

Factors affecting state and territory differences in student retention in Australia¹

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Abstract

Apparent retention rates have been an important measure of school system performance in Australia, yet they have not been necessarily an accurate measure of relative performance. A range of factors affects the rates, some related to the measurement of retention itself, some to differences in populations, and some to differences in policies. This paper has shown that it is possible to adjust for some of these factors to make more accurate comparisons of system performance. When we do make adjustments the gaps between the states and territories reduce substantially. Differences in the sizes of the adjustments help identify several important influences that need to be considered both for the measurement and comparison of student retention and for the targeting of policies to improve retention rates and reduce differences.

Introduction

An important goal in Australian education is to ensure that all young people have the opportunity to complete Year 12 or its vocational equivalent. The National Goals for Schooling in the Twenty-First Century include the aim that ‘all students have access to the high quality education necessary to enable the completion of school education to Year 12 or its vocational equivalent and that provides clear and recognised pathways to employment and further education and training’ (MCEETYA, 1999). Yet rates of retention to Year 12 vary across states and territories (‘jurisdictions’) and have varied substantially over time. While the national apparent retention rate increased markedly during the 1980s, before easing in the 1990s, differences between jurisdictions diverged over this period. Some of this divergence may be due to population and economic differences, other to policy differences linked to characteristics of school systems, senior school certificate reforms, curriculum and program changes (such as the development of Vocational Education and Training in schools), and school-based policies.

Contributing also to differences between jurisdictions are problems in the measurement of retention itself. Student retention is usually expressed as the percentage of Year 7/8 students who progress to Year 12. These statistics are often referred to as apparent retention rates, in recognition of the fact that they do not take account of such things as the movement of students between states and territories, differences in immigration levels, part-time secondary study, students who repeat a

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year, adult re-entry students (from an earlier Year 7/8 cohort), inter-sector school transfers, students who spread Year 12 over two years, and differences between jurisdictions in enrolment policy and full-time Year 12 workloads. For these reasons, simple comparisons of annual published apparent retention rates can be misleading.

Partly in response to such measurement issues, the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) Taskforce on Performance Monitoring and Reporting has proposed two alternative measures: the participation of 15-19-year-olds in education, training and work, and the percentage of 19-year-olds who have completed Year 12 or attained a qualification at Australian Qualification Framework (AQF) Certificate II or above (MCEETYA, 2003). These indicators also have measurement limitations and rather than being treated as replacements for retention need to be viewed as additional measures of school performance.

All states and territories are committed to increasing rates of retention and identifying the most appropriate interventions or mechanisms for doing so. In this context, it is vital to gain an understanding of the factors that affect differences in retention rates. Only then will it be possible to get some sense about what can be targeted from a policy perspective to improve rates of retention. Included in this is a need to identify the factors that affect the measurement of retention and limit its usefulness as a performance indicator.

This paper reports the results of a study set up to identify the main drivers of current trends in retention rates across states and territories, and to develop and apply a model of differences in patterns of retention. The study included a review of research on retention in order to identify key factors affecting retention and participation, conducted in conjunction with a series of interviews with a sample of senior policymakers in each jurisdiction to identify, from their experience, the key factors that shape retention. From this phase of work, a model of retention was developed conceptualising the impact of sets of factors on differences between jurisdictions in retention. Elements of the model were then tested using data from a variety of sources including the Australian Bureau of Statistics (ABS) publication *Schools Australia*.

The design of the study was distinctive in its method of linking research with policy. As well as the traditional methods of literature review, meta-analysis, survey and statistical modeling, it also included discussions with policy staff in all state and territory education departments during the hypothesis-forming part of the project, workshops on the policy implications of the findings with senior officers in four jurisdictions, and interaction with a steering committee that included state and Commonwealth officers, school-based staff and a parent representative. All jurisdictions had the opportunity to comment on the project report before it was published. The full report was presented and workshopped at a national forum in September 2004. The net effect of these methods was to increase the accuracy and legitimacy of the project, and to increase the use of this research in policy development.

The work is important because it contributes to our understanding of the factors that influence school performance and provides more accurate assessments of system comparisons. We begin by examining the current trends in student retention and

particularly the differences across states and territories. The following section summarises some of the research on differences between jurisdictions in retention, paying particular attention to the factors that have been identified as important influences. From this we develop a conceptual model of factors shaping differences across jurisdictions including a range of policy factors such as school organisation, resources and curriculum, and non-policy factors such as social, demographic and economic characteristics. Elements of the model are then tested using available data. Included in this applied modeling is a series of adjustments needed to correct problems in the measurement of retention such as changes in population, the effects of differences in overseas and interstate migration, and variations in the numbers of part-time students and the numbers of mature-age and cross-border students.

State and territory differences in retention

By May 2003, nearly 1 out of every 3 young Australians aged 15-24 enrolled in secondary school in 2002 had left school before reaching Year 12 or completing a senior school certificate (ABS, 2003). In total, the non-completers accounted for approximately 90,000 of the 295,000 15 to 24-year-olds enrolled in secondary school in the previous year. These numbers have not changed appreciably in recent years and are proportionately high compared to other OECD countries (Lamb, Long & Baldwin, 2003). The cumulative effect of tens of thousands of young people leaving school each year short of finishing a senior school program translates into hundreds of thousands of young people who are out of school, and lacking a senior secondary school credential.

