were initially non-resident workers. Table 8 shows the distribution by age of citizens and permanent residents for 1990 and 2000. The actual number of citizens, 2,973,091, is four percent higher than it would have been without immigration (and nine percent higher than the 1980 population of citizens projected forward at 1980 fertility rates and 1990 mortality rates would have been). Given that both

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<sup>11</sup> The Singapore Department of Statistics does not publish statistics on the number of daily commuters from Johore and they are not included in the employment figures. The Malaysian government estimates that 40,000 commute daily to jobs in Singapore. They include 27,103 non-skilled workers, 10,235 skilled workers, and 2,832 professionals (Straits Times, 2001). They may be important to manufacturing and other sectors.

<sup>12</sup> Similar conclusions could be drawn from a study of incomes. In 1982, non-Singaporeans (permanent residents and non-residents) accounted for nine percent of the paid labor force but 40 percent of those earning \$3,000 or more per month (at the time, the top 2.6 percent of the wage distribution). In 1988, non-Singaporeans made up 10 percent of the paid labor force but 25 percent of those earning \$3,000 or more per month (at the time, the top 5 percent of the wage distribution). In 1982 non-Singaporeans were just slightly over-represented among those earning less than \$400 per month but by 1988 non-Singaporeans comprised 34 percent of those earning less than \$400 per month (by then 14 percent of those employed). Unfortunately, data for more recent years has not been published.

fertility and mortality have declined and emigration has escalated, the increase suggests sizable net naturalization. The table also indicates quite noticeable net increases (immigration - emigration - deaths) in cohort sizes in the younger portion of the prime working ages, particularly among the residents (which includes the migrant permanent residents). The largest two age birth cohorts in Singapore's history increased in size by seven 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.

(Figure 4 about here)

That overall smoothing, however, contrasts to the effects of migration on educated labor. Figure 4 shows age-sex pyramids for resident graduates in 1990 and 2000 based on Census data. Table 9 show the age distribution of non-student, resident university graduates in 1990 and 2000. In the top panel the age distribution of 2000 is shifted upward to more easily allow comparisons within cohorts. In the bottom panel the age distributions are even to allow comparisons of the experience of successive cohorts.

(Table 9 about here)

Looking at the top panel of Table 9 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 full population (remember, non-residents are not included and they fill a sizable proportion of graduate-level jobs). The size of individual cohorts of university graduates has grown unevenly over the past ten years. For example, while the cohort of those 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 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. I do not have income measures by age and education but we can expect flat salary

trajectories for the squeezed cohorts, corresponding to the overall trend. The economic stress among the graduates, as measured by the implied increased competition in the labor market, is concentrated among those who should have benefitted the most – those with the requisite education in place just as the new economy push and occupational upgrading gathered steam. It is ironic that this group is also the peak of the baby-boomers placing them in double demographic jeopardy – from immigration and from their own cohort size. The absolute and relative magnitude of the increase in size of the cohort of graduates increases as age decreases. As they aged over the decade, the younger cohorts faced more competition than the older.

While the top panel of Table 9 traces cohorts over time, the bottom half compares age groups a decade apart, figuratively allowing comparisons between older and younger brothers and sisters at similar point in their careers. The bottom panel of Table 9 shows that while the number of university graduates in each age group approximately triples, some age groups are more heavily affected than others. I use 1990 as a base and develop a very 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 postulate that the positions at each level increase in proportion and that employment expands in direct proportion to economic expansion. Normally, the increased opportunity economic expansion should result in a windfall for everyone. Examining the data shows that that has not been the case in Singapore. The most over-crowded age band is 45-49 (one of the early baby boom cohorts), followed by those in their 30s. Those in their late 20s come off somewhat easier, possibly because immigration may have temporarily slowed in the late 1990s – in 2000 there were somewhat less than three times as many people chasing twice as many jobs than a decade earlier. The increased crowding and consequent competition suggest significant downward pressure on wages as is found in the U.S. (Borjas, 2003). The omission of non-residents is a serious omission of this part of the analysis.<sup>13</sup> Nevertheless, by any measure, educated labor has been squeezed and some cohorts and

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<sup>13</sup> Recent newspaper reports have suggested that multinational firms are now increasingly likely to post younger employees to Singapore, suggesting that experience is not a key factor in Singaporean labor migration.

age groups more than others. Those in their early 30s in 2000 faced perhaps the most heavy weight of proportional and numerical increase. This group was also perhaps the most affected by the housing price bubble of the mid-1990s. While the implied level of competition has affected all age grades, those with the newest university educations and freshest skills should have benefitted the most from a sectoral shift to knowledge-based production. It appears that they have not, rather those who were already well-established by 1990 seemed to have been most shielded from the effects of migration.

(Table 10 about here)

Table 10 shows the mean age of selected sub-populations in 1990 and 2000. If migration was driven by the need for experienced labor, the large influx of migrants would “age” the most affected occupations. Singapore’s resident population is aging. A stationary population would maintain the same average age and distribution. Contrary to expectation, migration helped maintain or reduce the age profile of some sub-populations. Permanent residents are younger than citizens and their average age decreased over the decade. Due, in part, to 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 has also been a factor holding average age of certain occupations down. Occupations in the middle of the skill distribution, such as clerical work, that less exposed to immigration have been aging more quickly than the population as a whole despite the expansion of service industries. That suggests, along with evidence presented below, that a portion of the occupational change may be due to reclassification, rather than upgrading.

### **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. The analysis that follows attempts to measure the need for educated foreign labor – and thus their role in the economy – by first projecting employment forward to 2000 on the basis of the 1990 occupational structure and then by examining the sectoral distribution of non-

resident labor. Tables 1 and 7 show that there was substantial occupational change in Singapore between 1990 and 2000. Sectoral change is a major reason for occupational change (Singelmann, 1978).<sup>14</sup> 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 needed in the economy in 2000 and, therefore, a measure of the excess supply.

(Table 11 about here)

Table 11 supplies occupational projections based on assumptions of observed total and sectoral employment change and of a constant 1990 occupational distribution. If the occupational distribution of each industry in 1990 is used in combination with each industry's total employment in 2000 to predict the occupational distribution 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 in 2000 than would be expected on the basis of 1990 patterns. In addition, the employment deficits among clerical workers and sales and service workers suggest that work has sometimes been upwardly re-classified: a task that was previously performed by a sales person may now be accomplished by a "sales executive." Relying on the estimates for 2000 shown in Table 7, the corresponding numbers of non-citizens those occupations is 68,280, 70,787, and 64,145, respectively. So that 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 11 and assuming the same educational distribution within occupations that held in 1990, there would be a need for 125,002 university graduates in the work force in 2000. That is substantially fewer than the 316,047 actually employed.

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<sup>14</sup> U.S. Bureau of Labor Statistics documents indicate that occupational change within industry is often projected on an ad hoc basis, such as by guessing about the continuation of historical trends.



Local graduates added to the 1990 base and allowing for full retirement at age 55 would have produced 36,320 more than what was needed. As it was, the excess number of university graduates numbered over 112 thousand. 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.

(Table 12 about here)

The sectoral distribution of educated migrants would indicate their role in the labor market. Unfortunately, occupation-industry matrices by citizenship status are not available but by matching such matrices for all working persons and resident working persons, residents and non-residents can be compared. Table 12 suggests, on the basis of the representation of managers and professionals in various industries a broad division of labor between university-educated Singaporeans and non-residents. Selected occupations are shown. Non-resident managers, professionals, and associate professionals are more likely than their resident equivalents to be in manufacturing and they are less likely to be employed in service industries. Non-resident professionals, for instance, are almost twice as likely to work in the construction industry as their resident counterparts. Within services, non-resident managers and professionals are over-represented in financial services and business services. Non-resident managers, for example, are 50 percent more likely to be found in financial services than their resident counterparts. They are under-represented in other service industries – non-resident managers and professionals are half as likely as their resident counterparts to be found in that sector. Fully 35 percent of resident professionals are in “other service industries” and residents comprise almost 90 percent of the professionals in that sector, suggesting that government employment has continued to absorb a large number of native Singaporean graduates.

