NATIONAL VOCATIONAL EDUCATION
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OCCASIONAL PAPER

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About the research

Measuring VET participation by socioeconomic status: an examination of the robustness of ABS SEIFA measures over time

Patrick Lim and Tom Karmel, NCVER

At every five-yearly census, the Australian Bureau of Statistics (ABS) recalculates both the SEIFA (Socio-economic Indexes for Areas) indexes and also recalibrates the borders and sizes of the geographic areas from which these SEIFA measurements are derived. Further, over time, the composition of geographic areas may change, due to urban renewal or other factors.

The National Centre for Vocational Education Research (NCVER) reports vocational education and training (VET) participation rates at least annually, and the question that arises is how well do the SEIFA indexes perform over the interim years, that is, between the releases of new census data. Of particular interest is the reporting of participation rates for the census years. In reporting the 2011 year, NCVER uses the 2006 census data, as the ABS does not release new SEIFA values until 18 months after each census. The focus of this paper is on VET participation rates; however, the methodology would be equally applicable to higher education or school participation.

The approach used in this paper is that the 2006 and 2011 National VET Provider Collections have had the 2006 and 2011 SEIFA measures applied to each of them, along with the Australian populations at each time. Using these data, it was possible to determine VET participation rates (by age) as a proportion of the Australian population, using both the 2006 and 2011 census data. The SEIFA index used in this paper was the Index of Relative Socio-economic Disadvantage (IRSD).

Key messages

- The estimates of VET participation made for 2011 based on 2006 quintiles are reasonably accurate when the quintiles are based on statistical local areas (SLAs).
- The results based on postal areas (POAs) are not as accurate.
- The new Statistical Area 2 geographic boundaries will be more stable and accurate over time.
- The SEIFA quintiles (deciles) using area-based calculations are not to be taken as a robust benchmark in the sense of 20% of the population. That is, 20% of the population does not fall into the lowest quintile (for example). SEIFA quintiles are derived by ensuring that 20% of all geographic regions are in the quintile and thus the underlying distribution of the population does not evenly fall across the five quintiles.
- Any over- or under-representation of any socioeconomic status (SES) group cannot be judged accurately by whether the share of a particular quintile is over or under 20%.

Rod Camm
Managing Director, NCVER

Contents

Tables and figures

Tables

Figures

Introduction

The relationship between social and economic disadvantage and participation in tertiary education has received considerable policy attention over the years. In particular, the Bradley Review (Bradley et al. 2008) recommended greater participation by those with low socioeconomic (SES) backgrounds in higher education. Following that review, the Australian Government set targets for the proportion of higher education enrolments at undergraduate level to be filled by people from low socioeconomic backgrounds.

Lim and Gemici (2011) and Karmel and Lim (2013) show that there is a very poor relationship between an individual measure of socioeconomic status and the area-based Socio-Economic Indexes for Area (SEIFA), produced by the Australian Bureau of Statistics (ABS) after each census of the Australian population. Nevertheless, those papers show that SEIFA performs reasonably for monitoring the relationship between socioeconomic status and tertiary education participation.

The particular issue investigated here is the impact of using a measure of socioeconomic status (SEIFA) that remains static between the five-yearly censuses. This paper investigates whether differences in the way geographic boundaries are defined or differences in the calculation of SEIFA values at different censuses impact on the measurement of education participation rates by socioeconomic status over time. These changes could potentially lead to a misreading of changes in participation. Apparent changes in participation might simply be due to changes in boundaries, the composition of neighbourhoods, or the way SEIFA is derived, rather than changes in the actual participation rates for specific SES groups.

The approach in this paper is to use the 2006 and 2011 NCVER VET collections and apply the 2006 and 2011 SEIFA measures to each of them in turn.[1] The SEIFA measures based on postal area (POA) and statistical local areas (SLA) have been appended to the individual clients' postcode and statistical local area in the collections. The focus is on the Index of Relative Socio-economic Disadvantage (IRSD), one of four SEIFA measures.

Typically, an analysis of educational participation by socioeconomic status assigns each student a SEIFA quintile and then looks at the distribution of students across the quintiles, with an underlying assumption that if a SEIFA 'quintile' has less (more) than 20% of students then that SES group is under-represented (over-represented). However, this approach is problematic because 'quintiles ain't quintiles'. This is because the definition of quintiles does not necessarily represent the population in question. SEIFA quintiles ensure that 20% of the geographic areas are contained in each quintile without regard to the size of the population in each of those geographic areas. Our approach therefore is to estimate the population in question, based on the ABS usual residents profile (URP) or estimated resident populations (ERP), for the relevant age groups by postal district and statistical local area, and then derive educational participation rates for the 'quintile' based on the rates for each postal district and statistical local area.

This approach also corrects a common misunderstanding (as pointed out by Karmel & Lim 2013): that there is an issue in vocational education and training (VET) because those coming from a low-SES background are skewed toward lower-level qualifications. What counts is the participation rate at the various qualification levels — if the participation rate in higher-level qualifications is satisfactory,

[1] We intend to undertake similar analysis for higher education in due course.

then the fact that there are also considerable numbers of students studying lower-level qualifications should not be of concern.

The structure of the paper is as follows. We first provide a description of the ABS SEIFA measures and show how the distribution of the population differs from that of postal district and statistical local area.[2] This is followed by an examination of VET participation using the static measure of SES over time, as the constituent building blocks change their population characteristics, resulting inevitably in a change of SEIFA classification for areas. We find that the SEIFA measure based on statistical local area is reasonably robust, a rather comforting finding for policy-makers. We note, however, that the SEIFA based on postal district is less well behaved. To round out the paper, we present data on VET participation rates for 2006 and 2011 according to SES quintiles for three age groups: 15—19 years, 20—24 years and 25—64 years, based on the preferred statistical local area unit. These can be taken to be the definitive measures of how VET participation has changed between 2006 and 2011 in relation to socioeconomic status. We end with a brief discussion.

Finally, it is worth noting that the SEIFA standardised score measures of socioeconomic status have not been designed for use in time series or longitudinal analysis (ABS 2011), primarily due to changes in the boundaries, the way the indexes are calculated between censuses, and the fact that the standardised scores values are not equivalent over years. The ABS recommends using the deciles (quintiles, quartiles) in a time-series analysis. This paper uses SEIFA quintiles (derived using the published ABS deciles) for comparisons between census years.