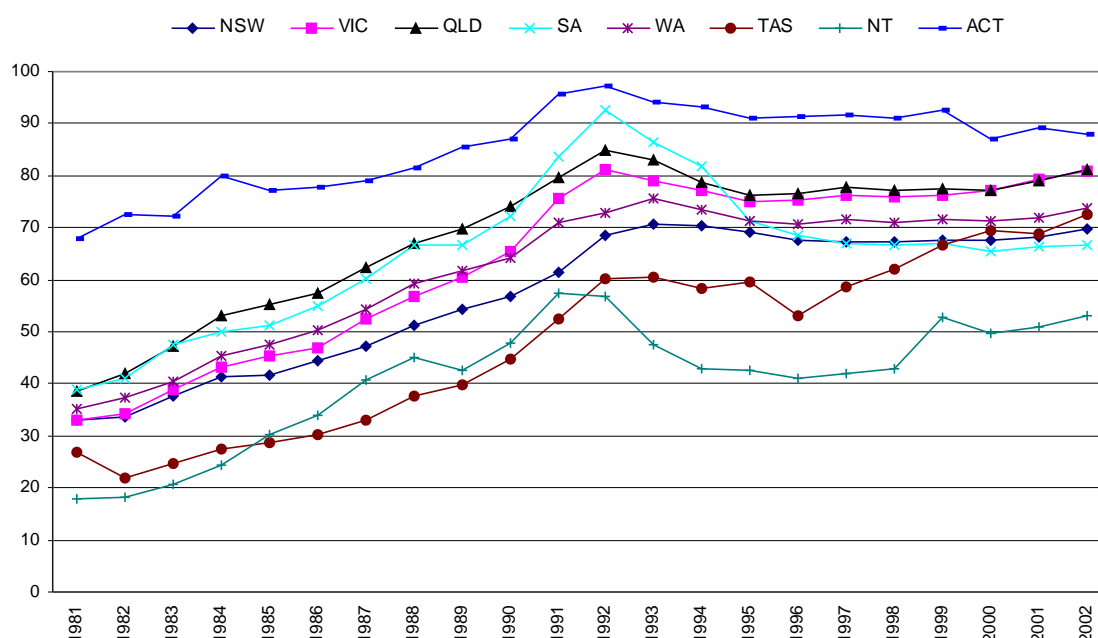
National retention rates mask large variations in early leaving and completion across the states and territories. Discussion of national trends in school retention conceals the fact that schools are divided along lines of state and territory responsibility and are subject to differences in state and territory economic conditions and in the composition and dispersion of domestic populations. The impact of these political and demographic differences is evident in the rates of retention from 1981 by jurisdiction presented in Figure 1.

It is important to note that the comparisons using ABS figures are not adjusted for differences in population change and levels of migration and the numbers of part-time students. These have had an influence on the figures for particular states. Yet despite these limitations, state and territory comparisons are revealing because long-term patterns of growth or decline occur within the contexts of state and territory provision. Differences across states in economic conditions, in labour market opportunities, in senior school programme development, in institutional reforms, as well as in populations can affect the rates at which opportunities in senior school are taken up.

Figure 1 shows that during the period of dramatic expansion in school completion in the 1980s, states displayed similar patterns of growth though the amount of growth varied. The states which began the 1980s with the lowest levels of retention, Tasmania and New South Wales, experienced weaker rates of growth than other states. This tended to widen the gaps over the decade. Therefore whereas in 1981 less than 15 percentage points separated the six states in the rates of retention, in 1992 over 30 points separated the states. For the two largest systems (Victoria and New South Wales), there was only a one percentage point gap in the rate of retention in

1981. By 1991, this gap had increased to 12 percentage points. Differences between states grew until the early 1990s. The differential downturn in rates of retention from 1992 led to some convergence across the states in rates of school completion, returning to the patterns of the early 1980s. In 2002, again about 15 percentage points separated the six states.

Figure 1 Apparent retention rates, by state and territory: 1981-2002



Source: Australian Bureau of Statistics, *Schools Australia*, successive years, cat. no. 4221.0

Growth in retention also occurred in the two territories across the 1980s. However, the extent of growth in the ACT was lower than in other jurisdictions because of the high starting point in 1981 — almost 70 per cent.

Variations in levels of retention are a concern to governments and policy-makers. There is widespread interest among governments in improving levels of Year 12 retention as well as enhancing the transition from school to working life for young people. Differences in retention rates and post-compulsory participation across states and territories may be due to a range of non-policy factors (such as population differences, variations in dispersion, labour market and economic conditions, and migration) as well as policy factors (such as curriculum and certification structures, school organisation, education and training provision and age of school entry and leaving). To increase rates of retention means that it is essential to identify the different sets of factors that drive retention rates and estimate the size of their relative impact.

Factors shaping state and territory differences

A number of researchers in Australia have examined the factors that drive retention and participation rates. One strand, mainly comprising economists, has focused on the links between changes in the economy and changes in the demand for post-compulsory schooling. These studies measure the relationships between a range of labour market and economic-change factors and levels and shifts in apparent retention and age-participation rates, mostly at a national level. Some studies in this group have also looked at the relationships with year-level progression rates. Many of these studies do not include analyses of differences between jurisdictions, though a few do.

A second smaller group of studies has examined, more specifically, differences between jurisdictions in apparent retention and age participation rates. This work has focused on measurement of the relative influence of state and territory policies compared with population and economic conditions.

Table 1 presents an outline of several of the main studies. The first column of the table presents the author(s) of the paper, the type of survey data, and the outcome variable. The remaining two columns present information on some of the relevant explanatory factors utilised in the studies. The variables have been grouped according to whether they reflect policy or non-policy influences.

In all of the studies, the factors have different rankings based on their estimated impact on state and territory differences in rates of retention or participation. The Commonwealth Grants Commission (2003) identified from its analysis that non-policy influences account for approximately 70 per cent of the variation between jurisdictions in participation rates of 15-17-year-olds. Among these factors, the Commission included Indigenous status, social composition, remoteness, ethnicity, employment levels, and non-government school enrolments. Several policy factors were identified as significant. These included the proportion of part-time students, the role of VET as an alternative to school, and the provision of secondary colleges.

