SOCIO-ECONOMIC INDICES AND THE IDENTIFICATION OF DISADVANTAGED SCHOOLS(Footnote 1)

(Footnote 1: This paper is based on a Report prepared for the State Management Committee of the Queensland Special Program Schools Scheme, Queensland State Education Department, April 1991)

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ABSTRACT

In May 1991 the process of identification of a new list of Queensland schools to be funded under the Commonwealth's Disadvantaged Schools Program for the next triennium was begun. Given the aim of the program, the Commonwealth's concern is that the funds be directed efficiently towards those schools with concentrations of students from low socio-economic backgrounds. To that end, an index of disadvantage based on Australian Bureau of Statistics census data has been developed by Dr. Ken Ross, and is used to distribute Commonwealth funds among the States. However, the distribution of funds within Queensland has previously been determined by a survey of school principals. This paper outlines the construction of indices of socio-economic disadvantage for the classification of Queensland government schools and highlights some of the technical and policy difficulties arising from this utilisation of Ross's methodology. We focus on the many valid criticisms of our indices from knowledgeable policy consultants in the various regions of the State.

INTRODUCTION

During the course of 1991, a new list of disadvantaged schools to be funded under the Commonwealth's Disadvantaged Schools Program (DSP), must be identified for the triennium 1992-1994. Given the aim of the program, the Commonwealth has been concerned that the funds be directed efficiently towards students from low socio-economic backgrounds. To that end, an index of disadvantage based on Australian Bureau of Statistics (ABS) census data has been developed by Dr Ken Ross (Ross, Farish and Plunkett, 1988, referred to hereafter as Ross). The distribution of Commonwealth funds among the States has been based on this index. However, the distribution of funds within a given State has been determined by a State management committee and approved by the State minister. Within Queensland, until this year,

schools that received funding had been identified on the basis of a survey of school principals. It is now proposed that "Ross's method" be extended to the school identification process in Queensland. With respect to government schools, Victoria, Tasmania, West Australia and the Northern Territory currently utilise variants of Ross's method.

In Section 2 of this paper, an attempt is made at an adequate definition of socio-economic disadvantage, because we strongly believe that an index of such disadvantage ought to be derived from such a definition, not vice-versa. Subsequent sections will describe the four steps involved in constructing an index of Ross's type on the basis of applying principal component analysis and weighting procedures to ABS census data. The index is then used to identify schools to be included or excluded from Queensland's Special Program Schools Scheme (SPSS) - the name in Queensland for the DSP. (Henceforth inclusion or exclusion will be referred to as SPSS status, and the schools included in the scheme will be called SPSS schools.)

The paper demonstrates that the introduction of indices to identify schools to be included in the SPSS will mean a shift away from the current inclusion/exclusion status of schools. There are sets of schools that are clearly identified as either disadvantaged or not, no matter what form of the index is employed. However, there remain up to 20,000 places outside of these schools (in the quota of 52,500 enrolments, using 1991 figures), whose inclusion or exclusion varies with choice of index. Any one index could, of course, be used to classify all 52,500 enrolments, but we feel that our preferred index should be used to allocate around 40,000 enrolments, followed by a tolerance region in which a purely operational approach is combined with the flexibility of local knowledge at the margins. The number 40,000 is derived from the average percentage agreement between the three indices considered in this paper, which are defined in Section 3. Using one preferred index to allocate all enrolments does have the advantage of administrative convenience and, as there are more disadvantaged students than available funds, such a procedure can be easily justified.

The effects of the introduction of indices on the current SPSS status will then be identified, followed by a discussion of the effects of different indices on SPSS status. The paper concludes with a number of recommendations on the use of an index in Section 9.

2. DEFINING SOCIO-ECONOMIC DISADVANTAGE

In constructing an index of socio-economic disadvantage for the purpose of classifying disadvantaged schools, one needs to begin with a definition

of 'socio-economic disadvantage'. In our view the index ought to reflect, indeed be drawn from such a definition, which in turn should have its base in the relevant theoretical and research-based social science literature.

Socio-economic scales derive from an approach to social inequality usually referred to as 'stratificationist' and/or 'categorical'. As such, they are concerned to categorise individuals on a scale from high to low prestige, most often using measures of occupation and income. Such an approach is usually contrasted with one which emphasises instead the relationships between broad social class groupings within the society and how that dynamic might explain aspects of the working of the social system. The latter approach is usually referred to as 'generative' in character. (See here Connell, 1977, pp. 4-7.) While the categorical approach emphasises the market capacity of individuals (occupation and income) and the status of their lifestyles, the generative approach emphasises, inter alia, power relations in the work place and inequalities in wealth distribution. For the purposes of classifying the most disadvantaged in the community, these differences are not so relevant. An index of socio-economic disadvantage based on census data should enable us to measure the most disadvantaged communities, while some measure of wealth would be necessary to considerations of the most advantaged. (For access to recent theoretical debates and empirical data on these matters, see Baxter, Emmison, Western and Western, 1991.)