[2] In 2006 there were 2513 POAs and 1395 SLAs; in 2011 2483 POAs and 1369 SLAs. Thus the POA is a finer classification.

SEIFA and population measures

There are four SEIFA measures (ABS 2011):

1 The Index of Relative Socio-economic Disadvantage (IRSD)

2 The Index of Relative Socio-economic Advantage and Disadvantage (IRSAD)

3 The Index of Education and Occupation (IEO)

4 The Index of Economic Resources (IER).

SEIFA measures are area-based measures of advantage and disadvantage as opposed to individual-level measures. The measures are constructed using the characteristics of the relevant community in a particular geographic area, with the data derived from relevant census data.

The methodology to calculate the indices is a multidimensional framework in which the characteristics for each index are based on variables that relate to the particular topic. The variables are constructed using a weighted sum of the variables included in the index. The technique used is that of Principal Component Analysis, a statistical approach that derives an index which explains the maximum amount of variance of the components. In 2011, the indexes are calculated using the Statistical Area 1 (SA1) geographic regions. To determine the indexes for other geographic regions, the individual responses from the smallest unit are aggregated up to the relevant geographic level. For earlier censuses the Collection District (CD) is the smallest unit used to derive the indexes.

There is a strong relationship between the four indices, with correlations better than 0.5. For more information about the indices, readers are referred to the SEIFA technical report (ABS 2011).

In developing the SEIFA indexes, the ABS divides the population of geographic areas into deciles, such that 10% of the relevant geographic regions are in each decile. (We have subsequently constructed quintiles by combining deciles.) However, in terms of Australian population numbers, it is clear that the SEIFA indexes based on area do not give true population quintiles (tables 1 and 2).

Table 1 Quintile distributions, Index of Relative Socio-economic Disadvantage, 2006 and 2011: postal area

Quintile	Geographic region (POA)		Population	
	2006	2011	2006	2011
1	19.6	19.7	15.0	16.0
2	19.7	19.7	17.6	17.7
3	19.7	19.8	20.4	19.7
4	19.7	19.7	21.4	21.5
5	19.6	19.7	25.7	25.4
Unknown	1.8	1.3	15.0	0.0
Total	**100.0**	**100.0**	**100.0**	**100.0**

Table 2 Quintile distributions, Index of Relative Socio-economic Disadvantage, 2006 and 2011: statistical local area

Quintile	Geographic region (SLA)		Population	
	2006	2011	2006	2011
1	20.0	20.0	13.2	16.0
2	20.0	20.0	21.8	20.6
3	20.0	20.0	20.4	20.1
4	20.0	20.0	22.9	23.9
5	20.0	20.0	21.7	19.5
Total	**100.0**	**100.0**	**100.0**	**100.0**

In particular, we observe that there is an unequal spread of the Australian population across the five quintiles. There are fewer people in the most disadvantaged (quintile 1) quintile than in the other quintiles.

Typically, an analysis of educational participation by socioeconomic status assigns each student a SEIFA quintile and then looks at the distribution of students across the quintiles.[3] The underlying assumption in this analysis is that if a SEIFA 'quintile' has less (more) than 20% of students, then that SES group is under-represented (over-represented). However, we have seen from the above that the overall Australian population is not equally distributed across the five quintiles, and thus lower quintiles will always be under-represented and higher quintiles always over-represented, simply by construction. Any analysis of education participation should therefore compare participation as a proportion of the size of the relevant quintile. Further, it should be noted that this issue would not disappear even if the quintiles lined up precisely with the Australian population. This is because educational participation is measured in relation to specific age groups (for example, 15—19 years) and the geographic distribution of a particular age group will differ from that of the whole population.

Table 3 shows how the population distributions across SES quintiles vary by age. The table also shows that the distributions depend on the geographic unit, again emphasising the importance of using participation rates.

Table 3 Population distribution by SEIFA Index of Relative Socio-economic Disadvantage postal area and statistical local area, 2006

Quintile	15 to 19-year-olds		20 to 24-year-olds		25 to 64-year-olds	
	2006 POA	2006 SLA	2006 POA	2006 SLA	2006 POA	2006 SLA
1	14.9	13.3	14.5	12.8	14.4	12.7
2	17.4	21.5	15.8	20.0	17.0	21.0
3	20.2	20.2	20.4	20.1	20.2	20.3
4	21.3	22.9	22.1	24.1	21.7	23.3
5	25.8	22.0	26.7	22.6	26.4	22.4
Unknown	0.4	0.2	0.6	0.4	0.3	0.3
Total Aust. population by age group	**1 356 906**	**1 356 904**	**1 347 362**	**1 347 360**	**10 569 442**	**10 569 439**

Source: ABS, 2006 Census of Population and Housing.

[3] An alternative approach recommended by the ABS is to calculate deciles (quintiles) based on population sizes. However, these values are not provided by the ABS and are not commonly used in other statistical reporting agencies. For this reason, NCVER uses the area-based quintiles.

SEIFA over time

When an index such as SEIFA is used to measure educational participation over time, there is an implicit assumption that areas are correctly assigned to a quintile. However, the characteristics of areas change over time and inevitably there will be changes to SEIFA values.

Tables 4 and 5 show how the geographic regions have been reclassified between 2006 and 2011. Table 4 shows that, of the total postal areas classified in quintile 1 in 2006, 81% were again classified as quintile 1 in the 2011 census. Subsequently 19% had a different classification in 2011. Thus, tables 4 (postal areas) and 5 (statistical local areas) show the extent of reclassifications between the 2006 and 2011 censuses.