Lamb (2002) modelled differences in attainment rates of 19 and 20-year-olds using the Australian Bureau of Statistics 2001 *Census of Population and Housing*. The aim was to examine the differential effects of a range of factors on post-compulsory attainment. Statistical Local Area (SLA) attainment rates for 19 and 20-year-olds were modelled to measure the levels of variation within and across states and territories. Regression (OLS) analysis was used to estimate the level of variation associated with a range of policy and non-policy factors. The results suggested that non-policy influences — such as SES composition, ethnicity, size of Indigenous population, population dispersion and school sector enrolments — accounted for over 85 per cent of differences between jurisdictions in attainment rates.

Ryan and Watson (2003), however, identified policy factors, such as age-grade structures, grade repetition, TAFE enrolments, and age of entry, as major sources of difference. They examined the impact of economic, demographic and policy factors by using regression analysis to explain the Year 12 retention rates of Australian States and Territories from 1989 to 2001. The aim was to identify whether economic or school structure factors (or some combination of both) were responsible for the retention patterns observed in states and territories over the 1990s. They reported that

while economic conditions and population differences contribute to differences in retention across states and territories, policy factors linked to differences in age-grade structures, grade repetition and TAFE enrolments were more influential.

Table 1 Empirical literature on state and territory differences

Study	Policy influences	Non-policy influences
Williams, Long, Carpenter & Hayden (1993) Australia Longitudinal survey data Year 12 completion	State*	Sex SES* Ac. Achievement* Ethnicity* Parent's education* Family wealth* Sector* Region
Vickers & Lamb (2002) Australia Longitudinal survey data Attainment (year-level)	State* Curriculum*	SES* Sex* Sector* Ethnicity*
Ryan and Watson (2003) Australia ABS Apparent retention rates Longitudinal survey data Apparent retention (state level)	Age-grade structure* TAFE enrolments* State* Grade repetition* Part-time students*	Unemployment rates* Indigenous students* Employment rates for 15 to 19-year-olds*
Lamb (2002) Australia 2001 Census data Year 12 attainment for 19 to 20-year-olds	State* Part-time students	Location* Indigenous students* Ethnicity* SES* Sector*
Commonwealth Grants Commission (2003) Australia Census data Age participation (15 to 17-year-olds)	Age of commencement of post-compulsory schooling* Prop. of part-time students* School type* VET enrolments* State*	Family income* Ethnicity* Indigeneity* Remoteness* Full-time employment* School sector*
Waters, Greenwell & Percival (2002) Australia Census and ABS data Participation rates	School entry age Stud. ages in Yrs 10/11/12* Senior colleges Student to staff ratios	Youth unemployment* Labour force participation* Full-time youth employment* Full-time employment* Occupational profile* Educ. attainment of pop Industry mix* Urban-rural distribution Proportion Indigenous* Sector

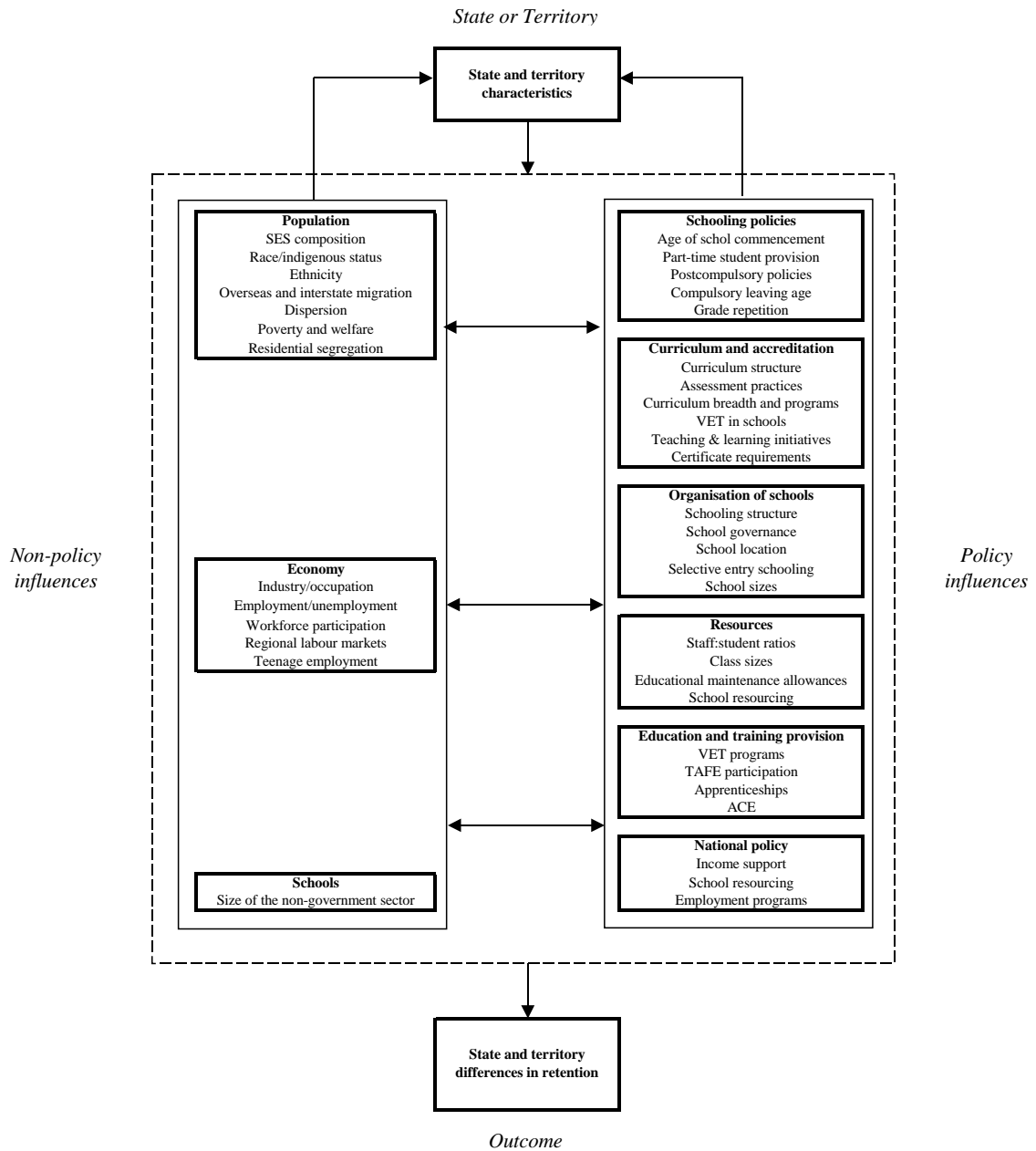
* Significant at least at the 5 per cent level.