Anecdotal evidence suggests there may also be unmeasured differences between native and domestic graduates in worker motivation and skill. One MNC manager, who when newly posted to Singapore to establish a branch facility, commented favorably on the Singaporean university system of specialized training, but later turned out to have hired few Singaporeans for the relevant jobs. An

employee of another multinational reported working in a polyglot working environment that turned non-Singaporean at 5:00 p.m. when the clerical personnel went home. Another informal informant claimed it is more cost-effective, despite the salary premium and housing allowance, to hire an expatriate who will work steadily for 10-12 hours a day than to hire a local graduate. Further, while one computer science instructor joked that some of his students went on to sell insurance, a foreign systems analyst working in a government-linked company claimed there were few Singaporeans doing technical work in his company. The relatively high work motivation of migrants is a generally observed phenomenon cross-nationally and frequently noticed by government officials in the local press. Confirming such informal evidence in the Singapore case would require careful measurement but such stories fit domestic media images (including a much-reproduced photograph of laboratory research assistants from around the globe) of the knowledge-based economy being built primarily on imported labor. Recently, persons working in research and development sectors have reported pressure to naturalize in order to reduce the appearance of dependence on foreign labor. These results suggest a broad productive/non-productive and knowledge-based/government administration and services divide between non-resident and resident labor and, I suspect, between natives and non-natives.

Available data does not suggest that migrants are relatively low on the labor queue. There appears to be a rough division of labor between domestic and foreign educated labor with the latter being more highly represented in income-generating sectors with high output per employee. These are also sectors where the wages for resident managers (many of whom may be non-natives) increased more rapidly than they did in other sectors (Ministry of Manpower, 2003c). That rapid increase in wages suggests a labor shortage in those fields and suggests that migrant educated labor fills high-skill needs that cannot be met domestically. Rather than being far down on the labor queue, migrant educated labor appears to be placed relatively highly as a group.

The sizeable 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 –

counteracting the usual handicap. By one measure, the 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 cases of a shortage of persons with particular types of training or with specialized work experience do arise, such shortages do not appear to be the major contributors to the importation of foreign educated labor. Nor is the reliance on foreign graduates necessarily the result of a shortage of work experience. If migrants were used to fill senior positions requiring experience-based skill that younger natives did not have the opportunity to gain, the migrants would be significantly older than natives in the same occupational groups. The reliance on foreign graduates is not necessarily the result of a shortage of specialized training. Non-resident graduates are over-represented in sectors that are not expanding rapidly and they are over-represented in sectors, such as manufacturing, construction, and business services, which have well-developed domestic university programs meant to meet labor force needs.

## **Conclusion**

Singapore's economy expanded at a very rapid rate for four decades and shifted away from low wage assembly labor towards manufacturing, services, and research requiring high levels of skill. Despite the high employment growth, a surplus of university graduates were chasing the available jobs with the predictable effects: soft average salaries, the downward filtering of graduates into the less-desired jobs, and the proletarianization of educated labor. Nevertheless, university-educated migrants were actively recruited from abroad. 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. The migrants smoothed the overall age distribution (of residents) somewhat but their numbers created a higher level of job competition for everyone, even if the younger cohorts of university graduates – who should have benefitted the most from the sectoral shift – were perhaps the most stressed. The disproportionate placement of the migrant graduates in high value-added sectors where wages were strong indicates that migrants enjoyed a favorable place

in the labor queue and that migrants provided a combination of skill and work motivation that could not be found locally.

Perhaps all countries exhibit some degree of simultaneous over-education and skill shortage but the phenomenon probably more seriously affects late-developing countries (Dore, 1976). Such countries tend to more heavily rely on education systems to build cohesion and allocate the high-paying government and government-linked employment that induces loyalty. As the competition for government jobs heightens, a mismatch between the demand for education and the demand for skilled labor develops and the certification value of schooling takes precedence over use value (Dore, 1976: 8). Therefore skill shortages are fundamentally linked to over-education and credentialism.<sup>15</sup> Over-education in Singapore was brought about by social legitimation needs. Education was centrally-controlled allowing little leeway for competitive institutions (Collins, 1971) while the imbalanced arithmetic between the politically induced opportunities for higher education and the structurally induced opportunities for social mobility of Boudon (1974) are an outcome, not a cause.

Over-education results in a diminishing value of each year of schooling, creating a ratchet effect. As access to higher education expands, the exclusivity is reduced, leading to periodic status panics inducing a search for ever-higher credentials (Fussell, 1984: Ch. 6). Consequently, to the extent that education becomes seen by students and educators alike as a service to individuals in their search for employment-gaining credentials – in contrast to economy-boosting skills and knowledge or other social purposes – (Labaree, 1997), the content of education will shift towards activities that symbolize cultural inclusion and build self-esteem. The resulting “therapeutic university (Hayes, 2002),” may weaken both the skills transmission and work socialization roles of education.

The equilibrating forces to brake over-education, 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 it is widely discussed as a consumption

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<sup>15</sup> Singaporeans are sensitive to the difference between credentials and knowledge. Jack Neo, a local film maker and actor, has played two different immensely popular film characters who had skill and intelligence but lacked the required pedigree to get ahead in their careers.

good points towards continuing doubts about the productive value of a university education. In populous countries, competition among large numbers of decentralized educational institutions may force a role structure (White, 1981) wherein some universities specialize in skill transmission in order to preserve their distinctiveness. But in smaller countries, such as Singapore, over-education 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 – thereby re-establishing old rifts. Such needs have not been lost on universities and many Australian, European, and North American universities have gone to Asia in search of the revenues their reputations can generate from a willing market.<sup>16</sup>

Whatever the considerable potential personal benefits of education, spending increasing numbers of years in a schooling system that does not effectively transmit knowledge exacerbates the financial problems tied to population aging by increasing the dependency ratio. Productive work lives are shortened at the beginning by excessive schooling and at the end by retrenchment-induced retirement. The flatter income trajectories brought about by the proletarianization of labor reduces the earning power of those in the labor force. All of which may contribute towards a falling birth rate (Machunovich, 1992). An aging population may require a radically different organization of education and the life course than we now have.

The declining opportunities for university graduates taking place in approximately a decade must have had a profound impact on the psyches of Singaporeans. A gap between material aspirations and resources in Singapore can be envisioned by imagining a 16-year old male forming his

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<sup>16</sup> Even though starting salaries for many state employees has been reduced by 20 percent (Lim, 2003), Singapore's state-controlled sector is probably still the largest and most attractive source of employment for university graduates (Ministry of Manpower, 2004a) but with seniority-based pay largely abolished, the institutional support for on-the-job learning (Doeringer and Piore, 1971; Williamson, 1975) largely disappears. As a consequence, as the distribution of needed skills within a population contracts, undermining the basis for relatively egalitarian distributions of income (Lenski, 1966). Over-education arguable leads to the computerization of managerial and professional work and the concentration of productive knowledge in multinational consulting firms, again, undermining systems of skills development.

income expectations and making his education decisions in 1990 and then comparing those expectations – based on what he sees around him in Singapore – with the results of his education decisions a decade later when he finds his income and housing prospects to be better than what they would be without a degree but significantly worse than he had expected them to be (Easterlin, 1987). Such disappointment would have occurred with or without the 1997 Asian financial economic crisis and other global shocks.

A changed external economic landscape may cause the unwritten middle class social contract to unravel (Zunz, Schoppa, and Hiwatari, 2002). In Singapore's case, the costs of maintaining that contract may have been increased by the PAP's desire to dominate in elections. Since the party strives to satisfy, not only the median, but all voters, the amount of economic rent that must be redirected toward the population is comparatively higher (Buchanan, 1980; Downs, 1957). As Singapore's rising costs rendered it less competitive for some sectors, the political arrangement of clientalistic rewards may have begun to run up against the new demands of economic production. 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 stronger 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 labor price 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. Accordingly, Singapore's success in labor control may be over-stated (Deyo, 1981; Tremewan, 1994).

As in the U.S., over-education in Singapore is likely to lead to the continued privatization of

discontent and the redefinition of social status, including elevating leisure activities as marks of distinction (Burris, 1983; Chua, 2003). The “exit” option appears to have become increasingly popular with approximately one-fifth of the population considering it. Emigration has 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 they are critical. Many of those emigrating or wishing to are university graduates and are the children of the most privileged – those who rapidly peopled the upper reaches of an expanding state bureaucracy a generation ago – and who see little possibility of following in their parents footsteps.<sup>17</sup> 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 early on redistributed the benefits of its geographic advantage to artificially create economic rents to encourage productive activity at a time when the promise of profit was not apparent. Such redistribution of reward has its costs, however, in a system of induced incentives that has difficulties adjusting to the realities of higher labor prices 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. By differentiating the features of state involvement that overcome market failures from those that create political rents, studies of the maturing newly industrializing countries will be able to more adequately understand the impact of developmental states on labor market and demographic processes.