Table 4 Cross-tabulation of 2006 SEIFA against 2011 SEIFA (Index of Relative Socio-economic Disadvantage), by postal area

2006 quintiles	2011 quintiles						
	1	2	3	4	5	Unknown	Total
1	81	15	3	1	0	0	100
2	16	63	18	2	1	0	100
3	2	19	64	14	0	0	100
4	1	3	14	73	9	0	100
5	0	0	1	11	88	0	100

Table 5 Cross-tabulation of 2006 SEIFA against 2011 SEIFA (Index of Relative Socio-economic Disadvantage), by statistical local area

2006 quintiles	2011 quintiles						
	1	2	3	4	5	Unknown	Total
1	88	11	0	0	1	1	100
2	15	74	11	0	0	0	100
3	0	18	69	12	0	0	100
4	0	0	16	75	7	2	100
5	0	0	1	10	88	1	100

We see there is considerable change in the SEIFA classifications for both postal areas and statistical local areas between 2006 and 2011. For example, taking the first quintile in 2006 (defined by POA), we see that 19% of the areas in that quintile in 2011 have been reassigned (in fact 1% of them to quintile 4). A second point is that the boundary effects prevent the discrepancies from cancelling out. That is, the reclassification of areas in quintiles 1 and 5 are in only one direction. This boundary effect does not operate to the same extent for quintiles 2, 3 and 4 and thus the extent of reclassification tends to be higher for these quintiles.

From table 5, it is clear that the statistical local areas are more stable over time, that is, an SLA is more likely to be classified with the same SEIFA quintile in 2006 and 2011. This is most likely because the postal area is at a lower level of aggregation than the SLA — the coarser the classification the less likely is reclassification.

The implication of these reclassifications is that the relationship between SES quintile and educational participation will become distorted over time, with the apparent participation by socioeconomic status changing over time even if there is no underlying change for the cohorts in question.

We now investigate the impact of participation rates by SEIFA quintile through the use of indexes from different census years. The point is to see whether the reclassification of the SEIFA of areas in 2011 from 2006 SEIFA has a significant impact on VET participation rates by SES quintile. In order to do this, both the 2006 and 2011 indexes based on postal area and statistical local area are appended to VET clients using the 2006 and 2011 NCVER VET collection.

To determine the impact of using a static SEIFA measure (say 2006) in the years between censuses, we present the impact of using SEIFA from two different censuses on the same data. For example, table 6 presents participation rates for 15 to 19-years-olds for 2006, using 2006 SEIFA values, and the participation rates for the 2011 collection, using both 2006 and 2011 SEIFA values. Columns two and four are the 'truth'; that is, the participation rates for each quintile using the data and SEIFA values for the years they are collected. The middle column represents the 'apparent'; that is, the participation rates for each quintile for the 2011 VET collection using the 2006 SEIFA values.[4]

We first consider the analysis based on postal areas.

Table 6 VET participation rates, 15 to 19-year-olds, 2006 and 2011, postal areas

Quintile	2006 collection using 2006 quintiles	2011 collection using 2006 quintiles	2011 collection using 2011 quintiles
1	40.5	44.9	42.1
2	45.3	48.5	44.4
3	32.4	36.6	36.2
4	24.2	25.2	27.4
5	19.6	19.4	21.3
Total 15 to 19-year-olds	**30.7**	**33.0**	**33.0**

Table 6 shows an interesting pattern. Comparing columns 2 and 3 of this table we would tentatively conclude that the relationship between vocational education and training and socioeconomic status had strengthened: participation has gone up in quintiles 1, 2 and 3 but there has been little change in quintiles 4 and 5. However, when we compare columns 2 and 4 (that is, 2006 actual with 2011 actual), we see in fact that the increase in participation is concentrated in quintiles 3 and 4, and that participation increased in all quintiles except quintile 2.

In table 7, we present the differences between the columns in table 6. The second column shows the actual change in participation rates between 2006 and 2011 (that is, based on columns 2 and 4 in table 6). However, the estimates for each quintile (as defined in 2006) are quite poor, apart from quintile 4. Of particular note is quintile 2, which is predicted as a three-percentage-point increase when using the 2006 SEIFA, but actually is a small decrease in participation. For quintile 1 there is a very substantial overestimate in growth.

[4] The participation rates calculated here are based on ABS usual resident population numbers. These are only available at each census and in intervening years estimated resident population numbers need to be used. This introduces another source of error in the estimates of the participation rates, which is not measured here.

Table 7 VET participation rates, 15 to 19-year-olds, changes between 2006 and 2011, postal areas

Quintile	Change using 2006 & 2011 SEIFA	Estimated change using 2006 SEIFA	Difference between actual change and estimated change	% of change versus estimated change
1	1.7	4.5	-2.8	-169.1
2	-0.9	3.2	-4.1	458.3
3	3.8	4.1	-0.4	-10.9
4	3.2	1.0	2.2	68.1
5	1.7	-0.2	1.9	110.6
Total 15 to 19-year-olds	**2.3**	**2.3**	**-0.1**	**-2.4**

Tables 8 to 11 present similar information for the remaining two age groups.

Table 8 VET participation rates, 20 to 24-year-olds, 2006 and 2011, postal areas

Quintile	2006 collection using 2006 quintiles	2011 collection using 2006 quintiles	2011 collection using 2011 quintiles
1	23.0	23.9	25.0
2	22.9	24.2	23.2
3	20.5	21.7	21.5
4	18.3	19.8	19.8
5	15.6	16.6	16.5
Total 20 to 24-year-olds	**19.4**	**20.7**	**20.6**

Table 9 VET participation rates, 20 to 24-year-olds, changes between 2006 and 2011, postal areas

Quintile	Change using 2006 & 2011 SEIFA	Estimated change using 2006 SEIFA	Difference between actual change and estimated change	% of change versus estimated change
1	1.9	0.9	1.0	53.0
2	0.2	1.3	-1.1	-437.3
3	1.0	1.2	-0.2	-21.3
4	1.5	1.5	-0.0	-0.5
5	1.0	1.0	-0.0	-4.6
Total 20 to 24-year-olds	**1.2**	**1.3**	**-0.1**	**-4.2**

Table 10 VET participation rates, 25 to 64-year-olds, 2006 and 2011, postal areas

Quintile	2006 collection using 2006	2011 collection using 2006 quintiles	2011 collection using 2011 quintiles
1	10.8	11.2	11.4
2	10.0	10.5	10.4
3	9.0	9.4	9.1
4	7.4	8.0	8.0
5	6.0	6.3	6.3
Total 25 to 64-year-olds	**8.3**	**8.7**	**8.7**