A model of state and territory differences in retention

Figure 2 presents a conceptual model of state and territory differences in retention based on the empirical literature. The proportion of students who move into post-

compulsory education and complete Year 12 varies between States and Territories. Difference between jurisdictions in participation and completion can be attributed to both policy and non-policy influences. The model shows both sets of influences and their interactions.

Figure 2 A conceptual model of state and territory differences in retention



Existing research indicates that potential *policy* influences on rates of completion and early leaving include the following:

- (1) schooling policies such as age of entry, numbers of part-time students, compulsory leaving age, grade repetition
- (2) curriculum and accreditation including certification, assessment practices, teaching and learning programs (e.g. New Basics; New Essentials)
- (3) school organisation such as senior secondary colleges, middle school programs, selective-entry schools, location and size
- (4) resources including student/staff ratios, class sizes, educational maintenance allowances, school resourcing
- (5) education and training provision including TAFE policies, interactions between schools and TAFE, VET entry policies, and
- (6) national policies such as income support, school resourcing, apprenticeship and employment programs.

Non-policy influences relate to population differences as well as economic factors. They include:

- (1) population differences related to SES composition, proportion of population from Indigenous backgrounds, ethnic composition, migration, dispersion of the population, poverty and welfare, residential segregation
- (2) economic differences including those related to industry mix, occupational structure, employment and unemployment levels, workforce participation, regional labour markets, and
- (3) school enrolment shares reflected in the size of government and non-government sector enrolments.

The framework suggests reciprocal relationships between the two main groups of factors. For example, policies in curriculum, school organisation, resources and welfare can be developed in response to population needs and economic circumstances. The relationships between factors can change over time: economic trends and migration can lead to changes in the demand for education and training provision as well as the demand for resources.

Modelling Apparent Retention in 2002

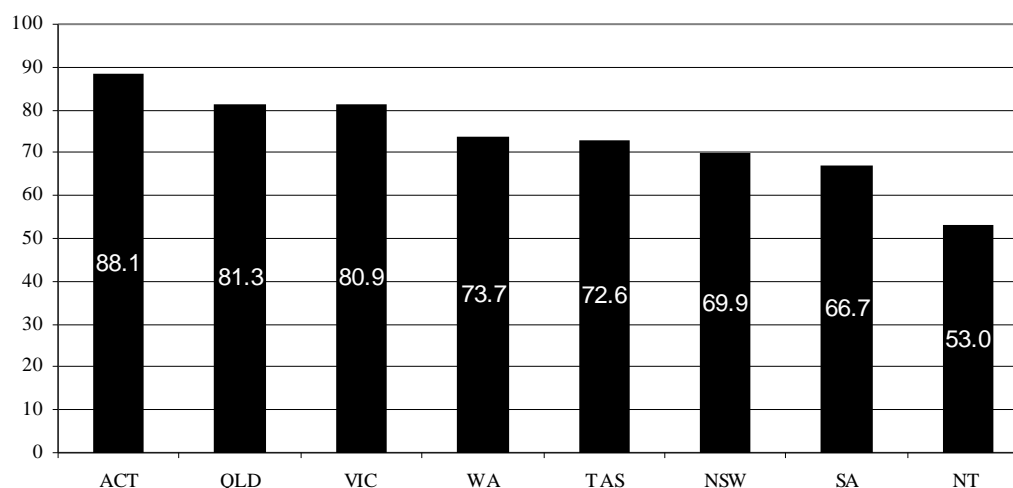
The key aim is to identify the main drivers of current trends in retention rates across states and territories. A major limitation in modelling differences is the extent and quality of available data. The model of differences between jurisdictions presented in Figure 2 requires data containing information on a vast array of policy and non-policy influences such as labour market conditions, availability of alternatives to education, schooling policies, curriculum and accreditation structures and changes, resources, funding policies, population differences, and economic contexts. There is no consolidated data set that provides such data. However, it is possible to measure the effects of some of the influences using available data from the ABS publication *Schools Australia*, and from the 2001 ABS *Census of population and housing*.

The Year 12 apparent retention rates are estimates produced by the Australian Bureau of Statistics (ABS) of the proportion of a cohort commencing secondary school and proceeding to Year 12 in the minimum possible number of years. Secondary school commences in Year 7 in New South Wales, Victoria, Tasmania and the Australian Capital Territory. It commences in Year 8 in the other jurisdictions (Queensland, South Australia, Western Australian and the Northern Territory). Consequently, the year in which the denominator is measured varies between jurisdictions for any Year 12 retention figure. Student retention is expressed as the percentage of Year 7/8 students who progress to Year 12. Published rates are confined to full-time students.