There are probably a number of reasons, both political and pragmatic, why the liberal-democratic state has utilised the socio-economic status approach in implementing a number of equity based programs, including the Commonwealth's DSP. For a start, the type of data collected by the census derives from and lends itself to a socio-economic analysis. In Britain, the Registrar-General has classified occupations into socio-economic groupings since the 1951 census. The most recent Australian Standard Classification of Occupations also has something of the flavour of a socio-economic scale about it.

As suggested above, one needs to begin with a definition of socio-economic disadvantage to create an index, while the creation of such an index is necessary given the aims and nature of the DSP and a desire for a more rational and objective approach to classification. Thus, the Administrative Guidelines for Commonwealth Programs for Schools for 1991 states:

> The Disadvantaged Schools Program is designed to assist those schools serving communities with the greatest degree and concentration of socio-economic disadvantage to increase the educational opportunities of their students (p. 42).

(The emphasis on communities, rather than schools here should be noted.)

The same document articulates the objective of the program in the following fashion:

> The objective of the Disadvantaged Schools Program is to assist schools and school community groups improve the educational participation, learning outcomes and personal development of young people disadvantaged by socio-economic circumstances (p. 42).

Socio-economic measures usually give emphasis to the intersection of economic circumstances with cultural or lifestyle characteristics. Here economic circumstances are usually conceived in terms of incomes, rather than in combined income/wealth terms. We might describe socio-economic circumstances then as the way in which economic capital interrelates with 'cultural capital' to determine life chances. With respect to schooling, what we are looking at is the way in which the intersection of limited amounts of these two forms of capital operates within families to constrain the educational opportunities and outcomes available to the young people within such families.

Given the need to rely upon census data, the best measures of socio-economic status generally utilise a combined measure of income, occupational status (including unemployment) and educational qualifications. This is an approach confirmed by the stratificationist literature. Here we can see the intersection of the economic (income) with the social and cultural (occupational status and educational qualifications). These are the components of the most commonly used measure of socio-economic status. It should be noted that such a combined index plays down inequalities in the distribution of wealth, which are in turn greater than those in the distribution of incomes. However, we do not have ready access to wealth distribution data for Australia (see Connell, 1991). Further, given our concern with socio-economic disadvantage this is not such a problem.

In these terms, socio-economic disadvantage can be defined as low standing on a combined index of income, occupational status, unemployment and educational qualifications. Income here is family adjusted income as measured by census data. Family adjusted income takes account of family size and as such picks up single parent families with low income and thus takes account of the feminisation of poverty. The synergistic impact (both economic and cultural) of these factors is to constrain the educational opportunities available to young people from such families. In terms of educational opportunities, it should be pointed out that the strongest correlation here exists between parental educational qualifications and the educational performance of off-spring. There are also reasonably strong correlations between each of income, unemployment and occupation and educational performance.

Socio-economic disadvantage thus stems from the intersection of economic deficit and cultural factors which inhibit successful negotiation with the dominant public institutions of the society, including schools. It should be noted that we are not talking about cultural deficit here and further, that the characteristics of those institutions have as much (or perhaps more), to do with such disadvantage as the characteristics of the

socio-economically disadvantaged themselves. Those of low socio-economic status then experience disadvantage because of the combination of economic and cultural factors.

Connell, White and Johnston (1990, p. 18) in the overview report of their research on the DSP similarly suggest that socio-economic disadvantage results from economic vulnerability, including lack of both productive assets and marketable credentials, combined with cultural vulnerability. For them socio-economic disadvantage is 'a matter of low community income; labour market vulnerability and economic dependence; lack of organisational power; damaging physical and social environments and cultural marginalisation' (p. 6).

Accepting what has been argued to this point, socio-economically disadvantaged communities would be those manifesting the following traits:

- low occupational status and high levels of unemployment
- low educational qualifications
- low family adjusted income

The definition of socio-economic disadvantage outlined above could be made more complex by taking account of additional stratifying social/cultural features of communities, for example, type of accommodation, family characteristics, perhaps even, language spoken at home, and Aboriginality. It ought to be stressed, however, that disadvantaged Aborigines (which includes most of the Aboriginal population) will be picked up on an index of socio-economic status based on income, occupational status, levels of unemployment and educational qualifications (Tesfaghiorghis and Altman, 1991). With respect to ethnicity and matters of migrant disadvantage, there is a need to disaggregate the statistics into specific groups and period of 'settlement' (Castles, 1986; Kalantzis and Cope, 1987). Because of that, it is most likely the case that such a socio-economic index will likewise locate those migrants experiencing disadvantage. It should also be noted that there are reasonably strong correlations between any of these additional dimensions (for example, type of accommodation and family type) and the more traditionally utilised dimensions of income, occupational status and educational qualifications.

The policy reality of the Disadvantaged Schools Program is that there are more disadvantaged students in Australian schools than catered for under the program. This means that some further dimensions of socio-economic disadvantage might be useful in fine tuning selection of schools for inclusion. We feel that a housing dimension would be a useful distinguisher in that respect. Census data provides us with useful measures of accommodation (type of dwelling) and crowding. Type of dwelling is a very useful measure of socio-economic disadvantage, while crowding relates to educational performance. In our view the tenancy measure (rental as

opposed
to ownership) from census data does not relate strongly to socio-economic differences. The inclusion of a housing measure in an index would provide another distinguisher between otherwise similar communities.