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<sup>17</sup> Wintrobe (1998) documented how a lack of through-flow at the top of internal labor markets resulted in frustration for younger cohorts and political consequences for the U.S.S.R. A similar phenomenon may have developed in Singapore where the slow pace of leadership renewal has surfaced as an issue (Chua, 2001).

## Bibliography

- Appelbaum Richard P. and Jeffrey Henderson. 1992. *States and Development in the Asian Pacific Rim*. Newbury Park: Sage Publications.
- Arrow, Kenneth J. 1973. "Higher Education As a Filter." *Journal of Public Economics* 2:193-216.
- Baltzell, E. Digby. 1958. *Philadelphia Gentlemen: The making of a national upper class*. Glencoe: Free Press.
- Bartholomew, David J. and Andrew F. Forbes. 1979. *Statistical Techniques for Manpower Planning*. New York: Wiley.
- Batenburg, Ronald and Marco de Witte. 2001. "Underemployment in the Netherlands: How the Dutch 'Poldermodel' Failed to Close the Education-Jobs Match." *Work, Employment, and Society* 15: 73-94.
- Baumol, William J., Sue Anne Batey Blackman, and Edward N. Wolff. 1989. *Productivity and American Leadership: The long view*. Cambridge: MIT Press.
- Bell, Daniel. 1973. *The Coming of Post-industrial Society: A Venture in Social Forecasting*. New York: Basic Books.
- Berg, Ivar E. 1971. *Education and Jobs: The Great Training Robbery*. Boston: Beacon Press.
- Berg, Ivar and Arne L. Kalleberg. 2001. "Emerging Labor Market Structures: Contexts and Correlates." Pages 3-26 in Ivar Berg and Arne L. Kalleberg, eds., *Sourcebook of Labor Markets: Evolving Structures and Processes*. New York: Kluwer Academic/Plenum Publishers .
- Borjas, George J. 2003. "The Labor Demand Curve Is Downward Sloping: Reexamining the Impact of Immigration on the Labor Market." *Quarterly Journal of Economics* 118: 1335-1374.
- Bosworth, Derek, Pat Dutton, Jackie Lewis. 1992. *Skill Shortages: Causes and Consequences*. Aldershot: Avebury.
- Boudon, Raymond. 1974. *Education, Opportunity, and Social Inequality: Changing Prospects in Western Society*. New York: Wiley.
- Bourdieu, Pierre and Jean-Claude Passeron. 1990. *Reproduction in Education, Society and Culture*. Richard Nice trans. London: Sage.
- Bowles, Samuel and Herbert Gintis. 1977. *Schooling in Capitalist America: Educational Reform and the Contradictions of Economic Life*. New York: Basic Books.
- Brymin, Malcolm. 2002. "Overqualification in Employment." *Work, Employment, and Society* 16: 637-654.
- Buchanan, James M. 1980. "Rent Seeking and Profit Seeking." Pages 3-15 in James M. Buchanan, Robert D. Tollison and Gordon Tullock, eds., *Toward a Theory of the Rent-Seeking Society*. College station: Texas A&M University Press.



- Burris, Val. 1983. "The Social and Political Consequences of Overeducation." *American Sociological Review*, 48: 454-467.
- Calhoun, Craig. 1999. "The Changing Character of College: Institutional Transformation in American Higher Education ." Pages 9-31 in Bernice A. Pescosolido and Ronald Aminzade, eds., *The Social Worlds of Higher Education: Handbook for Teaching in a New Century*. Thousand Oaks: Pine Forge Press.
- Castells, Manuel. 1988. *The Developmental City-State in an Open World Economy: the Singapore Experience*. Berkeley: Berkeley Roundtable on the International Economy, University of California, Berkeley.
- Chia Siow Yue. 2001. "Singapore: Towards a Knowledge-based Economy." Pages 169-208 in Seiichi Masuyama, Donna Vandenbrink, Chia Siew Yue, eds., *Industrial Restructuring in East Asia: Towards the 21st century*. Singapore: Institute of Southeast Asia Studies.
- Chua Beng Huat. 2003. *Life Is Not Complete Without Shopping: Consumption Culture in Singapore*. Singapore: Singapore University Press.
- Chua, Beng Huat. 1997. *Political Legitimacy and Housing: Stakeholding in Singapore*. New York: Routledge.
- Chua Lee Hoong. 2001. "In Search of New Leaders." *Straits Times* 27 October.
- Cohen, Malcolm S. and Mahmood A. Zaidi. 2002. *Global Skill Shortages*. Cheltenham: Edward Elgar.
- Coleman, James S. 1990. *Foundations of Social Theory*. Cambridge: Harvard University Press.
- Collins, Randall. 1971. "Functional and Conflict Theories of Educational Stratification." *American Sociological Review* 36: 1002-1019.
- Cookson, Peter W. and Caroline Hodges Persell. 1985. *Preparing for Power: America's elite boarding schools*. New York: Basic Books.
- Department of Statistics. 2000. "Is Income Disparity Increasing in Singapore?" Occasional Paper Series, May.
- de Grip, Andreis, Jasper van Loo, and Ken Mayhew. 2003. *The Economics of Skills Obsolescence: Theoretical Innovations and Empirical Applications*. Oxford: JAI.
- Deyo, Frederic C. 1981. *Dependent Development and Industrial Order: An Asian Case Study*. New York: Praeger.
- Doeringer, Peter B. and Michael J. Piore. 1971. *Internal Labor Markets and Manpower Analysis*. Lexington: CD Heath.
- Dore, Ronald P. 1976. *The Diploma Disease: Education, Qualification and Development*. London: Allen and Unwin.
- Downs, Anthony. 1957. *An Economic Theory of Democracy*. New York: Harper.

- Dresch, Stephen P. 1975. "Demography, Technology, and Higher Education: Toward a Formal Model of Educational Adaptation." *Journal of Political Economy* 83: 535-569.
- Durand, John D. 1968. *The Labor Force in the United States, 1890-1960*. New York: Gordon and Breach Science Publishers.
- Easterlin, Richard A. 1987. *Birth and Fortune: The impact of numbers on personal welfare*. Chicago: University of Chicago Press, second edition.
- Economic Review Committee. 2003. *New Challenges, Fresh Goals – Towards a Dynamic Global City*. Singapore: Ministry of Trade and Industry.
- Ehrenreich, Barbara. 1989. *Fear of Falling: The Inner Life of the Middle Class*. New York: Pantheon Books.
- Evans, Peter. 1982. "Reinventing the Bourgeoisie: State Entrepreneurship and Class Formation in Dependent Capitalist Development." *American Journal of Sociology* 88: S210-S247.
- Evans, Peter and James E. Rauch. 1999. "Bureaucracy and Growth: A Cross-National Analysis of the Effects of 'Weberian' State Structures on Economic Growth." *American Sociological Review* 64: 748-765.
- Freeman, Richard B. 1976. *The Overeducated American*. New York: Academic Press.
- Fussell, Paul. 1984. *Class*. New York: Ballantine.
- Gerschenkron, Alexander. 1962. *Economic Backwardness in Historical Perspective*. Cambridge: Harvard University Press.
- Girard, Monique and David Stark. 2003. "Hierarchies of Value in Manhattan-based New Media Firms." *Theory, Culture, and Society* 20: 77-105.
- Goode, William J. 1967. "The Protection of the Inept." *American Sociological Review* 32: 5-19.
- Halaby, Charles N. 1994. "Overeducation and Skill Mismatch." *Sociology of Education* 67: 47-59.
- Hartog, Jan. 2000. "Over-education and Earnings: Where Are We, Where Should We Go?" *Economics of Education Review* 19: 131-147.
- Hayes, Dennis. 2002. "Taking the Hemlock? The New Sophistry of Teacher Training for Higher Education." Pages 143-158 in Dennis Hayes and Robin Wynyard, eds., *The McDonaldization of Higher Education*. Westport: Bergin and Garvey.
- Ho Kong Weng. 2000. "The Changing Pattern of Production Fragmentation in Singapore and its Economic Consequences." NUS Economic Policy Forum, 19 September.
- Hui Weng Tat. 2002. "Foreign Manpower Policy in Singapore." Pages 29-50 in Koh Ai Tee, Lim Kim Lian, Hui Weng Tat, Bhanoji Rao, and Chng Meng Kng, eds., *Singapore Economy in the 21st Century: Issues and Strategies*. Singapore: McGraw-Hill, Education
- Inkeles, Alex and David H. Smith. 1975. *Becoming Modern: Individual Change in Six Developing Countries*. London: Heinemann Educational.