Figure 3 presents the 2002 rates of apparent retention by jurisdiction published by the Australian Bureau of Statistics. Approximately 30 percentage points separates the ACT (88.1 per cent) and the Northern Territory (53.0 per cent), the jurisdictions recording the highest and lowest rates in 2002, respectively. The states fall between these extremes with South Australia recording a rate of 66.7 per cent and Queensland a rate of 81.3 per cent.

The rates presented in Figure 3 are affected by three main sources of influence. The first is related to the *measurement* of retention. For example, differences in levels of population growth (including that from immigration), differences in the numbers of part-time compared to full-time students, and variations in the numbers engaged in mature-age study are not taken account of in the published apparent retention rates. The second source of influence is linked to differences in the *composition of populations*. For example, socio-economic status, educational attainment levels, proportion of the population that is Indigenous, and the spread of population between urban and rural areas vary between jurisdictions and can have marked effects on retention. *Policy differences* make up the third main source of influence. They include such things as differences in the age of commencement, differences in the features of school provision such as the provision of secondary colleges, variations in the structures of curriculum and certification, and differences in the availability of VET alternatives to school.

Figure 3 Apparent retention rates, by state and territory: 2002.



Source: ABS, *Schools Australia*. Cat. No. 4221.0.

The following sections of this paper present the various adjustments made to the 'official' ABS retention rate estimates to adjust for factors grouped according to the three main sources of influence. The method to be applied involves a cross-sectional analysis of the 2002 apparent retention rates. A series of adjustments are made to the 2002 published apparent retention rates to correct for differences in population change, numbers of mature-age students, numbers of part-time students, numbers of cross-border students, socio-economic status composition of populations, proportion of the population living in rural and remote areas (remoteness), size of Indigenous population, size of the private school sector, role of secondary colleges, and VET as an alternative to school. The unit of analysis is the state or territory. The analysis is cross-sectional because it only deals with one point in time and does not attempt to model trends or changes over time.

The first set of adjustments relate to measurement factors. They are corrections for factors that have a bearing because of the way that apparent retention is measured. The adjustments respond to differences in

- levels of population change,
- numbers of mature-age students,
- numbers of part-time students, and
- numbers of cross-border students.

The adjustments are made using numbers of students. They are relatively simple adjustments made to the denominator (the secondary school entering cohort enrolments) or numerator (final year enrolments) on which retention rates are based. The data for the adjustments were derived from the ABS publications *Schools Australia* (ABS, 2002), *Population by Age and Sex* (ABS, 2003), and the *2001 Census of Population and Housing* (ABS, 2001).

The second set of adjustments are based on regression analysis used to estimate the effects of population and other demographic factors on differences in retention rates across states and territories. Adjustments derived using regression analysis respond to differences in:

- socio-economic status composition of populations
- rurality and remoteness
- size of the Indigenous population, and
- size of the private school sector.

The number of policy factors that can be modelled is relatively small because of the lack of available data. They are:

- the provision of secondary colleges, and
- VET as an alternative to school.

Table 2 presents a summary of the adjustments. The figures in bold after each adjustment report the adjusted retention rate in a cumulative fashion. For example, figures in bold in the line after the adjustment for part-time students reports the apparent retention rate adjusted for both part-time students and population change.

Table 2 Apparent retention rates for 2002 and adjustments

	ACT	QLD	VIC	WA	TAS	NSW	SA	NT
2002 apparent retention	88.1	81.3	80.9	73.7	72.6	69.9	66.7	53.0
MEASUREMENT ADJUSTMENTS								
Population change	-6.7	-4.3	-4.8	-3.4	2.6	-3.0	-1.4	1.4
	81.4	77.0	76.1	70.3	75.2	66.9	65.3	54.4
Part-time students	1.0	1.1	0.7	1.0	2.2	0.7	3.5	3.2
	82.4	78.1	76.8	71.3	77.4	67.6	68.8	57.6
Mature-age students	-0.5	-0.8	-0.4	-1.1	-7.5	-0.3	-0.8	-1.0
	81.9	77.3	76.4	70.2	69.9	67.3	68.0	56.6
Cross-border students	-0.8	0.0	0.0	0.0	0.0	0.1	0.0	0.0
	81.1	77.3	76.4	70.2	69.9	67.4	68.0	56.6
POPULATION ADJUSTMENTS								
SES	-8.8	1.5	0.2	-0.5	3.4	-0.6	0.3	5.6
	72.3	78.8	76.6	69.7	73.3	66.8	68.3	62.2
Remoteness	-0.9	1.2	1.2	3.1	3.8	1.7	1.7	4.7
	71.4	80.0	77.8	72.8	77.1	68.5	70.0	66.9
Indigenous population	0.0	-0.2	-0.9	-0.3	-1.4	-0.4	-0.7	4.2
	71.4	79.8	76.9	72.5	75.7	68.1	69.3	71.1
Sector	-0.2	-0.1	-0.2	-0.2	0.0	0.2	0.2	0.1
	71.2	79.7	76.7	72.3	75.7	68.3	69.5	71.2
POLICY ADJUSTMENTS								
Secondary colleges	0.0	0.1	0.0	0.0	-1.0	0.0	0.1	0.0
	71.2	79.8	76.7	72.3	74.7	68.3	69.6	71.2
VET as an alternative	0.7	-1.0	-0.6	-0.1	1.2	2.7	-0.3	-1.8
	71.9	78.8	76.1	72.2	75.9	71.0	69.3	69.4
Final adjusted rate	71.9	78.8	76.1	72.2	75.9	71.0	69.3	69.4

Measurement factor adjustments

Population change

Population changes over time can affect retention rates through increases or decreases in population occurring between the secondary school entry year (Year7/8) and Year 12. Where there is an increase in the size of the population it can lead to an inflation in the reported retention rate because the size of the entering cohort (the denominator) is smaller than numbers available to be counted in the final year (the numerator). Conversely, population declines can lead to deflated apparent retention rates.