If we accept what has been argued in the preceding paragraph, then socio-economically disadvantaged communities would be distinguished by:

- low occupational status and high levels of unemployment
- low educational qualifications
- low family adjusted income
- crowded and poor quality housing.

The Victorian State Advisory Committee for the DSP has accepted such a definition of socio-economic disadvantage and as such has endorsed an index which is a variant of Ross, which takes account of the dimensions listed above.

One further caveat needs to be elucidated here with respect to the creation of an index of socio-economic disadvantage. As sociological research has indicated (for example, Connell, White and Johnston, 1990), the
16% (500,000) of Australian students covered by the Disadvantaged Schools Program are not qualitatively very different from say the next 10% of students as measured on a scale of socio-economic disadvantage. (Indeed, one of the recommendations of their Report is that the program's coverage be
extended to 25% of the total school population.) What any index of socio-economic disadvantage provides is a continuum. However, targeting for disadvantage requires the creation of a cut-off point on this continuum. Such a cut-off point is, as Connell, White and Johnston (1990, p. 17) argue,
'arbitrary from the point of view of the logic of the index itself'. The need for such a procedure results from the provision of limited funds. It also results from the standard assumption of most equity programs of the DSP
type, which had their gestation in the compensatory logic of the late sixties and early seventies, that the socio-economically disadvantaged are qualitatively different from the rest of the population with respect to those educationally relevant aspects of their culture (Connell, White and Johnston, 1990, p. 17). That debate need not concern us here. (See Henry, Knight, Lingard and Taylor, 1988, ch. 7.) Suffice to say that the creation of a cut-off along the continuum of the index creates a number of problems particularly at the margin of inclusion/exclusion, which might be an argument for requiring additional data for inclusion at the margins. The nature of such social science indices also needs to be taken account of. (See here Manning, 1986, pp. 18 ff.) However, an argument for the use of one
index to classify all schools to be included can also be sustained. (See recommendations in Section 9.)

3. THE CONSTRUCTION OF INDICES OF DISADVANTAGE

Step 1. The Choice of Dimensions

After settling on a definition, there then has to be agreement upon the dimensions (or indicators) of socio-economic disadvantage that are to be employed in the construction of the index of disadvantage. The 12 dimensions considered by Ross fall into two broad groups, one socio-economic and the other social and cultural. These are listed in Table 1.

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TABLE 1 ABOUT HERE
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Step 2. The Measurement of the Dimensions of Socio-Economic Disadvantage

A decision must be made upon how these dimensions should be measured. The measures used here are the percentage prevalence of agreed levels of a dimension within the census district that contains any given school. The levels are derived by aggregation of ABS census categories. There needs to be agreement on the aggregations employed and on the use of percentage prevalence rates as their measure. Table 2 lists the levels used by Ross.

Occupation appears in Ross's analysis in two ways. The first includes unemployment as a level in the calculations of prevalence, and so unemployment does not appear as an independent dimension in associated analyses. The second removes unemployment from the dimension of occupation and treats occupation and unemployment as separate dimensions. In any case, prevalence of the first 6 levels are calculated separately for males and females.

Family structure is treated similarly to occupation, with single parent families being considered alone in dimension 7 and as a level of family structure in dimension 6; these two dimensions should not appear together in the analyses of Step 4, as they are competing measures of the same dimension.

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TABLE 2 ABOUT HERE
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The prevalence rates are calculated using ABS data for the census districts (CD's) in which a school's students live. A sample of students' records within schools is used to ascertain the census district within which they live and thus obtain a set of census districts that form a school's catchment area. The prevalence rates associated with a particular school must then be averaged over that school's catchment area, which raises the question of how the averaging is to be done. One method is to weight the

rates by the proportions of students in the census districts. Given adequate computerisation, complete sampling should not be a problem, the street names of the students' addresses being all that is required to compute exact prevalence rates. The Queensland State Education Department sampled at least 50 students per school in obtaining the 1988 data on which this paper rests.

All the dimensions need some degree of monitoring between census collections, although this is easier said than done. However, fairly sharp changes within one census district will usually be ameliorated by smoother change within neighbouring districts, although at least 3 areas of concern still remain:

(i) The categorisation of income needs attention in inflationary times, to remove 'bracket creep'.

(ii) The prevalence of persons lacking fluency in English may vary greatly with patterns of immigration, as may their socio-economic status.

(iii) Sudden changes in patterns of unemployment, especially its increase following structural changes in industrial or agricultural production.

Table 3 lists some of the advantages and disadvantages associated with basing the analyses on ABS data.

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TABLE 3 ABOUT HERE
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Step 3. The Calculation of Scores within Dimensions

A single score for each school within any given dimension is calculated by principal component analysis (PCA). For a given dimension, this mathematical process finds the linear combination of measures of prevalence that has the largest variance among all such combinations. In this mathematical sense, it is the optimal reduction of several measures into one score. It is best interpreted by considering

(i) the correlation between the score and its constituent parts - which in our case are the measures of prevalence of levels, and

(ii) the weights applied to the constituent parts to obtain the score.