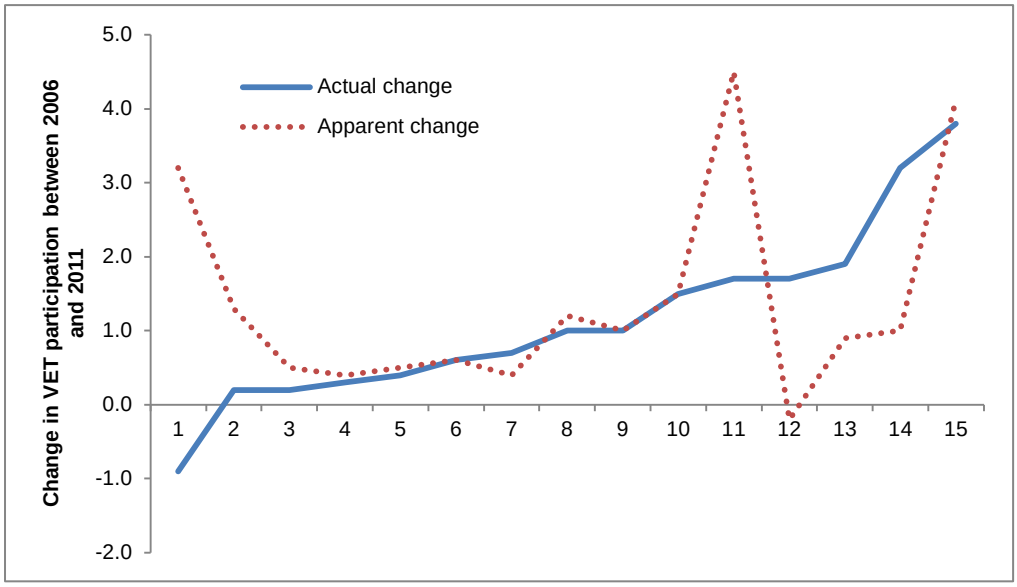
Table 11 VET participation rates, 25 to 64-year-olds, changes between 2006 and 2011, postal areas

Quintile	Change using 2006 & 2011 SEIFA	Estimated change using 2006 SEIFA	Difference between actual change and estimated change	% of change versus estimated change
1	0.7	0.4	0.2	35.0
2	0.4	0.5	-0.0	-9.8
3	0.2	0.5	-0.3	-152.7
4	0.6	0.6	0.0	-0.3
5	0.3	0.4	-0.1	-19.4
Total 25 to 64-year-olds	**0.5**	**0.5**	**0.0**[1]	**-1.8**

Note: 1 There is a small difference between the groups; however, rounding shows the difference as zero.

From these tables, we see that in some cases the difference between the actual and apparent change is quite substantial. Of course, in some instances the actual changes are quite small and therefore a large relative discrepancy may not be particularly important. To give an overview of tables 6 to 11, we plot the actual and apparent changes in figure 1. Our five quintiles and three age groups give 15 observations. In the figure, we plot actual and apparent ordered by size of the actual change.

Figure 1 Actual and apparent changes in VET participation for age by SES quintiles, 2006–11, SEIFA (Index of Relative Socio-economic Disadvantage), postal areas (percentage points)



This summary provides little confidence that the 2006 SEIFA quintiles give an accurate picture of movements over 2006 and 2011. While there is little error associated with some points, there are large errors associated with others.

Changes based on statistical local area quintiles

Tables 12—17 provide analogous tables, but using statistical local areas rather than postal areas.

Table 12 VET participation rates, 15 to 19-year-olds, 2006 and 2011, statistical local areas

Quintile	2006 collection using 2006 SEIFA (truth)	2011 collection using 2006 SEIFA	2011 collection using 2011 SEIFA (truth)
1	29.9	35.6	37.3
2	31.0	39.6	39.5
3	28.3	34.7	35.2
4	24.1	30.2	29.8
5	19.5	24.4	20.9
Total 15 to 19-year-olds	**30.8**	**33.0**	**33.0**

Table 13 VET participation rates, 15 to 19-year-olds, changes between 2006 and 2011, statistical local areas

Quintile	Change using 2006 & 2011 SEIFA	Estimated change using 2006 SEIFA	Difference between actual change and estimated change	% of change versus estimated change
1	7.4	9.0	1.60	21.4
2	8.5	10.0	1.5	17.9
3	6.9	8.4	1.6	22.9
4	5.6	6.5	0.8	14.4
5	1.4	4.0	2.6	182.5
Total 15 to 19-year-olds	**6.9**	**7.3**	**0.4**	**6.4**

Table 14 VET participation rates, 20 to 24-year-olds, 2006 and 2011, statistical local areas

Quintile	2006 collection using 2006 SEIFA (truth)	2011 collection using 2006 SEIFA	2011 collection using 2011 SEIFA (truth)
1	19.2	23.8	24.4
2	19.1	25.6	24.6
3	16.7	19.9	20.1
4	15.7	18.9	18.9
5	13.5	16.1	15.1
Total 20 to 24-year-olds	**16.5**	**20.6**	**20.6**

Table 15 VET participation rates, 20 to 24-year-olds, changes between 2006 and 2011, statistical local areas

Quintile	Change using 2006 & 2011 SEIFA	Estimated change using 2006 SEIFA	Difference between actual change and estimated change	% of change versus estimated change
1	5.2	4.7	-0.5	-10.2
2	5.5	6.5	1.0	17.6
3	3.4	3.3	-0.1	-3.9
4	3.1	3.2	0.0	0.3
5	1.6	2.7	1.1	70.3
Total 20 to 24-year-olds	**4.1**	**4.1**	**0.0**	**0.0**

Table 16 VET participation rates, 25 to 64-year-olds, 2006 and 2011, statistical local areas

Quintile	2006 collection using 2006 SEIFA (truth)	2011 collection using 2006 SEIFA	2011 collection using 2011 SEIFA (truth)
1	8.5	10.8	10.9
2	8.2	10.6	10.6
3	7.0	8.6	8.8
4	6.4	7.8	7.7
5	5.0	6.5	5.7
Total 25 to 64-year-olds	**6.8**	**8.7**	**8.7**