- Jackall, Robert. 1988. *Moral Mazes: The world of corporate managers*. New York: Oxford University Press.
- Jacobs, David. 1981. "Toward a Theory of Mobility and Behavior in Organizations: An Inquiry into the Consequences of Some Relationships between Individual Performance and Organizational Success." *American Journal of Sociology* 87: 684-707.
- Johnson, Chalmers Ashby. 1982. *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975*. Stanford: Stanford University Press.
- Juhn, Chinhui, Kevin M. Murphy, and Brooks Pierce. 1993. "Wage Inequality and the Rise in Returns to Skill." *The Journal of Political Economy* 101: 410-442.
- Kanter, Rosabeth Moss. 1977. *Men and Women of the Corporation*. New York: Basic Books.
- Kerr, Clark, John T. Dunlop, Frederick Harbison, and Charles Myers. 1960. *Industrialism and Industrial Man: The problems of labor and management in economic growth.*. Cambridge: Harvard University Press.
- Keyfitz, Nathan. 1985. *Applied Mathematical Demography*. New York: Springer, Second ed.
- Klitgaard, Robert E. 1986. *Elitism and Meritocracy in Developing Countries: Selection policies for higher education*. Baltimore: Johns Hopkins University Press .
- Koh Ai Tee, Lim Kim Lian, Hui Weng Tat, Bhanoji Rao, and Chng Meng Kng. 2002. *Singapore Economy in the 21st Century : Issues and Strategies*. Singapore: McGraw-Hill, Education.
- Koo, Hagen. 1991. "Middle Classes, Democratization, and Class Formation: The Case of South Korea." *Theory and Society* 20: 485-509.
- Labaree, David F. 1997. "Public Goods, Private Goods: The American Struggle over Educational Goals." *American Educational Research Journal* 34: 39-81.
- Lazear, Edward P. 1981. "Agency, Earnings Profiles, Productivity, and Hours Restrictions." *American Economic Review* 71: 606-20.
- Lenski, Gerhard E. 1966. *Power and Privilege: A Theory of Social Stratification*. New York , McGraw-Hill.
- Lim, Lydia. 2003. "Civil Service to Cut Starting Pay." *The Straits Times*, 8 November
- Livingstone, D. W. 1998. *The Education-Jobs Gap: Underemployment or Economic Democracy*. Boulder: Westview Press.
- Macunovich, Diane J. 1996. "Relative Income and Price of Time: Exploring Their Effects on US Fertility and Female Labor Force Participation." *Population and Development Review* 22: 223-257.
- Mak Lau Fong. 1993. "The Rise of the Singapore Middle Class: An Analytic Framework." Pages 307- 336 in Hsiao Hsin-Huang, Michael, ed. *Discovery of the Middle Classes in East Asia*. Taipei: Institute of Ethnology, Academia Sinica.

- Mak Lau Fong and Leong Choon Heng. 1993. "A Profile of the Singapore Middle Class: Part Report and Preliminary Findings." National University of Singapore, Department of Sociology, typescript.
- Manski, Charles F. 1995. *Identification Problems in the Social Sciences*. Cambridge: Harvard University Press.
- March, James G. and Herbert A. Simon. 1958. *Organizations*. New York: Wiley.
- Meyer, John W., Francisco O. Ramirez, and Yasemin Nuhoglu Soysal. 1992. "World Expansion of Mass Education, 1870-1980." *Sociology of Education* 65: 128-149.
- Mills, C. Wright. 1951. *White Collar: The American Middle Classes*. New York: Oxford University Press.
- Ministry of Manpower. 2004a. "Job Vacancies, 2003." Manpower Research and Statistics Department, January.
- Ministry of Manpower. 2004b. "Report on Labour Force In Singapore, 2003" Manpower Research and Statistics Department, January.
- Ministry of Manpower. 2003a. "Labour Market: Third Quarter 2003." Manpower Research and Statistics Department, December.
- \* Ministry of Manpower. 2003b. "Labour Market: First Quarter 2003." Manpower Research and Statistics Department, June.
- Ministry of Manpower. 2003c. *Report on Wages in Singapore*. Singapore: Research and Statistics Department.
- Ministry of Manpower. 2001. "Labour Market: Third Quarter 2001." Manpower Research and Statistics Department, December.
- National Science Foundation. 2004. *An Emerging and Critical Problem of the Science and Engineering Labor Force*. NSB 04-07, Arlington.
- National Science Foundation. 1995. *Nonacademic Scientists and Engineers: Trends from the 1980 and 1990 Censuses*. NSF 95-306, Arlington.
- North, Douglass Cecil. 1990. *Institutions, Institutional Change, and Economic Performance*. Cambridge: Cambridge University Press.
- Olson, Mancur. 1982. *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities*. New Haven: Yale University Press.
- Oxenham, John. 1984. *Education Versus Qualifications?* Boston: Allen and Unwin.
- Peebles, Gavin and Peter Wilson. 1996. *The Singapore Economy*. Cheltenham: Edward Elgar.
- Pinfield, Lawrence T. 1995. *The Operation of Internal Labor Markets: Staffing Practices and Vacancy Chains*. New York: Plenum Press.

- Robison, Richard and David S.G. Goodman. 1996. *The New Rich in Asia: Mobile Phones, Mcdonalds and Middle-class Revolution*. London: Routledge.
- Rodan, Garry. 2001. "Singapore: Globalization and the Politics of Economic Restructuring." Pages 138- 177 in Garry Rodan, Kevin Hewison, and Richard Robison, eds., *The Political Economy of South-east Asia: Conflicts, Crises, and Change*. South Melbourne: Oxford University Press, 2nd ed.
- Rodan Garry. 1992. "Singapore: Emerging Tensions in the 'Dictatorship of the Middle Class'." *The Pacific Review* 5: 370-381.
- Rodan, Garry. 1989. *The Political Economy of Singapore's Industrialization: National State and International Capital* . Basingstoke: Macmillan.
- Rumberger, Russell W. 1981. *Overeducation in the U.S. Labor Market*. New York: Praeger.
- Shapiro, Carl and Joseph E. Stiglitz. 1984. "Equilibrium Unemployment as a Worker Discipline Device." *American Economic Review* 74: 433-44.
- Shapiro, David and Steven H. Sandell. (1985). "Age Discrimination in Wages and Displaced Older Men," *Southern Economic Journal*. 52, 90-102.
- Shockey, James W. 1989. "Overeducation and Earnings: A Structural Approach to Differential Attainment in the U. S. Labor Force (1970-1982)." *American Sociological Review* 54: 856-864.
- Singelmann, Joachim. 1978. *From Agriculture to Services: The Transformation of Industrial Employment*. Beverly Hills: Sage.
- Smith, Herbert L. "Overeducation and Underemployment: An Agnostic Review." *Sociology of Education* 59: 85-99.
- Statistical Abstract of the United States*. 2003. Bureau of Statistics, Treasury Department. Washington: Government Printing Office.
- Straits Times*. 2001. "No Levy on Those Commuting to Work in Singapore." December 17.
- Straits Times*. 2000. "Civil Service Has Biggest Pay Hike." 16 December.
- Thurow, Lester. 1975. *Generating Inequality*. New York: Basic Books.
- Tremewan, Chris. 1994. *The Political Economy of Social Control in Singapore*. New York: St. Martin's Press.
- Weber, Max. 1978. *Economy and Society*, edited by Guenther Roth and Claus Wittich. Berkeley: University of California Press.
- Welch, Finis. 1970. "Education in Production." *Journal of Political Economy* 78: 35-59.
- White, Harrison C. 1981. "Where Do Markets Come From?" *American Journal of Sociology*, Vol 87:517-547.

- Williamson, Oliver E. 1975. *Markets and Hierarchies, Analysis and Antitrust Implications: A study in the economics of internal organization*. New York: Free Press.
- Wintrobe, Ronald. 1998. *The Political Economy of Dictatorship*. Cambridge: Cambridge University Press.
- Yeo Soek Lee. 2001. "Educational Upgrading through External Degree Programmes." *Statistics Singapore Newsletter*: 2-8. Singapore: Department of Statistics, October.
- Young, Michael D. 1958. *The Rise of the Meritocracy, 1870-2033. An essay on education and equality*. Baltimore: Penguin Books.
- Zunz, Olivier, Leonard Schoppa, and Nobuhiro Hiwatari. 2002. *Social Contracts under Stress: The Middle Classes of America, Europe, and Japan at the Turn of the Century*. New York: Russell Sage Foundation,.