The correlations are called 'loadings' and are used to assess the relative importance of the levels used to construct the score. The scores are oriented so that lower values correspond to greater levels of

disadvantage and higher values to greater levels of advantage. To ensure comparability across dimensions, scores are all normed in the same way. If this is not done, any process of combination is more likely to reflect scales of measurement rather than genuine covariation. The scores are normed to a mean of 100 and a standard deviation of 15. We have been unable to access ABS data and carry out the PCA within dimensions. The scores which form the basis of analyses in Step 4 and subsequent sections were calculated by Dr. Ross.

Although PCA is in one sense an optimal procedure, it should be noted that there are sometimes compelling, simpler alternatives that lead to scores that are more easily interpreted than principal component scores. One alternative is to aggregate a dimension into two levels and choose the percentage prevalence within one of them. For example, occupation (ignoring unemployment) could be categorised into (a) self employed, and (b) wage/salary earner, with the prevalence of (a) as our measure. Another useful device is to contrast two aspects of a dimension. For example, the difference in prevalence between white collar and blue collar occupations could be used; Ross's principal component for occupation has precisely this interpretation. Note that for dimensions that have been aggregated into two levels, there is no principal component to find, the score is just the normed version of the measure of prevalence of one of the levels and conforms to the first of the alternatives mentioned above.

Step 4. The Combination of Dimensional Scores into an Index of Disadvantage

The final step is to decide on the means of combining the dimensional scores into an index of disadvantage. There is an infinity of ways of doing this; however, the aim is to decide on a single index - which may itself arise from pooling several indices - that ranks schools in terms of disadvantage, and can thus be used to identify SPSS schools.

The authors feel compelled to remark straightaway that PCA (a data-based procedure) has been used to create dimensional scores, and that Ross's method now moves on to more arbitrary means of combining these scores into an index of disadvantage. In policy terms, this is where the formally rational meets the political. In Section 7, the consequences of continuing to use PCA to combine the dimensional scores are pursued, with, it is noted, some success.

Ross's method uses linear combinations of the dimensional scores, with user-defined integer weights. Ross (Table 3.3, p. 21) lists the weights for 20 possible indices, labelled a to t. These weights are reproduced in Table 4, along with mnemonic names for the dimensions. It must be noted that the weights are inherently arbitrary, and gain credibility only through

intuitive reasonableness and grounding in social theory.

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TABLE 4 ABOUT HERE
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The weights reflect the relative importance given to each dimension, with a zero weight corresponding to the exclusion of a dimension. To facilitate the comparison of different indices, we have normed them in the same way as dimensional scores. This process is mandatory if different indices are to be combined. The indices derived from the weights in Table 4 fall into 3 main categories, broadly labelled as economic, social and a mixture.

(1) Economic: a, p, q, r, s, t
(2) Social: b, c, d
(3) Mixture: e, f, g, h, i, j, k, l, m, n, o

There are alternatives to making a single choice based on user-defined linear combinations, in spite of the compelling desire for simplicity. Several competing indices might be averaged into a single "average" index, perhaps in order to combine different points of view(Footnote 2).

(Footnote 2: Einstein's maxim might be adapted here. "Indices should be a simple as possible, and no simpler".)

A compelling alternative is to apply PCA to the dimensional scores (remember that these scores are themselves the outcome of PCA). This data-based approach relieves the user of the necessity to produce weights and lets the data decide on the relative importance of the dimensions. This approach underlies Manning's indices (s and t) in Table 4 and is pursued for our data in later Sections.

The suggestion of using PCA could be taken back one remove, and in Step 3, PCA could be applied to levels, taken across subsets of the dimensions. This may produce interpretable dimensions of its own, along with an optimal combination of prevalence rates across dimensions. This can only be implemented with the raw data on percentage prevalence rates.

4. THE IMPACT OF INDICES OF DISADVANTAGE ON CURRENT PRACTICE

In order to help assess the impact of various indices of disadvantage on SPSS schools, 4 indices have been chosen to demonstrate different outcomes within a ceiling allocation of 52,500 enrolments in the scheme (the 1991 Commonwealth figure for disadvantaged government schools in Queensland). A comparison of SPSS status under current practice and that implied by the indices will then be undertaken. A name and description of

the 4 trial indices is now given.

(1) Occupation (OCC1). Current practice is based on occupational status (including unemployment), as determined by school principals for a sample of at least 50 students. Our first index is therefore the census based equivalent of current practice.

(2) Economic (ECON4). A simple average is taken over four dimensions:- occupation (excluding unemployment), unemployment, income and education.

(3) Victorian (VICAP6). The Victorian Government's "Option A" (Sheehan, 1990) ameliorates the strongly socio-economic emphasis of the ECON4 index by weighting in the two further socio-cultural dimensions of crowding and accommodation. Rather than use user-defined weights, our index applies PCA to the same six dimensions:- occupation (excluding unemployment), unemployment, income, education, crowding and accommodation. The loadings and weights for this index are given in column 5 of Tables 10 and 11 of Section 7.