There are two main sources of population change relevant to state and territory retention rates. One is overseas migration which has continued to add to Australia's population for a considerable time. In 1999-2000, according to ABS figures, 45 per cent of Australia's population growth was from net overseas migration (ABS, 2001). In the period from 1995 to 2000, net overseas migration amounted to approximately 521,000. The other main source of population change is interstate patterns of migration. In 2000, two states — Victoria and Queensland — were the only jurisdictions to record net gains from interstate migration (ABS, 2000).

It is possible to adjust retention rates for changes in population. By calculating the age breakdown of the cohort entering secondary school it is possible to increase or decrease the size of the cohort according to the size of the changes in the relevant proportional ages between entry and Year 12. For the 2002 apparent rate this means adjusting for changes in the population of the relevant age cohorts in jurisdictions between 1997/98 and 2002. That is, proportional population growth in each Year 7 or 8 single year of age cohort over the years to Year 12 is used to adjust the retention rate estimate. The denominator is increased (or reduced) to match population growth over the intervening years.

The ACT recorded the largest increase in the relevant teenage population between 1997 and 2002, while Tasmania and the Northern Territory actually recorded falls. Table 2 shows the impact of the variations in population change. The adjustments show that the retention rate would be higher than the published apparent rate in 2002 for both Tasmania (2.6 percentage points) and the Northern Territory (1.4 points). The rates would be lower for all other jurisdictions. The ACT requires the largest adjustment (6.7 percentage points), followed by Victoria (4.8 points), and Queensland (4.3 points).

Part-time students

ABS apparent retention rates are calculated using only full-time student enrolments. Numbers of part-time students vary across states and territories depending on institutional arrangements and policies. Not including part-time students in the retention rate estimates could substantially under-report levels of retention in systems where there are large numbers of part-time students. In this situation the real efforts of different jurisdictions to help young people remain at school is being under-reported.

The numbers of part-time students are now published annually in *Schools Australia*. The enrolments are reported by year-level and so it should be possible to adjust the Year 12 (numerator) enrolments to include part-time students using this data. However, the data are not provided by age. The exclusion of age makes it difficult to estimate the numbers of part-time students linked to entering cohorts. For example, in at least one jurisdiction the numbers of reported part-time students in Year 11 in 2002, if added to the Year 11 full-time student enrolments, would produce a retention rate to Year 11 well in excess of 100 per cent. Age and year-level data are both necessary to make adjustments for numbers of part-time students.

While ABS data on part-time students cannot be used at present to make adjustments for the 2002 retention rates, it is possible to make adjustments using the results from the 2001 Census of Population and Housing. In that survey, the numbers of full-time and part-time school students are recorded by age. Adjustments can be made by calculating the numbers of 15 to 18-year-olds who are recorded as being part-time school students.

Table 2 shows that South Australia requires the largest adjustment for numbers of part-time students (3.5 percentage points). It is closely followed by the Northern Territory (3.2 points). Tasmania (2.2 points) also has a large number of part-time students. New South Wales (0.7), Victoria (0.7), the ACT (1.0) have relatively small numbers and require only marginal upwards adjustments in retention to correct for the exclusion of part-time students.

Mature-age students

School enrolments reported in *Schools Australia* can include mature-age students who have returned to school. The effect of this is to inflate apparent retention rates because these students will appear in the Year 12 (numerator) enrolments but not in the entering Year 7/Year 8 cohorts (denominator) on which the apparent retention rate is calculated. The numbers of mature-age students are likely to vary by jurisdiction depending on policies related to mature-age study.

While it is not possible to identify mature-age students in the Year 12 enrolments, it is possible to identify the age-structure of the entering cohorts and the corresponding age-structure that should exist in Year 12. For example, if 80 per cent of Year 7 students in 1997 are 12 years of age at the time of the August census, and no students are older than 14, then it can be assumed that the Year 12 cohort in 2002 is likely to be comprised of 80 per cent of 17-year-olds and no students older than 19. Using this procedure it is possible to identify students who are likely to be mature-age students, those 20 years of age or older.

Adjustments for the numbers of mature-age students displayed in Table 2 show that Tasmania requires the largest adjustment for the numbers of mature-age students — a reduction of 7.5 percentage points. In that state there are large numbers of mature-age students included in the Year 12 figures reported in *Schools Australia*. Most of the states and territories require reductions of less than one percentage point to adjust for mature-age students.

Cross-border students

Students who live close to state and territory borders may choose to undertake their senior school study in a state or territory other than the one in which they commenced secondary school. This has a potential impact on retention rates because if the numbers are large enough they may inflate the retention rates for the state or territory in which students do their senior school study and at the same time reduce the rates for the state or territory in which the student began secondary school.

Figures on the numbers of cross-border students are not published. For 2002, it was possible to obtain some estimates from data provided by states and territories on the numbers of students undertaking Year 12 with a home address based in a state or territory other than the one in which they were enrolled at school.

Table 2 shows that two jurisdictions are affected. A number of Year 12 students in the ACT have a New South Wales home address. However, many of these students had studied in the ACT in Year 10 or earlier. The number of Year 12 students in the ACT holding a New South Wales home address and not studying in the ACT in Year 10 or earlier requires an adjustment of 0.8 percentage points to the 2002 retention rate. This adjustment produces a slight increase for New South Wales.