*Primary data sources*

- Department of Statistics. 1981. *Census of population 1980*. Singapore.
- Department of Statistics. 1991. *Census of population 1990: Advance Data Release*. Singapore: SNP Publishers.
- Department of Statistics. 1991. *Census of population 1990*. Singapore: SNP Publishers.
- Department of Statistics. 2001. *Census of population 2000: Advance Data Release*. Singapore.
- Department of Statistics. 2001. *Census of population 2000*. Singapore.
- Ministry of Labour. 1990. *Report on the Labour Force Survey of Singapore*. Singapore: Ministry of Labour.
- Ministry of Labour. 1999. *Report on the Labour Force Survey of Singapore*. Singapore: Ministry of Labour.

### *Data sources for Figures and Tables*

Figure 1: Logged GDP computed from and GDP per capita taken from Department of Statistic websirte on historical statistics <http://www.singstat.gov.sg/keystats/economy.html>

Figure 2: Index numbers computed from Ministry of Labour/Ministry of Manpower *Report on the Labour Force Survey of Singapore*

Figure 3: Index numbers computed from Ministry of Labour/Ministry of Manpower *Report on the Labour Force Survey of Singapore*

Figure 4: Created from *Census of Population* 1990 and 2000 data

Table 1: Population and labor force data from *Census of Population* 1980, 1990, and 2000; GDP data from Department of Statistic websirte on historical statistics <http://singstat.gov.sg/>

Table 2: Population and income data from *Census of Population* 1980, 1990, and 2000; housing index data from Housing Development Board and Urban Redevelopment Authority websites

Table 3: 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

Table 4: Data from Ministry of Manpower *Labour Market Report*, various years

Table 5: Population and labor force data from *Census of Population* 1970, 1980, 1990, and 2000; enrollment data from Ministry of Education interactive website, <http://www.moe.gov.sg/>

Table 6: Data from *Census of Population* 1980, 1990, and 200; Ministry of Labour/Ministry of Manpower *Report on the Labour Force Survey of Singapore*, various years

Table 7: Reported from, calculated on basis of from *Census of Population* 1980, 1990, and 2000

Table 8: Data from *Census of Population* 1990 and 2000

Table 9: Data from *Census of Population* 1990 and 2000

Table 10: Data from *Census of Population* 1990 and 2000

Table 11: Calculated on the basis of *Census of Population* 1990 and 2000 data

Table 12: Calculated on the basis of Ministry of Manpower *Report on the Labour Force Survey of Singapore*, 2000