(4) Full Principal Component Analysis (PCA10). A full PCA is applied across the ten distinct dimensions:-occupation (excluding unemployment), unemployment, education, income, family structure (including single parent families), accommodation, tenancy, crowding, language fluency and Aboriginality. The loadings and weights for this index are given in column 2 of Tables 10 and 11 of Section 7.

Note that the 4 indices are on a continuum ranging from the more socio-economic (OCC1, ECON4) through to the more socio-cultural (VICAP6, PCA10).

Table 5 gives certain summary statistics about enrolments for the SPSS status implied by these 4 indices, compared with current practice.

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TABLE 5 ABOUT HERE
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The occupation index (OCC1) contrasts starkly with current practice (itself based on assessing occupation) and has been included in our list of four only to demonstrate the difference between supposedly objective and subjective assessments of occupational status. We believe this disparity is further evidence to support the move to an index-based approach, given the greater validity of ABS data. The authors do not consider the OCC1 index to be a serious candidate for actual use, and it will only be considered briefly in subsequent Sections of this paper. The agreement between current and implied status is 44% (23183 as a percentage of 52500), compared with the admittedly not much better agreement of 56% (29252 as a percentage of

52500) for the PCA10 index. The clear evidence of Table 5 is that a move to index-rated socio-economic disadvantage implies a shift away from current practice.

We now explore the relationships between the form of the index, the implied SPSS status and enrolments by considering regional effects. This is about as far as we can go with the data supplied, but we still manage to pinpoint where change will take place. Tables 6, 7 and 8 look at the implications of the ECON4, VICAP6 and PCA10 indices on the numbers of schools and enrolments in the SPSS by region.

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TABLE 6 ABOUT HERE
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On the basis of the ECON4 index, there is a shift in emphasis at the expense of south-east Queensland (the two Brisbane regions and West Moreton), the North-West, Peninsula and Capricornia towards schools in the Sunshine Coast and Wide Bay regions(Footnote 3).

(Footnote 3: At the SPSS forum in Brisbane (April, 1991), another economic indicator was trialled based on occupation and income alone, which produced a very different shift towards the South-West, Darling Downs and Wide Bay Regions, at the expense of all of South-East Queensland.)

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TABLE 7 ABOUT HERE
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This index, with its economic emphasis, tempered by socio-cultural considerations, implies a shift away from Brisbane based regions. The gains are more evenly spread than for the ECON4 index, with Northern and Peninsular regions being provided with more than 2,000 extra places each. Wide Bay and Sunshine Coast still gain, but they are no longer the sole major beneficiaries they were under the ECON4 index.

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TABLE 8 ABOUT HERE
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We see from Table 8, that for an index with a distinct socio-cultural flavour, South-East Queensland still loses enrolments, but the major gains are made in the Northern and Peninsular regions.

5. CONSISTENT FEATURES OF SPSS STATUS BETWEEN METHODS OF ALLOCATION TO THE SCHEME

We have identified a large middle ground of change in SPSS status on

the basis of changing over to the use of indices of disadvantage. The figures for the indices in Table 5 show that between 25,000 and 30,000 of the available 52,500 enrolments may "change places". Having exposed this very large middle ground of movement, it is important to know

(a) the extent of concordance between the current status and that implied by indices, and
(b) the extent of the consistency, or middle ground of debate, between indices.

In order to obtain a measure of consistency in the face of an infinity of possible indices, consistency is measured by counting the number of times
a school would be included in the SPSS across our 3 trial indices, ECON4, VICAP6 and PCA10, taking into account a ceiling of 52,500 enrolments. This is cross-tabulated with the current status in Table 9 for schools and enrolments that are either definitely included or definitely excluded on the
basis of this restricted definition of consistency.

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TABLE 9 ABOUT HERE
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We see that 122 schools are in the SPSS under current and implied status, and comprise 20,740 of the 52,500 allotted enrolments. That is, only about 40% of available places are similarly allocated by the current and proposed schemes.

6. CONSISTENT FEATURES OF SPSS STATUS USING INDICES OF SOCIAL DISADVANTAGE

We now quantify the degree of consistency of SPSS identification between indices (ignoring current status). From the infinity of possible indices, attention is restricted to the 3 trial indices ECON4, VICAP6 and PCA10 described above. There are 202 schools that are included in SPSS on all 3 indices, involving 34146 enrolments (65% of 52500). The agreement between the 3 indices is reasonable. A further 856 schools are excluded. The remaining 227 schools are identified for the SPSS by at least one of the
indices.