Table 17 VET participation rates, 25 to 64-year-olds, changes between 2006 and 2011, statistical local areas

Quintile	Change using 2006 & 2011 SEIFA	Estimated change using 2006 SEIFA	Difference between actual change and estimated change	% of change versus estimated change
1	2.3	2.2	-0.1	-4.3
2	2.3	2.4	0.1	3.2
3	1.8	1.6	-0.3	-14.5
4	1.4	1.4	0.0	3.1
5	0.7	1.5	0.8	105.1
Total 25 to 64-year-olds	**1.9**	**1.9**	**0.0**	**0.0**

Casual inspection indicates that the estimates of participation rates based on statistical local areas are better behaved than those based on postal areas. We show this in two ways. In figures 2—4 we plot the 'apparent' 2011 participation rates (that is, based on 2006 quintiles) and the actual participation rates (that is, based on 2011 quintiles). We then plot the estimates of change between 2006 and 2011 against the actual change over this period (figure 5).

Figure 2 Apparent and actual VET participation rates for those aged 15–19 years, by SES quintile, 2011

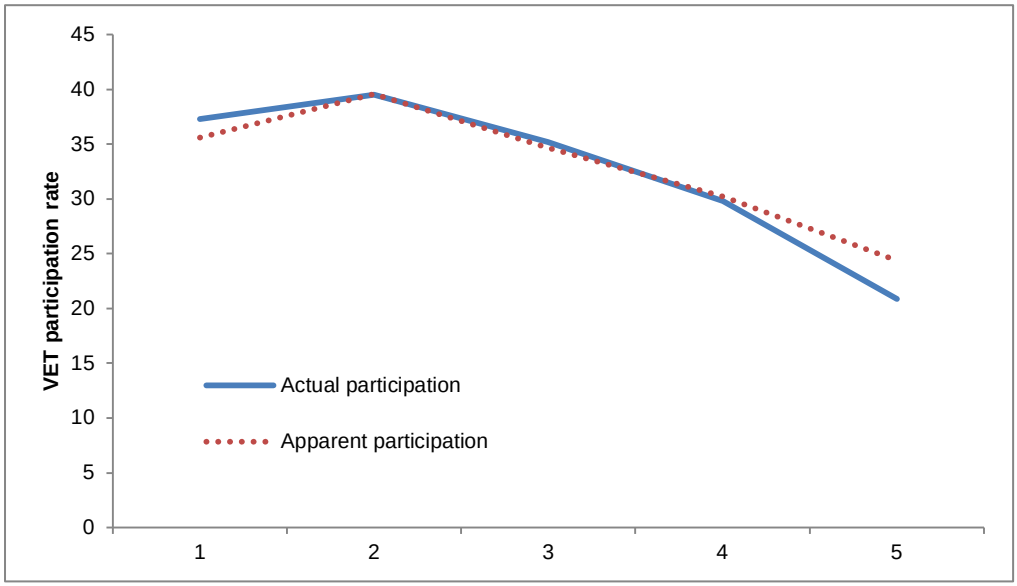


Figure 3 Apparent and actual VET participation rates for those aged 20–24 years, by SES quintile, 2011