Figure 1

### Singapore GDP and GDP per capita

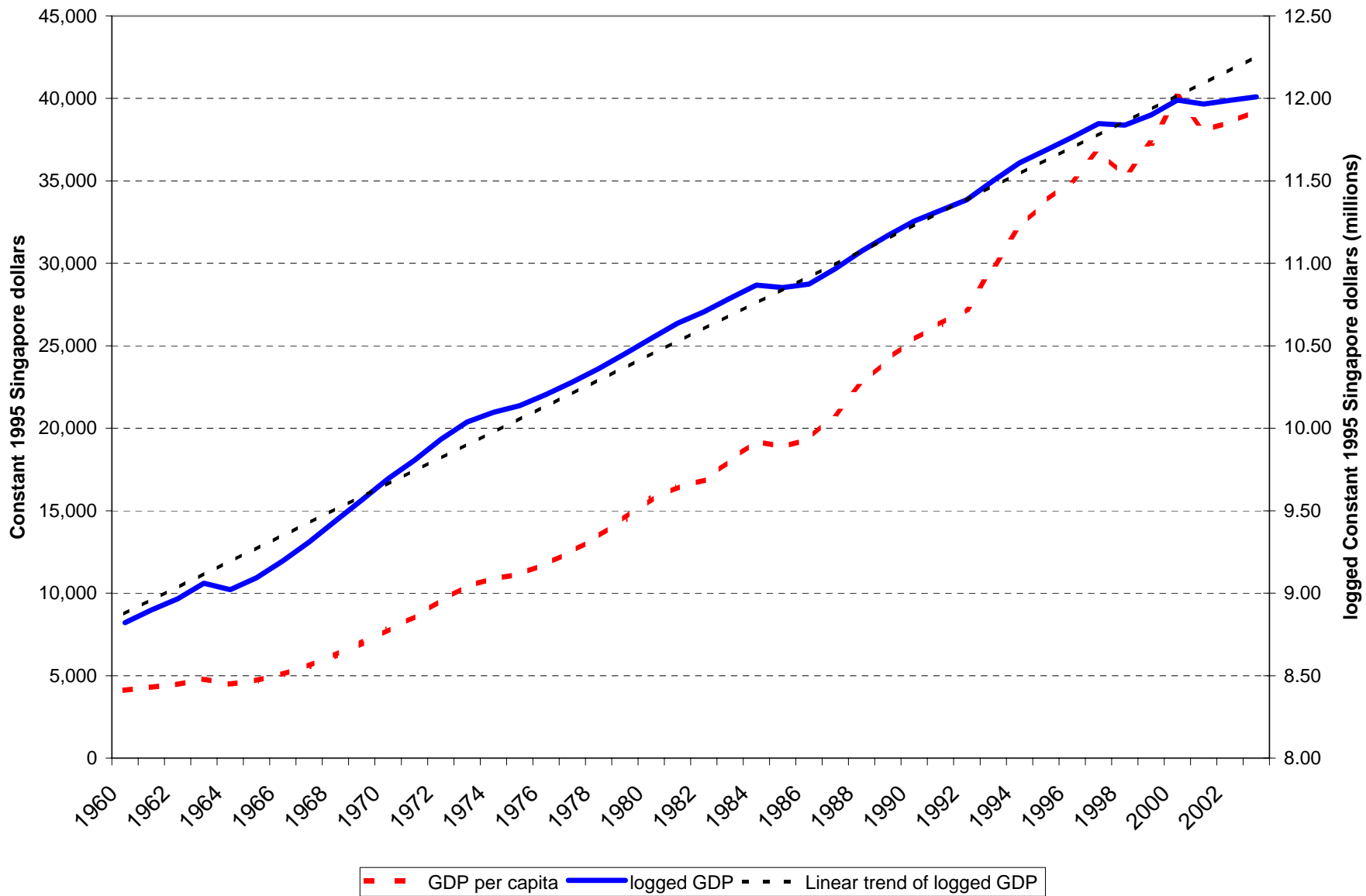




Figure 2

### Occupational employment trends

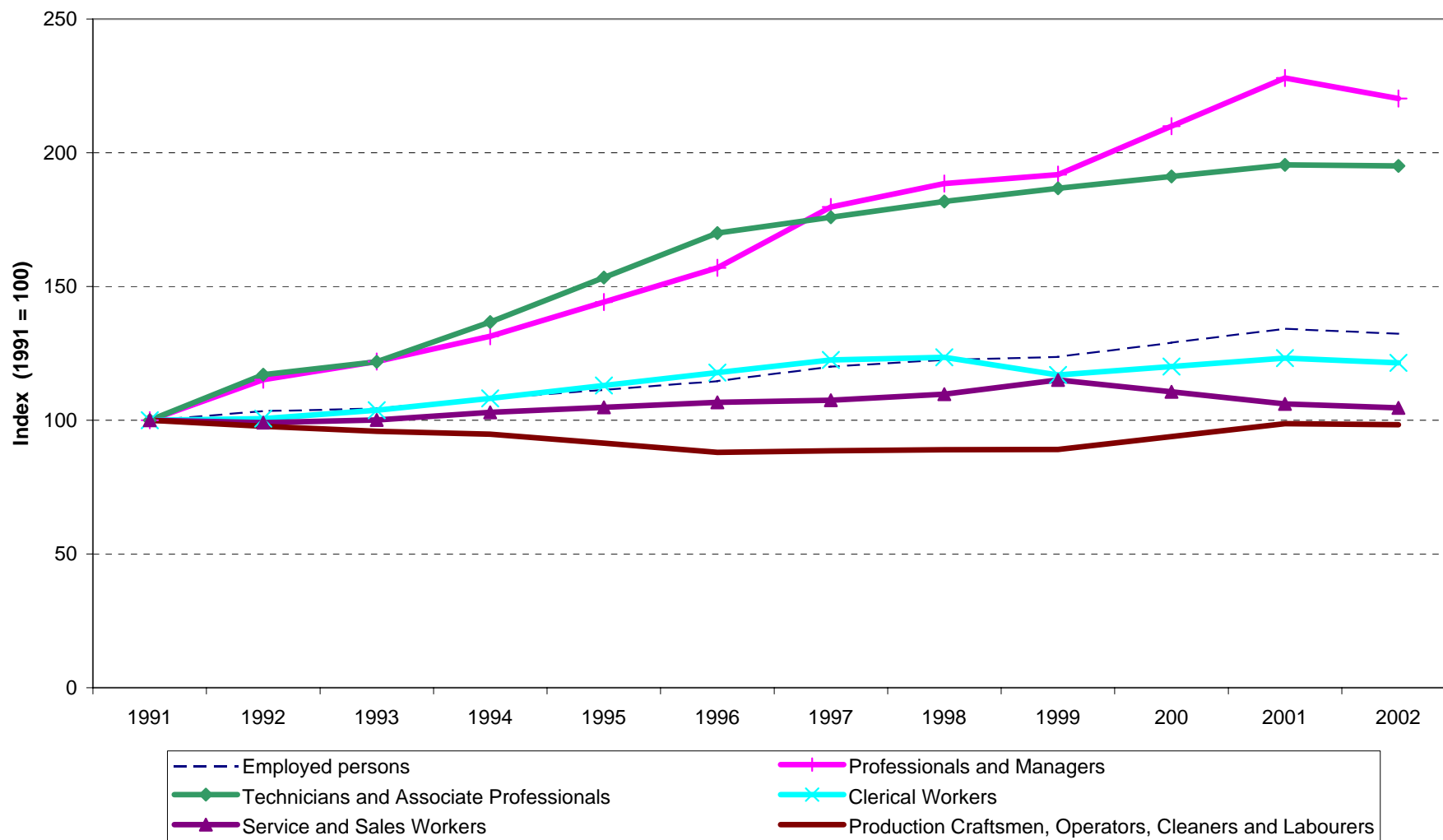


Figure 3

### Sectoral employment trends

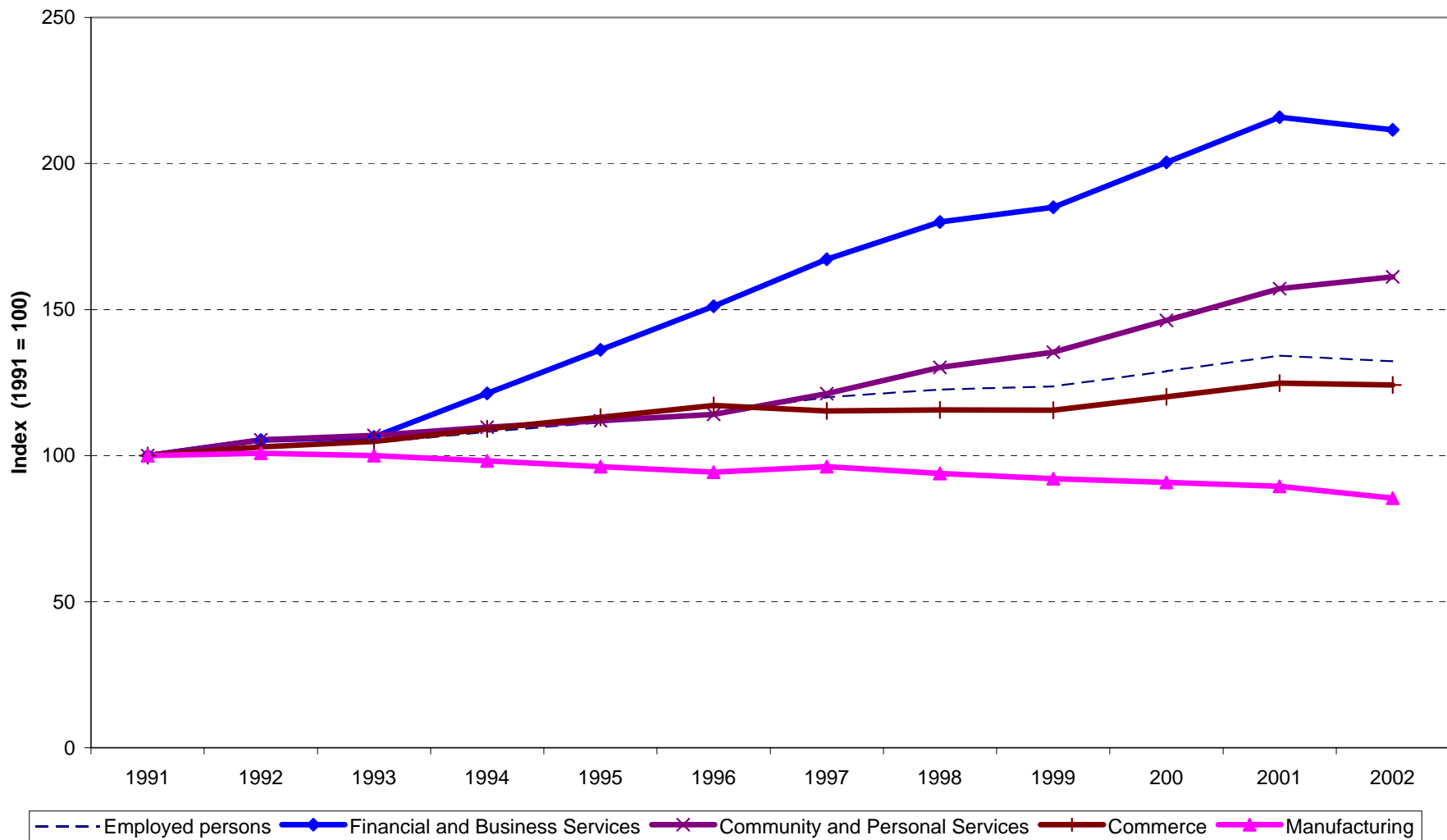
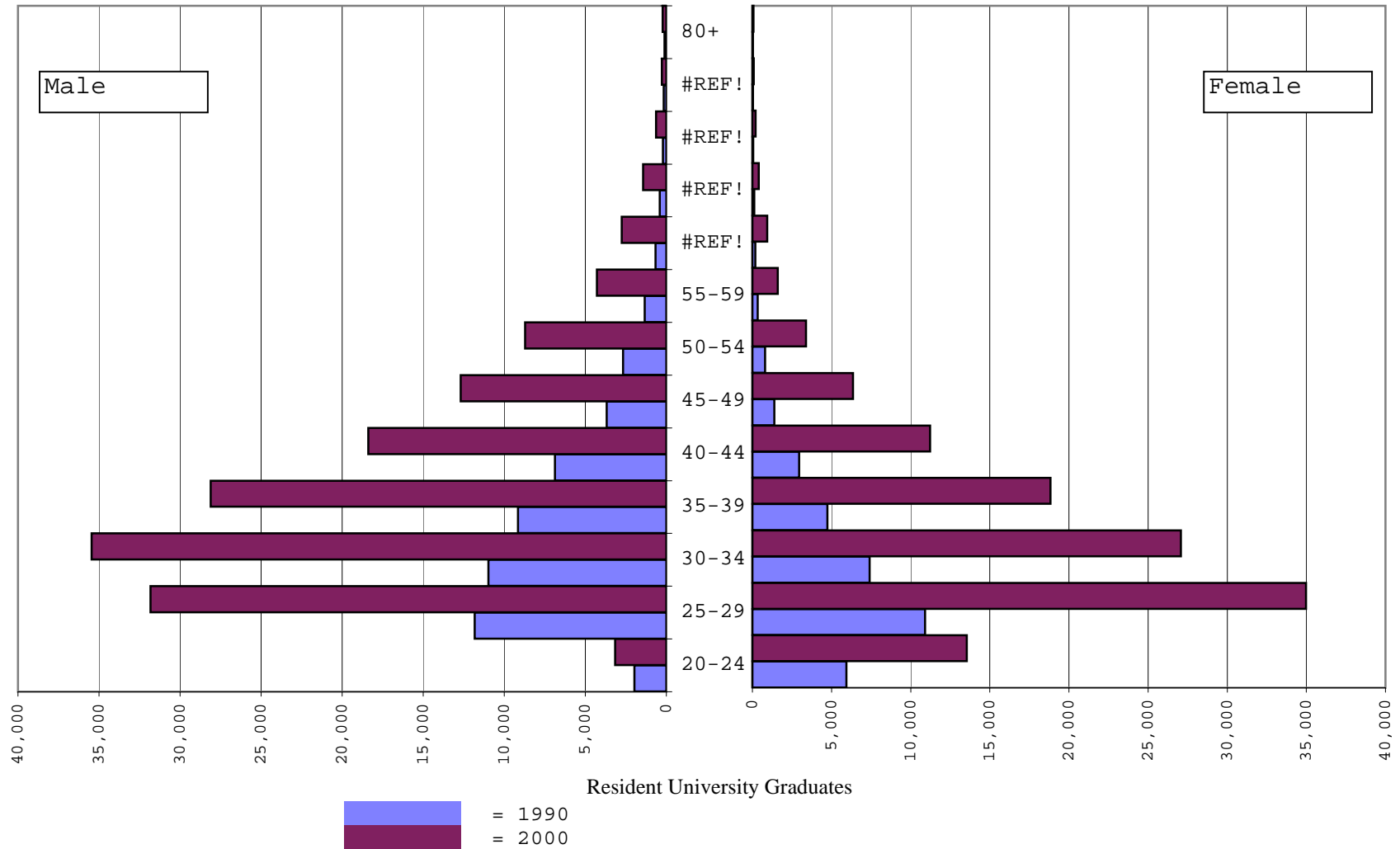


Figure 4

### Singapore: 1990-2000 Resident University Graduates by Age and Sex



Note: one of the U.S. Census Bureau Population Analysis Spreadsheets was used to prepare this figure.