7. INDICES BASED ON PRINCIPAL COMPONENT ANALYSIS

An alternative to user-defined weights is to combine the dimensions by PCA, and give meaning to the resulting index (the normed first principal component score) by its loadings. Table 10 presents the loadings for five closely related sets of dimensions, using the mnemonic names given in Table 4. The five sets are needed to deal with the two definitions of both occupation and family structure. The PCA10 index defined in Section 4

appears as the second set and the VICAP6 index as the fifth set. Note that the loadings are the correlations between the individual dimensions and the corresponding first principal component; correlations greater in magnitude greater than .5 are considered to represent a strong relationship. The loadings, re-scaled into relative weights that sum to 100 are given in Table
11.

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TABLES 10 and 11 ABOUT HERE
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It is valuable confirmation of practice elsewhere to note that the data-defined weights for the VICAP6 index in column 5 of Table 11, when rounded to the nearest 10, agree with the user-defined integer weights of the Victorian government's Option A, which the authors feel gives further credence to this particular form of index.

8. EXTERNAL VALIDITY

Ross (p. 8) presents evidence of good correlations (around .7) between one of his indices and school achievement (a word knowledge test and a literacy test), plus less convincing correlations (around -.2) with social and learning handicaps. If average measures of school achievement could be made available, a measure of the validity of the indices of disadvantage becomes possible.

9. RECOMMENDATIONS

(1) Recommend the use of a census-based index of disadvantage in preference
to current practice, because of the objectivity of ABS data and the intuitive acceptability of the approach given current social theories.

(2) Strongly recommend that the method used to construct the index be made public knowledge, to provide an informed basis for debate.

(3) Recommend that the particular form of index should be data-based, using
the following 6 dimensions:

(i) occupation (excluding unemployment),
(ii) unemployment,
(iii) educational qualifications,
(iv) family adjusted income,
(v) crowding, and
(vi) accommodation.

(4) The index given in Recommendation 3 could be used to allocate all

52,500 enrolments. This process is administratively convenient and justifiable, especially as the number of enrolments is less than the numbers of disadvantaged students.

An alternative approach allows some form of tolerance by selecting the first 40,000 enrolments via the index, with the remaining 10,000 utilising index position and local knowledge. One symmetrical procedure would be to continue ranking schools on the index up to a notional ceiling of around 60,000, so that the deficit and notional excess in the allocation of places is roughly the same, that is, 10,000 on each side of the ceiling of about 50,000. This procedure reduces the number of places to be debated upon from 52,000 to around 22,000(Footnote 4). Serious policy thought needs to be given to choice within these tolerance limits. Perhaps all schools within these limits should be invited to sustain an argument for inclusion. A consideration of the specific goals of the DSP against the smorgasbord of other Commonwealth and State funded equity programs ought also to be useful in considerations at the margins.

(Footnote 4: South Australia, as indicated in a report of their review of the index declared list, is considering utilising the following criteria for identification of schools at the margins.

- High school transience rate.
- Newly established schools in rapidly growing areas.
- Schools in localities which lack community facilities.
- The index ranking of co-sited schools.)

Given our preferred index and given the effect of such an index of excluding large high schools, some consideration could be given to school size and secondary characteristics for inclusion at the margins. The demography of Queensland means that there are many small primary schools and a concentration of large high schools in Brisbane and the large provincial centres (furthermore, Queensland has very large high schools by national standards). This means, in effect, that the large high schools draw on larger catchment areas than the primary schools, thus diluting the concentration of socio-economically disadvantaged students and ensuring exclusion from the Program. Perhaps a formula would be constructed so that the high schools fed by high index-rated primary schools be included at the margins. Such a procedure, however, would have to take account of the objective of the Disadvantaged Schools Program, that is, to serve schools with concentrations of socio-economically disadvantaged students.

Such a recommendation ought to circumvent problems arising from sudden changes in prevalence data between census collections, as local knowledge can be used to ameliorate the effect of the index of disadvantage on selection.

(5) Recommend that some measure of the validity of the index of disadvantage be achieved by relating the index to measures of school achievement.

(6) Recommend that a precise procedure be developed for linking prevalence data for any given school with all the census districts within its catchment area, to improve the quality of the prevalence data and hence the quality of the index of disadvantage.

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TABLE 1. DIMENSIONS OF SOCIO-ECONOMIC DISADVANTAGE

Socio-economic Dimensions
1 Occupation (including unemployment)
2 Occupation (excluding unemployment)
3 Unemployment
4 Education
5 Income
Social and Cultural Dimensions
6 Family Structure (including single parent families)
7 Single parent families
8 Accommodation
9 Tenancy
10 Crowding
11 Language
12 Aboriginality

TABLE 2. THE AGGREGATION OF AUSTRALIAN BUREAU OF STATISTICS CATEGORIES INTO LEVELS WITHIN DIMENSIONS

1,2	Occupation	Professional; administrative; clerical; sales, trades; production/process; labourers; unemployed
3	Unemployment	Unemployed
4	Education	Degree; certificate or "other quals"; students more than 15 years old; left school less than 15 years old; never attended school; no qualifications
5	Income	Family income more than $26,000; family income less than $10,000
6,7	Family Structure	Persons separated or divorced; single parent families
8	Accommodation	dwellings (greater than 7 rooms); improvised homes/caravans; dwelling (less than 4 rooms)