Population factor adjustments

The next set of adjustments relate to population and demographic differences between states and territories. These adjustments were made using data from the 2001 *Census of Population and Housing*. The data set contained information on the year-level attainments of 19 and 20-year-olds for all Statistical Local Areas (SLA) in Australia. This was used to calculate a Year 12 attainment rate for each SLA. Information from the census was also obtained on the following:

1. Indigenous population was calculated as the percentage of the population from Indigenous backgrounds.
2. School sector refers to the percentage of secondary school-age students in government, Catholic and independent schools.
3. Location is measured using the Accessibility/Remoteness Index of Australia (ARIA) that was developed by the Commonwealth Department of Health and Aged Care (DHAC) and the National Key Centre For Social Applications of Geographic Information System (GISCA). ARIA measures the remoteness of a point based on the physical road distance to the nearest Urban Centre in each of five size classes. It covers the following classifications (1) Major city, (2) Inner regional, (3) Outer regional, (4) Remote, (5) Very remote, which were applied to SLA's for this study.
4. Socioeconomic status was measured using the SLA aggregate of the Socioeconomic Indexes for Australia (SEIFA). There are six indices available in SEIFA: urban index of advantage, rural index of advantage, index of

disadvantage, index of advantage, index of economic resources, and the index of education and occupation. The index of disadvantage was used in this study.

The main aim of the analyses was to examine the differential effects of the above factors on retention for each jurisdiction. A set of regression analyses was undertaken to derive parameter estimations of the effects of each variable on rates of Year 12 attainment for 19 and 20-year-olds. This method enables estimation of the level of variation accounted for by different groups of factors. In the analyses an inclusion and removal procedure was used in which each standardised factor was included and then removed to measure its impact on jurisdiction estimates and the variance explained. The models included dummy variables for jurisdictions to help measure the size of the differential impact of each factor in turn.

Socioeconomic status

There are large differences across states and territories in the socio-economic status (SES) composition of populations. This is likely to have a substantial impact on differences in retention rates. One of the most consistent findings in the research on schooling is that completion of school is strongly related to social background (for example, see Audas & Willms, 2001; Rumberger & Thomas, 2000; Lamb, Dwyer & Wyn, 2000). Early leavers are much more likely to come from lower SES backgrounds where the parents are more often in unskilled work, the parents have a limited amount of formal education, and the family has a lower level of income. Social differences in the composition of populations across states and territories indicate that it is important to consider SES in examining differences between jurisdictions in retention.

Table 2 presents the adjustments required for differences in the SES compositions of populations. The analysis on which the adjustments were estimated attempts to hold SES constant across states and territories to measure its effects. That is, it estimates what the retention rate would be if each of the states and territories had the same population.

The largest impact of SES is on the rates in the ACT. The higher SES (and more homogeneous) composition of the population in the ACT is estimated to add approximately 8.8 percentage points to the apparent retention rate. New South Wales (0.6) and Western Australia (-0.5) also need adjustments downwards to compensate for the SES composition of the population. Tasmania (3.4 percentage points), Queensland (1.5 points) and the Northern Territory (5.6 points) require upwards adjustments to the retention rates because the SES compositions of their populations contribute to lower retention rates.

Remoteness and population dispersion

Population dispersion also varies greatly by jurisdiction. A larger proportion of the population in the Northern Territory lives in rural and remote areas. Compared to other states, Tasmania also has a less urban population. Previous research shows that

young people living in rural and remote parts of Australia have lower rates of enrolment in post-compulsory schooling (for example, see Long, Carpenter & Hayden, 1999; Teese, 2002). Differences in the spatial distributions of populations across states are likely to exert a major influence on differences in retention rates.

The impact of variations in levels of remoteness and population dispersion, presented in Table 2, suggests that the higher proportions of the population in the Northern Territory living in remote areas contribute to lower retention rates. The size of this impact is estimated to be 4.7 percentage points. The impact is estimated to be about 3.8 percentage points in Tasmania and 3.1 points in Western Australia.

Density of Indigenous population

The lowest rates of retention in Australia are recorded by young people from Indigenous backgrounds (see Long, Frigo & Batten, 1999). Rates of Year 12 enrolment are as much as 30-40 per cent below those of non-Indigenous groups. Differences in the distributions of Indigenous Australians across states and territories are likely therefore to have an influence on differences between jurisdictions in retention.

Table 2 reports the adjustments required for differences in the size of the Indigenous populations in each jurisdiction. The adjustments reflect the regression estimates of the impact of the density of Indigenous populations on retention. The figures show that the Northern Territory requires the largest adjustments. The size of the Indigenous population in the Northern Territory is estimated to lower apparent retention rates by approximately 4.2 percentage points, after controlling for the effects of SES and rurality and remoteness. The effects for other jurisdictions are negligible. This does not mean that other jurisdictions do not have large Indigenous populations. The effects on retention estimated using regression techniques that take account of other factors suggest that the impact on retention for other systems is small.

Sector enrolment shares

School-effects studies support the view that school sector exerts an influence on retention and post-compulsory participation beyond the effects of intake differences (see, for example, Williams & Carpenter, 1990; Lamb, Hogan & Johnson, 2001). The effects are far less pronounced on achievement and learning progress, but substantial in terms of participation and retention. Given the differences across states in sector enrolment shares, it is important to include sector in the modelling of student retention.

The adjustments for differences across states and territories in non-government school enrolments indicates that, after controlling for other factors, the impact of differences in non-government enrolments is to slightly increase apparent retention rates in the ACT, Victoria, Queensland and Western Australia. Therefore, the adjustments need to be downwards in these jurisdictions. The opposite is true of South Australia, New South Wales and the Northern Territory. The effects of differences in sector enrolment shares on retention are small.