Table 1 Selected Indicators of Social and Economic Change in Singapore, 1990-2000

	1980		1990		2000		Ratios of increase	
	number (000)	percent of total population	number (000)	percent of total population	number (000)	percent of total population	1980-1990	1990-2000
<b>Population</b>								
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
Non-residents (includes students, foreign workers and others)	132	5.5	311	10.3	755	18.8	2.36	2.42
Non-citizens	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
<b>Working persons</b>								
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
Non-citizen residents	40	3.7	57	3.7	164	7.8	1.42	2.89
Non-residents	79	7.4	248	16.1	612	29.2	3.13	2.47
Non-citizens	119	11.1	305	19.9	777	37.1	2.55	2.55
<b>Selected occupations</b>								
Managers			132	8.6	249	11.9		1.89
Professionals			64	4.2	187	8.9		2.91
(both)	52	5.1	196	12.8	436	20.8	2.53	2.22
Assoc profs	95	9.4	176	11.5	313	14.9	1.85	1.77
(all three)	147	14.5	373	24.2	749	35.8	2.53	2.01
<b>GDP</b> (1995 Million Singapore dollars)	37,959		77,299		161,143		2.04	2.08

Table 2 University graduates in the Singaporean economy

	1980		1990		2000	
	number (000)	percent of residents	number (000)	percent of residents	number (000)	percent of residents
<b>Resident non-students with:</b>						
Total	1,556	100.0	1,910	100.0	2,277	100.0
University degrees	33	2.1	85	4.4	267	11.7
Degrees and polytechnic diplomas combined	59	3.8	150	7.9	408	17.9
<b>Median monthly income</b> (constant 1995 Singaporean dollars)						
Overall	\$441		\$1,204		\$2,382	
University graduates	\$2,175		\$3,857		\$4,827	
Compared to:						
overall	6.45		3.20		2.03	
secondary school leavers	3.14		2.76		2.14	
<b>HDB resale price index</b>						
<b>private property index (URA)</b>						
			100		287	
			55		135	

Table 3 Percentage of the labor force and of selected occupations that are university graduates

	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 in selected years

2003/1992	2.396	1.865	1.156	2.005	3.296
2002/1992	2.215	1.754	1.101	1.945	2.710
2002/1990	2.970	1.841	1.018	2.511	170.331

Table 4 Involuntary employment separation among professionals, managers, executives, and technicians

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

Table 5 Proxy birth cohort, university preparation, and university intake

	1970	1980	1990	2000
Population aged 20 (proxy birth cohort)	45,802	61,018	42,007	41,079
Enrollment in last year of pre-university 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 (NUS, NTU, SMU)	2,075	3,002	6,928	11,232
Percent of proxy birth cohort (aged 20)	4.5	4.9	16.5	27.3
Percent of eligibles				
Pre-university course	44.3	39.0	51.8	90.7
Poly grads included	40.6	29.3	35.4	42.5



Table 6 Highest Educational Qualification Received by Residential Status

**Qualification  
1980**

	Non-Students Aged 5 Years and Over					
	Total	Residents	Citizens	Permanent Residents	Non-Residents	Non-Citizen
Total	1,660,944	1,555,759	1,479,484	76,275	105,185	181,460
percent of total		93.7	89.1	4.6	6.3	10.9
University	44,002	33,370	29,236	4,134	10,632	14,766
percent of university-educated		75.8	66.4	9.4	24.2	33.6
Percent of residence category that is university-educated	2.6	2.1	2.0	5.4	10.1	8.1

Working Persons Aged 10 Years and Over

	Working Persons Aged 10 Years and Over					
	Total	Residents	Citizens	Permanent Residents	Non-Residents	Non-Citizen
Total	1,077,090	997,815	957,607	40,208	79,275	119,483
percent of total		92.6	88.9	3.7	7.4	11.1
University	38,259	29,751	26,400	3,351	8,508	11,859
percent of university-educated		77.8	69.0	8.8	22.2	31.0
Percent of residence category that is university-educated	3.6	3.0	2.8	8.3	10.7	9.9

**1990**

Non-Student Population Aged 10 Years and Over

	Non-Student Population Aged 10 Years and Over					
	Total	Residents	Citizens	Permanent Residents	Non-Residents	Non-Citizen
Total	2,185,659	1,910,015	1,827,888	82,127	275,644	357,771
percent of total		87.4	83.6	3.8	12.6	16.4
University	103,800	84,919	73,116	11,662	18,881	30,543
percent of university-educated		81.8	70.4	11.2	18.2	29.4
Percent of residence category that is university-educated	4.7	4.4	4.0	14.2	6.8	8.5

Working Persons Aged 15 Years and Over

	Working Persons Aged 15 Years and Over					
	Total	Residents	Citizens	Permanent Residents	Non-Residents	Non-Citizen
Total	1,537,011	1,290,082	1,233,171	56,911	246,929	303,840
percent of total		83.9	80.2	3.7	16.1	19.8
University	92,526	72,925	62,893	10,032	19,601	29,633
percent of university-educated		78.8	68.0	10.8	21.2	32.0
Percent of residence category that is university-educated	6.0	5.7	5.1	17.6	7.9	9.8

**2000**

Non-Students Aged 15 Years and Over

	Non-Students Aged 15 Years and Over					
	Total	Residents	Citizens	Permanent Residents	Non-Residents	Non-Citizen
Total	2,958,732	2,277,400	2,056,969	220,431	681,332	901,763
percent of total		77.0	69.5	7.5	23.0	30.5
University	364,768	266,631	194,556	72,075	98,137	170,212
percent of university-educated		73.1	53.3	19.8	26.9	46.7
Percent of residence category that is university-educated	12.3	11.7	9.5	32.7	14.4	18.9

Working Persons Aged 15 Years and Over

	Working Persons Aged 15 Years and Over					
	Total	Residents	Citizens	Permanent Residents	Non-Residents	Non-Citizen
Total	2,094,814	1,482,579	1,387,719	94,860	612,235	707,095
percent of total		70.8	66.2	4.5	29.2	33.8
University	316,047	234,880	167,355	67,525	81,167	148,692
percent of university-educated		74.3	53.0	21.4	25.7	47.0
Percent of residence category that is university-educated	15.1	15.8	12.1	71.2	13.3	21.0

Table 7 Occupation by residential status

Year	Number Total (000)	Percent				
		Resident	Citizens	Permanent Residents	Non- Residents	Non- Citizen
2000						
Total	2,091	70.9	63.2	7.7	29.2	36.8
Senior Officials & Managers	249	85.0	72.6	12.4	15.0	27.3
Professionals	186	80.6	62.1	18.5	19.7	38.2
Associate Professionals & Technicians	312	90.8	79.7	11.0	9.3	20.3
Clerical Workers	230	92.7	83.7	8.9	7.3	16.3
Service & Sales Workers	212	86.5	80.3	6.2	13.8	20.0
Production & Related Workers	511	55.9	52.5	3.4	44.0	47.4
Cleaners, Labourers & Related Workers	335	30.2	28.5	1.7	69.9	71.6
Others	54	99.0	90.5	8.5	2.0	10.5
1990						
Total	1,537	83.9	80.2	3.7	16.1	19.9
Administrative & Managerial Workers	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 Workers	200	97.4	96.5	0.9	2.6	3.5
Sales & Service Workers	195	95.1	93.5	1.5	4.9	6.5
Production & Related Workers	473	75.4	71.8	3.6	24.6	28.2
Cleaners & Laborers	231	60.9	60.5	0.4	39.1	39.5
Others	66	99.5	95.7	3.8	0.5	4.3
1980						
Total	1,077	92.6	88.9	3.7	7.4	11.1
Administrative & Managerial Workers	52	87.0	81.4	5.6	13.0	18.6
Professional & Technical Workers	95	91.8	87.7	4.1	8.2	12.3
Clerical Workers	167	99.2	97.7	1.4	0.8	2.3
Sales Workers	132	97.9	93.9	4.0	2.1	6.1
Service Workers	112	92.7	87.4	5.3	7.3	12.6
Agricultural Workers & Fishermen	21	97.1	92.9	4.2	2.9	7.1
Production & Related Workers	435	88.2	84.0	4.2	11.8	16.0
Not Classifiable	62	99.2	98.2	1.0	0.8	1.8