9	Tenancy	Dwellings being purchased; tenant (housing authority); tenant (private)
10	Crowding	Average number of bedrooms per person; households with more than 5 persons; households with more than one family
11	Language	Persons lacking fluency in English
12	Aboriginality	Aboriginal or Torres Strait Islander

TABLE 3. THE USE OF ABS DATA

Advantages	Disadvantages
‹ Objectivity of census data	‹ Length of time between census collections
‹ Accuracy of census data (at the time of collection)	‹ Difficulties in detecting prevalence shifts between census collections
‹ Essentially complete enumeration within a CD	

TABLE 4. TWENTY SETS OF WEIGHTS FOR COMBINING DIMENSIONS INTO INDICES

	Dimension											
	1	2	3	4	5	6	7	8	9	10	11	12
Index	occ1	occ2	unem	educ	inc	fam	spf	acc	ten	crd	lang	abr
Ross Models												
a	1	0	0	1	1	0	0	0	0	0	0	0
b	0	0	0	0	0	1	0	1	1	1	0	0
c	0	0	0	0	0	0	0	0	0	0	1	0
d	0	0	0	0	0	0	0	0	0	0	0	1
e	1	0	0	1	1	1	0	1	1	1	0	0
f	1	0	0	1	1	0	0	0	0	0	1	1
g	1	0	0	1	1	1	0	1	1	1	1	1
h	2	0	0	2	2	1	0	1	1	1	1	1
i	1	0	0	1	1	2	0	2	2	2	1	1
j	1	0	0	1	1	1	0	1	1	1	2	1
k	1	0	0	1	1	1	0	1	1	1	1	2
Models suggested by school systems												
l	1	0	0	1	1	1	0	1	1	1	0	1

m	2	0	0	2	2	1	0	1	1	1	0	0
n	2	0	0	2	2	1	0	1	1	1	0	1
o	3	0	0	3	3	2	0	2	2	2	1	1
Commonwealth Schools Commission Models												
p	0	50	10	15	20	0	0	0	0	0	0	5
q	0	50	20	15	0	0	5	0	0	0	0	10
r	0	55	20	15	0	0	0	0	0	0	0	10
Manning Models												
s	0	64	10	21	0	0	5	0	0	0	0	0
t	0	75	0	25	0	0	0	0	0	0	0	0

Source: Ross (1988)

TABLE 5. SUMMARY STATISTICS FOR ENROLMENTS IN THE SPSS

Current status	implied status	# schools	Enrolments total	mean	std	min	max	median	
Occupation (OCC1)									
out	out	870	303201	349	350	0	1817	246	
out	in	134	29350	219	240	6	1233	120	enter
in	out	160	30746	192	229	6	1475	109	leave
in	in	121	23183	192	208	8	1050	100	
Economic (ECON4)									
out	out	826	304143	368	349	0	1817	284	
out	in	178	28408	160	223	6	1267	61	enter
in	out	137	29593	216	249	7	1475	142	leave
in	in	144	24336	169	186	6	851	89	
Victoria (VICAP6)									
out	out	860	308924	359	347	0	1817	271	
out	in	144	23627	164	229	6	1233	59	enter
in	out	137	29593	216	249	7	1475	109	leave
in	in	164	28996	177	181	6	851	101	
PCA (PCA10)									
out	out	872	309413	355	347	0	1817	260	
out	in	132	23138	175	232	6	1233	60	enter
in	out	110	24677	224	269	7	1475	109	leave
in	in	171	29252	171	179	6	876	100	

TABLE 6. ENROLMENTS WITHIN REGIONS BY CURRENT AND IMPLIED SPSS STATUS BASED
ON THE "ECON4" INDEX

Status Numbers of Schools

CUR	IMP	BN	BS	CA	DD	NW	NO	PE	SO	SW	SU	WM	WB
out	out	93	96	84	86	25	93	48	64	40	46	91	60
out	in	0	1	14	18	4	30	21	6	12	13	16	43
in	out	16	11	12	12	9	13	23	6	5	3	18	9
in	in	1	3	11	8	4	13	32	11	4	5	25	27
# extra schools		-16	-10	+2*	+6*	-5	+17	-2	0	+7	+10	-2	+34

Numbers of Enrolments

Status													
CUR	IMP	BN	BS	CA	DD	NW	NO	PE	SO	SW	SU	WM	WB
out	out	44068	43625	25632	20349	4492	30442	15409	40067	4721	26667	31704	17327
out	in	0	56	599	1687	116	3275	2918	3961	621	4344	2672	8159
in	out	3458	2163	1714	1815	2003	2694	5479	3805	436	348	3971	1707
in	in	17	502	1224	996	128	1540	3188	5108	869	1311	6297	3156
# extra enrolments		-3458	-2107	-1115	-128	-1887	+581	-2561	+156	+185	+3996	-1299	+6452

CUR status in current triennium; IMP status implied by the index;
* Increase in school numbers accompanied by a decrease in enrolments.
BN Brisbane North BS Brisbane South CA Capricornia DD Darling Downs
NW North Western NO Northern PE Peninsula SO South Coast
SW South Western SU Sunshine Coast WM West Moreton WB Wide Bay