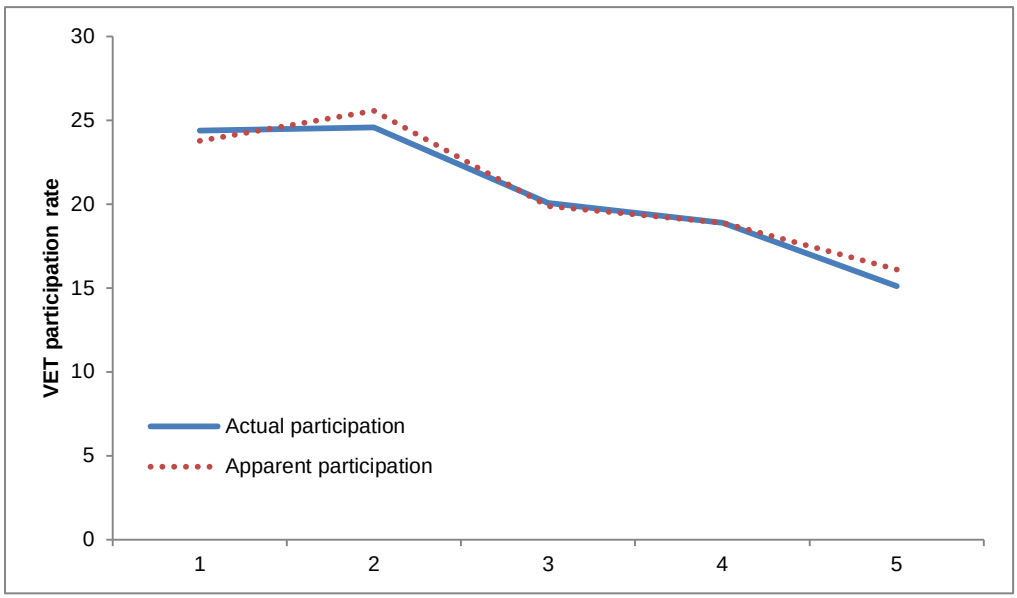
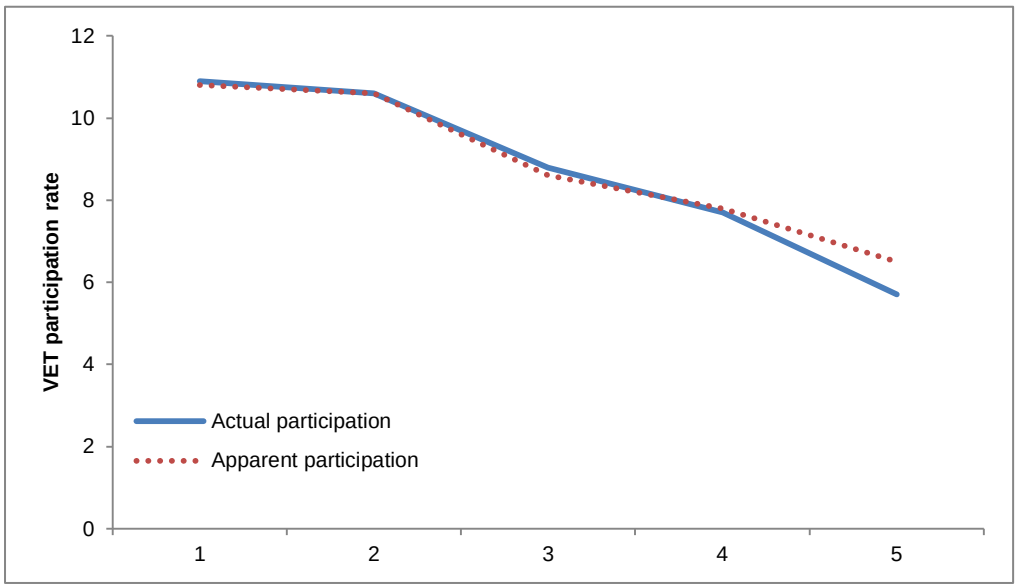
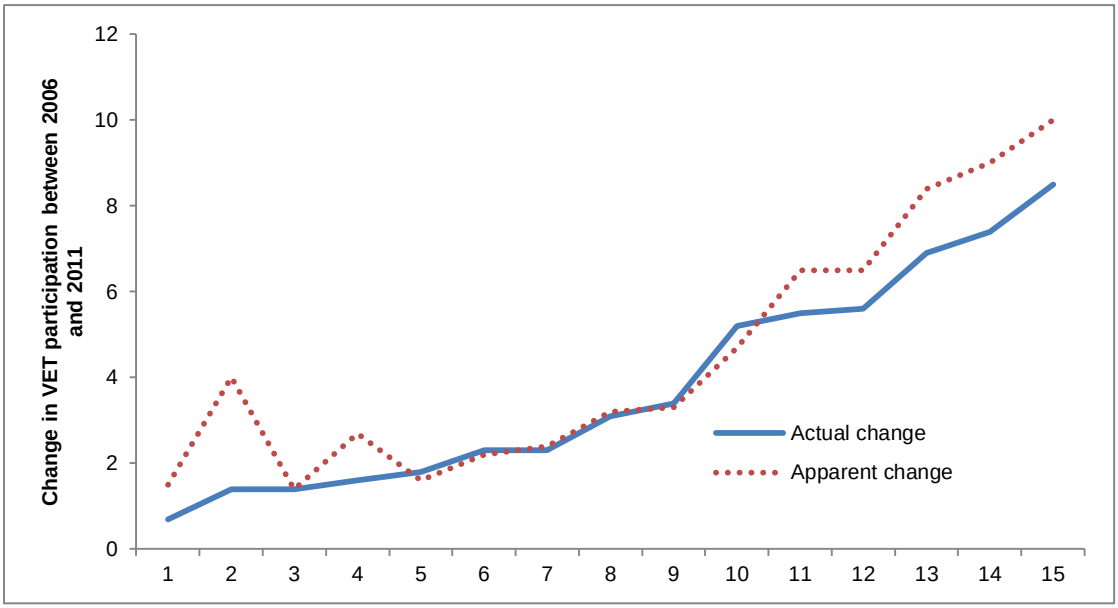


Figure 4 Apparent and actual VET participation rates for those aged 24–64 years, by SES quintile, 2011



We see that, on the whole, the participation rates for 2011, which would have been estimated using the 2006 quintiles, line up quite well, although there are some discrepancies. In figure 5, we plot the changes between 2006 and 2011 for the 15—24 years age group by SES quintile observations. As can be seen, the estimates of change based on the 2006 quintiles give a good indication of the actual changes

Figure 5 Actual and apparent changes in VET participation for age by SES quintiles, 2006—11, SEIFA, statistical local areas (percentage points)



Thus our conclusion is that the estimates based on the SLA quintiles capture the changes in VET participation within the SES quintiles satisfactorily.

It is difficult to deduce why the statistical local area estimates are so much more satisfactory than the postal area estimates. The POA classification is more detailed than the SLA classification and we have seen that the level of reclassification in 2011 using 2006 quintiles is higher than that for statistical local areas. Thus it appears that the robustness of estimates may well depend on the level of the classification. If this is the case, then our analysis would suggest that continued use of an SLA or equivalent classification should provide satisfactory estimates of VET participation for SES quintiles but a finer classification may be problematic.

Estimates at the qualification level

We conclude our empirical analysis by comparing for 2011 the estimates based on the 2006 quintiles with the actual participation rates based on the 2011 quintiles for each qualification and for each of our three age groups. Given our earlier finding that the SLA estimates were more satisfactory than the POA estimates, we present only the data based on statistical local areas.

For brevity, the complete tables are not presented. (They are available upon request.) We do present a graphical summary of the results. For each age group we present two graphs. The first compares the estimates for 2011 based on the 2006 SES quintiles with the actual participation rates based on the 2011 SES quintiles. For each age group there are 35 observations (five quintiles by seven qualifications). The second graph presents the estimates of the change between 2006 and 2011: the actual change is derived from the 2011 estimate based on 2011 quintiles and the 2006 estimate based on the 2006 quintiles; the apparent change uses the same base (that is, 2006 estimate based on 2006 quintiles) but for 2011 uses the 2006 quintiles. As in the first graph there are 35 observations for each age group.