Table 8 Singapore population by age and year

**Resident population by age group**

Age in 1990	1990		Age in 2000	2000		increase within cohort	
	persons	percent		persons	percent	net	percent
Total	2,705,115		Total	3,263,209		558,094	
0-4	223,403	8.3	0-4	213,278	6.5		
5-9	204,978	7.6	5-9	252,082	7.7		
10-14	197,892	7.3	10-14	235,438	7.2	12,035	5.4
15-19	221,412	8.2	15-19	211,320	6.5	6,342	3.1
20-24	232,281	8.6	20-24	212,609	6.5	14,717	7.4
25-29	283,681	10.5	25-29	267,582	8.2	46,170	20.9
30-34	293,032	10.8	30-34	290,880	8.9	58,599	25.2
35-39	252,725	9.3	35-39	323,064	9.9	39,383	13.9
40-44	203,975	7.5	40-44	313,048	9.6	20,016	6.8
45-49	127,556	4.7	45-49	262,626	8.0	9,901	3.9
50-54	117,512	4.3	50-54	207,082	6.3	3,107	1.5
55-59	99,801	3.7	55-59	125,471	3.8	-2,085	-1.6
60-64	82,810	3.1	60-64	111,103	3.4	-6,409	-5.5
65-69	59,729	2.2	65-69	89,182	2.7	-10,619	-10.6
70-74	44,960	1.7	70-74	68,001	2.1	-14,809	-17.9
75-79	32,269	1.2	75-79	40,053	1.2	-19,676	-32.9
80 & OVER	27,099	1.0	80 & OVER	40,390	1.2	-4,570	-10.2

152,102 Total gain within complete cohorts  
210,270 Gain within cohorts aged 10-54

**Singapore Citizens**

Age in 1990	1990		Age in 2000	2000		increase within cohort	
	persons	percent		persons	percent	net	percent
Total	2,595,243		Total	2,973,091		377,848	
0-4	218,453	8.4	0-4	196,994	6.6		
5-9	197,951	7.6	5-9	235,174	7.9		
10-14	191,313	7.4	10-14	222,603	7.5	4,150	1.9
15-19	216,097	8.3	15-19	202,730	6.8	4,779	2.4
20-24	224,002	8.6	20-24	195,909	6.6	4,596	2.4
25-29	268,574	10.3	25-29	222,343	7.5	6,246	2.9
30-34	279,006	10.8	30-34	237,063	8.0	13,061	5.8
35-39	240,425	9.3	35-39	281,886	9.5	13,312	5.0
40-44	194,613	7.5	40-44	287,758	9.7	8,752	3.1
45-49	119,906	4.6	45-49	245,664	8.3	5,239	2.2
50-54	111,609	4.3	50-54	195,986	6.6	1,373	0.7
55-59	96,279	3.7	55-59	117,707	4.0	-2,199	-1.8
60-64	79,694	3.1	60-64	104,910	3.5	-6,699	-6.0
65-69	57,319	2.2	65-69	84,936	2.9	-11,343	-11.8
70-74	43,342	1.7	70-74	64,267	2.2	-15,427	-19.4
75-79	31,063	1.2	75-79	38,212	1.3	-19,107	-33.3
80 & OVER	25,597	1.0	80 & OVER	38,949	1.3	-4,393	-10.1

2,340 Total gain within complete cohorts  
61,508 Gain within cohorts aged 10-54

Table 9 Resident university graduates by age, 1990 and 2000

**Cohort-based comparisons**

Age in 1990	1990		Age in 2000	2000		increase within cohort	
	persons	percent		persons	percent	net	percent
Total	84919		Total	266631		181712	
25 -29	22740	26.8	35-39	46940	17.6	24200	106.4
30-34	18388	21.7	40-44	29618	11.1	11230	61.1
35-39	13891	16.4	45-49	19041	7.1	5150	37.1
40 -44	9833	11.6	50-54	12093	4.5	2260	23.0
45 -49	5051	5.9	55-59	5883	2.2	832	16.5
50-54	3469	4.1	60-64	3686	1.4	217	6.3
25-44	64852			107692		42840	66.1

**Age-based comparisons**

	1990			2000		increase within age group	
	persons	percent		persons	percent	net	percent
Total	84919		Total	266631		181712	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

Table 10 Mean Age of Selected Sub-Populations, 1990 and 2000

	1990	2000	difference
Resident Population	31.2	34.0	2.8
Singapore 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 Over	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, Labourers 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, Social	33.2	34.2	1.1
Resident Non-Students Aged 15 Years and Over	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

Table 11 Occupational projection using 1990 occupational distribution and actual total employment and industry employment change

Total	Senior Officials & Managers	Professionals	Associate Professionals & Technicians	Clerical Workers	Service & Sales Workers	Production Craftsmen & Related Workers	Plant & Machine Operators & Assemblers	Cleaners, Labourers & Related Workers
Predicted occupation-industry distribution in 2000 (on basis of 1990 data)								
2,094,813	178,867	96,419	252,215	287,934	272,613	263,097	316,815	330,616
Actual occupation-industry distribution in 2000								
2,094,814	249,290	186,599	313,060	231,472	211,929	266,443	245,234	336,030
Surplus over predicted								
--	70,423	90,180	60,845	-56,462	-60,684	3,346	-71,581	5,414

Table 12 Sectoral distribution of non-residents by occupation

Non-residents as a percent of industry-occupation

	Total	Senior Officials & Managers	Professionals	Associate Professionals & Technicians
Total	29.2	15.0	19.5	9.5
Goods Producing Industries	45.7	15.9	26.1	13.7
Manufacturing	33.4	18.6	23.6	13.9
Construction	66.8	10.0	37.6	15.5
Other Goods Industries	13.6	14.1	14.7	1.6
Services Producing Industries	20.5	14.7	17.4	8.0
Wholesale & Retail Trade	11.5	13.4	20.9	6.8
Hotels & Restaurants	18.6	9.6	12.0	11.9
Transport & Communications	9.4	15.4	15.2	7.6
Financial Services	9.5	23.0	21.3	4.0
Business Services	15.5	16.6	24.2	7.6
Other Services Industries	36.5	8.1	10.8	10.8

Sectoral distribution of non-residents by occupation (percent)

	Total	Senior Officials & Managers	Professionals	Associate Professionals & Technicians
Total				
Goods Producing Industries	53.9	31.0	31.6	37.9
Manufacturing	23.7	24.5	22.3	31.6
Construction	29.9	5.9	8.9	6.2
Other Goods Industries	0.3	0.5	0.4	0.2
Services Producing Industries	46.1	69.0	68.4	62.1
Wholesale & Retail Trade	5.4	26.7	6.0	9.2
Hotels & Restaurants	3.5	2.5	0.2	1.4
Transport & Communications	3.0	8.4	3.7	7.6
Financial Services	1.5	11.0	8.9	4.5
Business Services	5.7	17.3	32.0	13.4
Other Services Industries	27.0	3.1	17.6	25.9

Degree of over-(under-) representation of non-residents

	Total	Senior Officials & Managers	Professionals	Associate Professionals & Technicians
Total	1.00	1.00	1.00	1.00
Goods Producing Industries	1.56	1.06	1.34	1.45
Manufacturing	1.14	1.24	1.21	1.47
Construction	2.29	0.67	1.93	1.64
Other Goods Industries	0.46	0.94	0.75	0.17
Services Producing Industries	0.70	0.98	0.90	0.84
Wholesale & Retail Trade	0.40	0.89	1.07	0.72
Hotels & Restaurants	0.64	0.64	0.62	1.25
Transport & Communications	0.32	1.02	0.78	0.80
Financial Services	0.32	1.53	1.09	0.42
Business Services	0.53	1.11	1.24	0.80
Other Services Industries	1.25	0.54	0.55	1.14