Policy adjustments

There have been a number of state and territory differences in school and education policies identified as potential influences on retention. They include:

1. The age of commencement at school and/or the rate of progress through the early grades of primary school. There are variations across states in the age of commencement. It is unclear what affect this has on post-compulsory enrolments. A study by NATSEM (2002) suggests that age of commencement has little impact on levels of post-compulsory enrolments.
2. Age-grade structure differences across the states and territories. The study by Ryan and Watson (2003) suggests that the states and territories with higher proportions of younger students at a given stage of schooling (such as the proportion of 12-year-olds in Year 8), obtain substantially higher retention rates thanks to the policies supporting this effect.
3. The ability of students to repeat and advance. Studies of repeating undertaken in the past have shown little variation in rates of grade-repeating by jurisdiction, with most occurring in the early years (DEET, 1995). However, Ryan and Watson (2003) report differential impact on retention of grade repeating.
4. Characteristics of the school system, such as the provision of secondary colleges. The research undertaken by NATSEM (2002) suggests that the college system of schooling that exists in Tasmania and the ACT does not significantly influence differences in post-compulsory participation. The same was also true for school location. Differences in school curriculum offerings are likely to be as great (or indeed greater) within states as between states.
5. Curriculum and certificate structures. Research on school programs, such as VET in Schools, suggests that program provision may have an influence on retention (see, for example, Polesel et al. 2004). There is also some evidence that differences in school completion are linked to differences in certificate structures across states as well as the minimum leaving age (Vickers and Lamb, 2002).
6. Interactions between school education and VET. The availability of VET in non-school settings may affect rates of school retention, particularly if there are variations across states and territories in non-school VET alternatives. Ryan and Watson (2003) report a significant impact based on state and territory differences in the TAFE enrolments of 17-year-olds.

Given available data, it was possible in this study to assess the impact of only two policy differences across states and territories: (1) the provision of secondary colleges, and (2) VET provision acting as an alternative to school.

Secondary college provision

A policy that could affect participation in different states and territories is the provision of senior secondary colleges. Where States have created a separate

government college system for Years 11 and 12, more students may remain in the system and the schools may also attract additional students from the non-government sector. Such a system exists in the ACT and Tasmania. Other States have a number of secondary colleges that provide Years 11 and 12 separately. It is unclear what the effect on retention is. Data on the provision of secondary colleges was available by SLA across Australia to measure the effects on retention. Table 2 shows that after adjusting for population and measurement differences across states and territories, the impact of secondary college provision on differences in retention is negligible.

VET as an alternative

The effect of the non-school VET sector on post-compulsory participation rates is not clear. Students in New South Wales who wish or need to repeat a year can do so in the VET system (CGC, 2001). Furthermore, the proportion of 15-17-year-olds attending TAFE colleges is higher in New South Wales and Western Australia than in other jurisdictions (CGC, 2001). On the other hand, the provision of VET in school may encourage students to remain in secondary school when they may otherwise have left.

Table 2 reports the adjustments required to reflect the effects of VET as an alternative to school education. The adjustments reflect the regression estimates of the impact of differences in the non-school VET enrolments of 16-year-olds on retention. The results show that New South Wales requires the largest adjustment. The role of VET as an alternative to school in New South Wales is estimated to lower apparent retention rates by approximately 2.7 percentage points, after controlling for the effects of other factors. The effects for other jurisdictions are varied.

Conclusion

Apparent retention rates have been an important measure of school system performance in Australia, yet they have not been necessarily an accurate measure of relative performance. The rates are affected by a range of factors, some related to the measurement of retention itself, some to differences in populations, and some to differences in policies. This paper has shown that it is possible to adjust for some of these factors to make more accurate comparisons of system performance.

The results of the modelling of state and territory differences show that the gaps between the states and territories diminish considerably when they are adjusted for population differences, immigration, mature-age study and modalities of school use (part-time versus full-time). In 2002, apparent retention rates varied by up to 30 percentage points (88.1 per cent in the Australian Capital Territory and 53.0 per cent in the Northern Territory). After adjustments are made for a range of measurement, population and policy factors, less than 10 points separates the States and Territories.

The adjustments have a different impact depending on jurisdiction. For example, mature-age students add 7.5 percentage points to the apparent retention rate for Tasmania. Population growth added 3.0 points to the retention rate for New South Wales and 4.8 points to Victoria. The higher SES composition of the population of

the Australian Capital Territory has a large impact on its retention rate, as does the levels of remoteness and the size of the Indigenous population in the Northern Territory.

The importance of the adjustments presented in this paper is not in the final adjusted rates. For one thing, there is still a range of other factors that would need to be included for accurate comparison of state and territory differences. These include such factors as grade repetition, economic contexts, the ethnic compositions of state and territory populations, and the impact of age-grade structures, to name just a few. For another thing, the population and policy adjustments are an exercise in abstraction. The final rates tells us what the levels of retention would be, were the states and territories more uniformly similar in their population characteristics, in the geographical dispersal of their communities, and in the exchange of their populations which occurs across interstate boundaries. But states and territories are not uniformly similar in these respects, and in fact are drawn apart by the play of macro-economic and social forces.

The important point of the sets of adjustments is that they help identify several important influences that need to be considered both for the measurement and comparison of student retention and for the targeting of policies to improve rates and reduce differences. Critical factors influencing the low retention rates recorded in the Northern Territory, for example, are remoteness of much of the population, the large proportion of the population that is Indigenous, and SES composition. Strategies to target and improve retention in the Northern Territory need to focus on these factors.

Population differences between states and territories contribute substantially to retention differences. Removing the impact of population and related factors greatly compresses differences between jurisdictions. This suggests that national strategies for increasing retention should aim at reducing differences between student groups and communities *within states and territories*. In the long-term, this will also reduce the gaps between jurisdictions, particularly those that are based on socio-economic and cultural differences in populations.

The analysis in this paper may provide a tool that policymakers can use in interpreting future publications of apparent retention rates.

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