Figure 6 VET qualification participation rates by SES quintiles for 2011, 15–19 years, actual (2011 quintiles) and apparent (2006 quintiles)

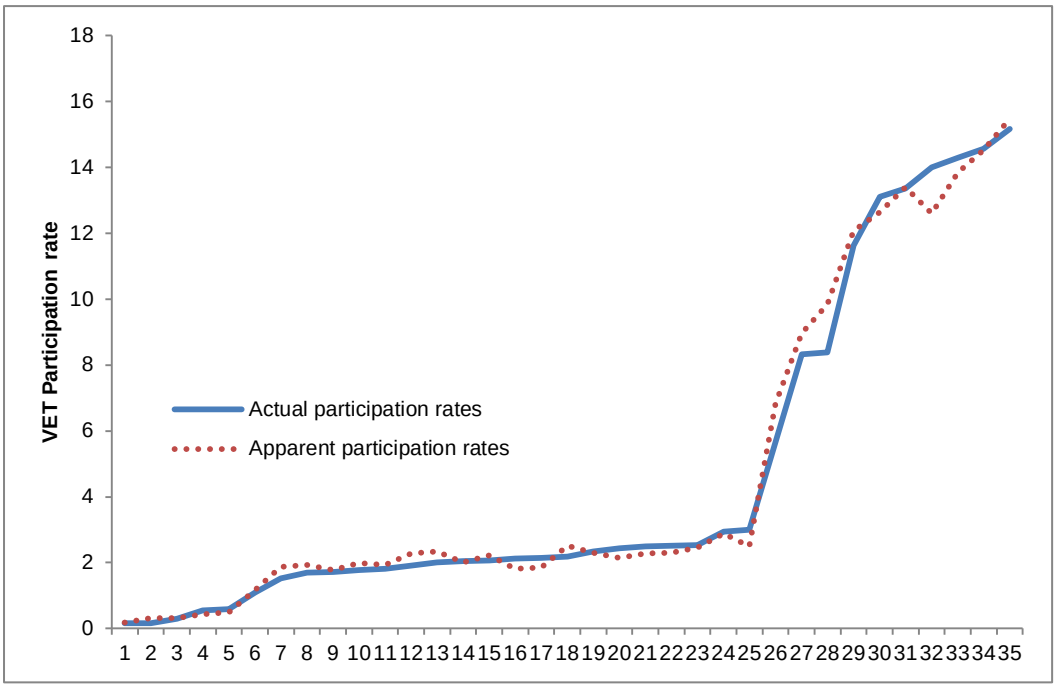


Figure 7 Changes between 2006 and 2011 in VET qualification participation rates by SES quintiles, 15–19 years, actual (2011 based on 2011 quintiles) and apparent (2011 based on 2006 quintiles)

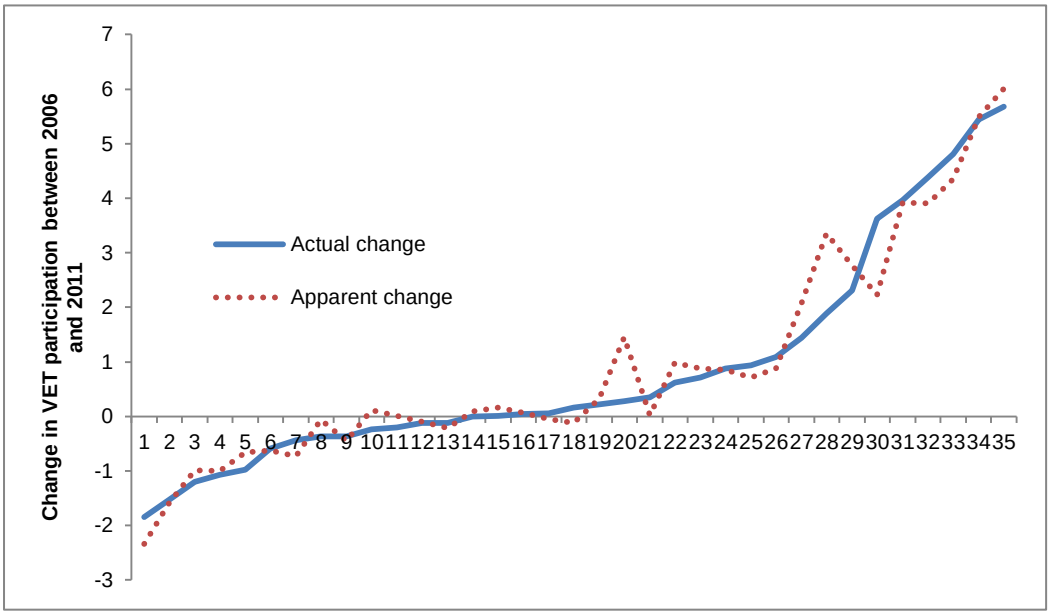


Figure 8 VET qualification participation rates by SES quintiles for 2011, 20–24 years, actual (2011 quintiles) and apparent (2006 quintiles)