TABLE 7. ENROLMENTS WITHIN REGIONS BY CURRENT AND IMPLIED SPSS STATUS BASED ON THE "VICAP6" INDEX

Numbers of Schools

Status CUR	IMP	BN	BS	CA	DD	NW	NO	PE	SO	SW	SU	WM	WB
out	out	92	96	85	96	23	93	43	64	44	52	95	77
out	in	1	1	13	8	6	30	26	6	8	7	12	26
in	out	15	10	11	14	7	9	5	5	5	4	20	12
in	in	2	4	12	6	6	17	50	12	4	4	23	24
# extra schools		-14	-9	+2*	-6	-1	+21	+21	+1	+3*	+3	-8	+14

Numbers of Enrolments

Status CUR	IMP	BN	BS	CA	DD	NW	NO	PE	SO	SW	SU	WM	WB
out	out	43862	43265	25873	21657	4394	29611	14303	40067	5047	27516	32522	20897
out	in	206	56	448	379	214	4106	4024	3961	295	3495	1854	4589
in	out	3146	1986	1430	1916	1562	2099	1963	3759	436	457	4008	2171
in	in	329	679	1508	895	569	2135	6704	5154	869	1202	6260	2692
# extra enrolments		-2940	-1930	-982	-1537	-1348	+2007	+2061	+202	-141	+3038	-2154	+2418

CUR status in current triennium; IMP status implied by the index;
* Increase in school numbers accompanied by a decrease in enrolments.
BN Brisbane North BS Brisbane South CA Capricornia DD Darling Downs
NW North Western NO Northern PE Peninsula SO South Coast
SW South Western SU Sunshine Coast WM West Moreton WB Wide Bay

TABLE 8. ENROLMENTS WITHIN REGIONS BY CURRENT AND IMPLIED SPSS STATUS BASED

ON THE "PCA10" INDEX

Status — Numbers of Schools

CUR	IMP	BN	BS	CA	DD	NW	NO	PE	SO	SW	SU	WM	WB
out	out	89	95	82	100	18	99	41	64	41	55	102	86
out	in	4	2	16	4	11	24	28	6	11	4	5	17
in	out	13	5	8	13	5	7	5	6	4	7	20	17
in	in	4	9	15	7	8	19	50	11	5	1	23	19
# extra schools		-9	-3	+8*	-9	+6*	+17	+23	0	+7	-3	-15	0

Status — Numbers of Enrolments

CUR	IMP	BN	BS	CA	DD	NW	NO	PE	SO	SW	SU	WM	WB
out	out	43010	43013	25034	21849	3614	29962	12004	40067	4470	29512	33659	23219
out	in	1058	308	1197	187	994	3755	6323	3961	872	1499	717	2267
in	out	2845	1273	1317	2031	1040	2036	1963	3834	337	1642	3567	2792
in	in	630	1392	1621	780	1091	2198	6704	5079	968	17	6701	2071
# extra enrol-ments		-1787	-965	-120	-1844	-46	+1719	+4360	+127	+535	-143	-2850	-525

CUR status in current triennium; IMP status implied by the index;
* Increase in school numbers accompanied by a decrease in enrolments.
BN Brisbane North BS Brisbane South CA Capricornia DD Darling Downs
NW North Western NO Northern PE Peninsula SO South Coast
SW South Western SU Sunshine Coast WM West Moreton WB Wide Bay

TABLE 9. SCHOOLS AND ENROLMENTS BY CURRENT AND IMPLIED SPSS STATUS

	Numbers of Schools		Numbers of Enrolments	
	Current status		Current Status	
Implied status	out	in	out	in
out	776		293726	
in		122		20740

TABLE 10. CORRELATIONS BETWEEN DIMENSIONS AND FIVE FIRST PRINCIPAL COMPONENTS

	PCA10			VICAP6	
Dimension	1	2	3	4	5
occ1	0.70		0.70		
occ2		0.55		0.55	0.64
unem		0.63		0.63	0.64
educ	0.58	0.50	0.59	0.51	0.68
inc	0.50	0.51	0.50	0.52	0.72
fam	0.11	0.26			
spf			0.09	0.22	
acc	0.54	0.64	0.52	0.61	0.55
ten	0.60	0.56	0.60	0.56	
crd	0.75	0.71	0.76	0.72	0.52
lang	0.08	0.13	0.08	0.12	
abr	0.72	0.73	0.73	0.72	
% variance explained	31.5	30.3	31.5	30.2	39.7

TABLE 11. THE WEIGHTS ACROSS DIMENSIONS FOR THE FIVE FIRST PRINCIPAL COMPONENTS

	PCA10			VICAP6	
Dimension	1	2	3	4	5
occ1	15		15		
occ2		11		11	17
unem		12		12	17
educ	13	9	13	10	18
inc	11	10	11	10	19
fam	2	5			
spf			2	4	
acc	12	12	12	12	15

ten	13	11	13	11	
crd	16	14	17	14	14
lang	2	2	2	2	
abr	15	14	15	14	

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