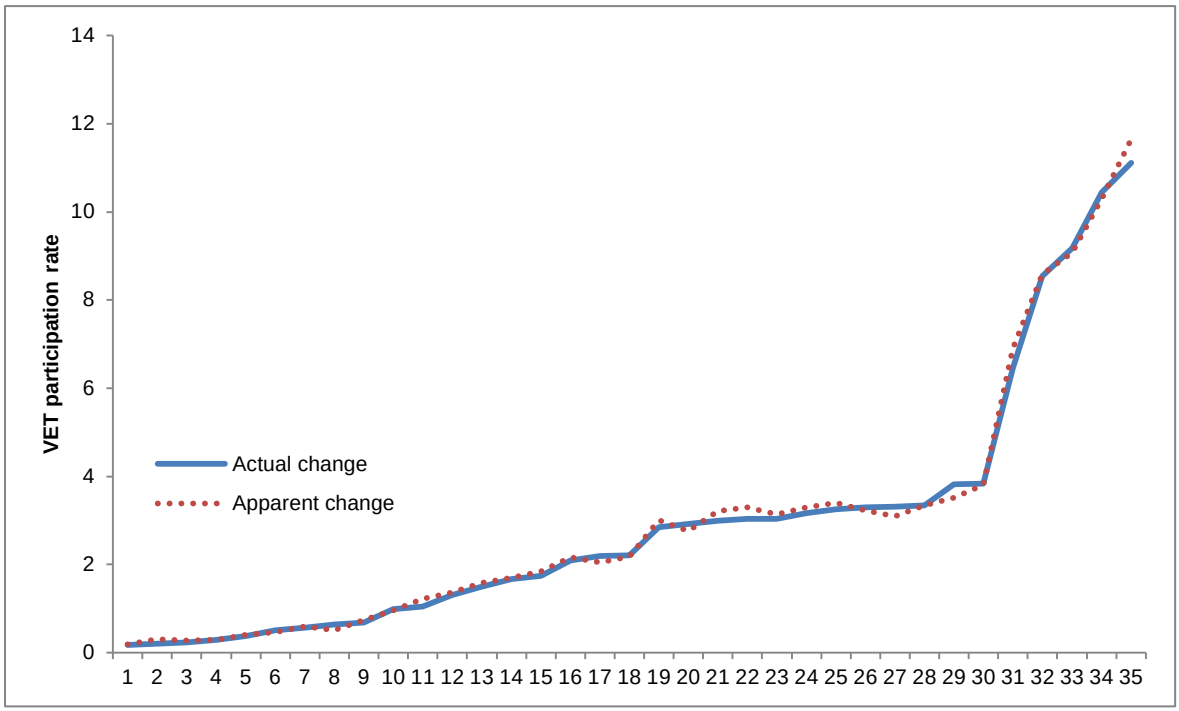


Figure 9 Changes between 2006 and 2011 in VET qualification participation rates by SES quintiles, 20–24 years, actual (2011 based on 2011 quintiles) and apparent (2011 based on 2006 quintiles)

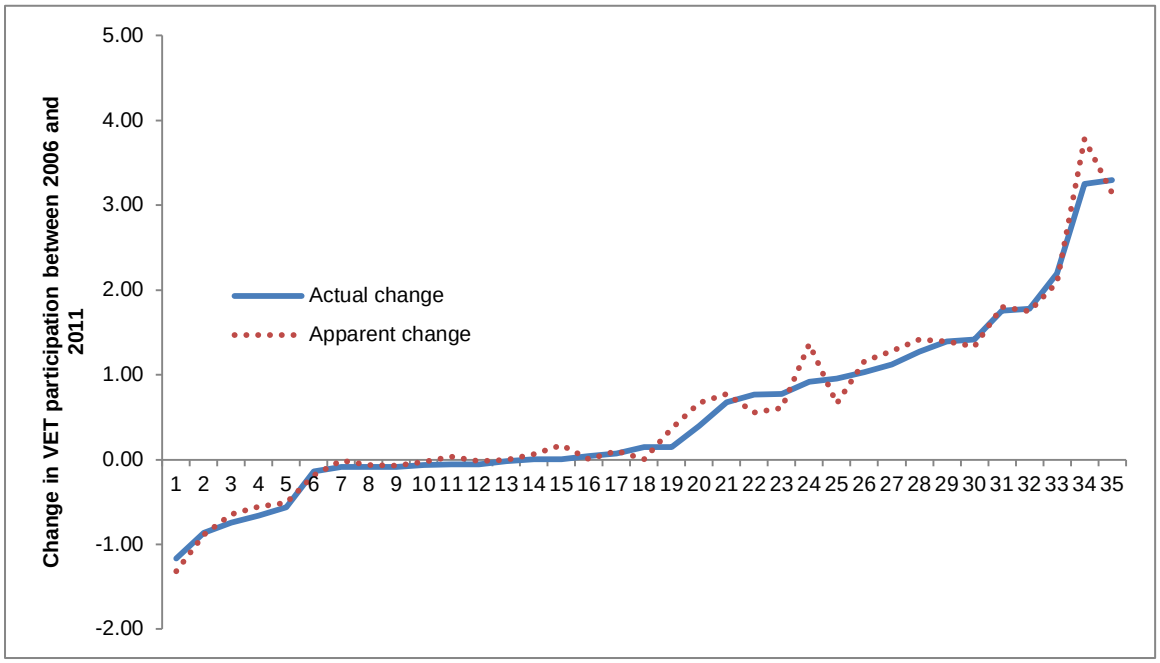


Figure 10 VET qualification participation rates by SES quintiles for 2011, 25–64 years, actual (2011 quintiles) and apparent (2006 quintiles)

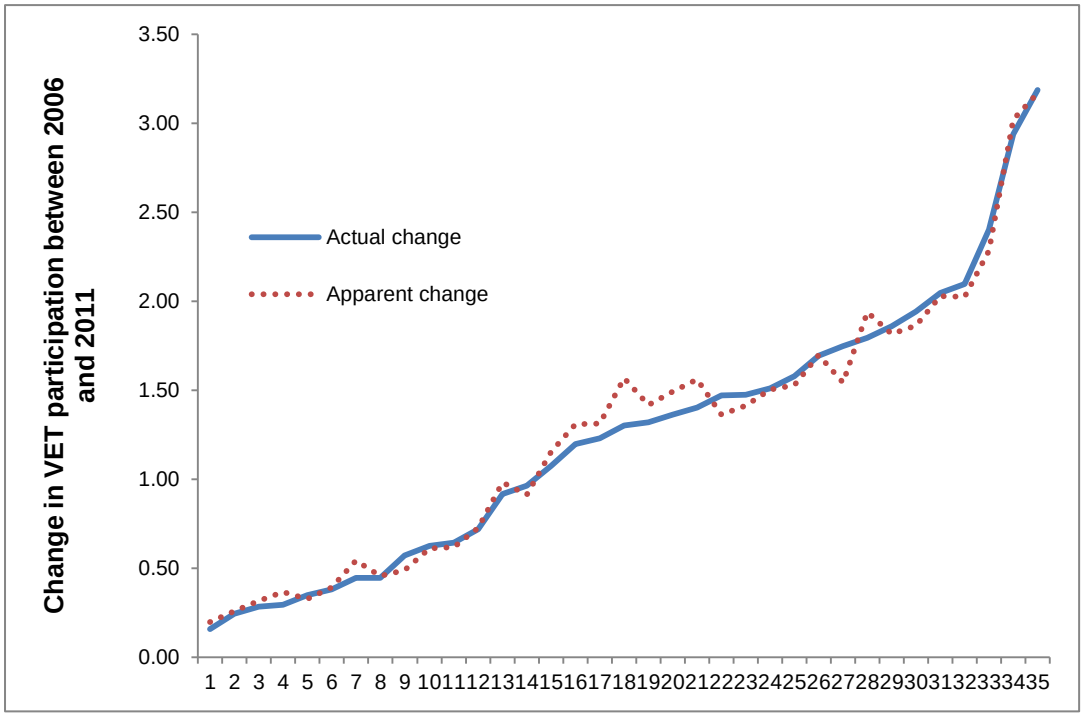
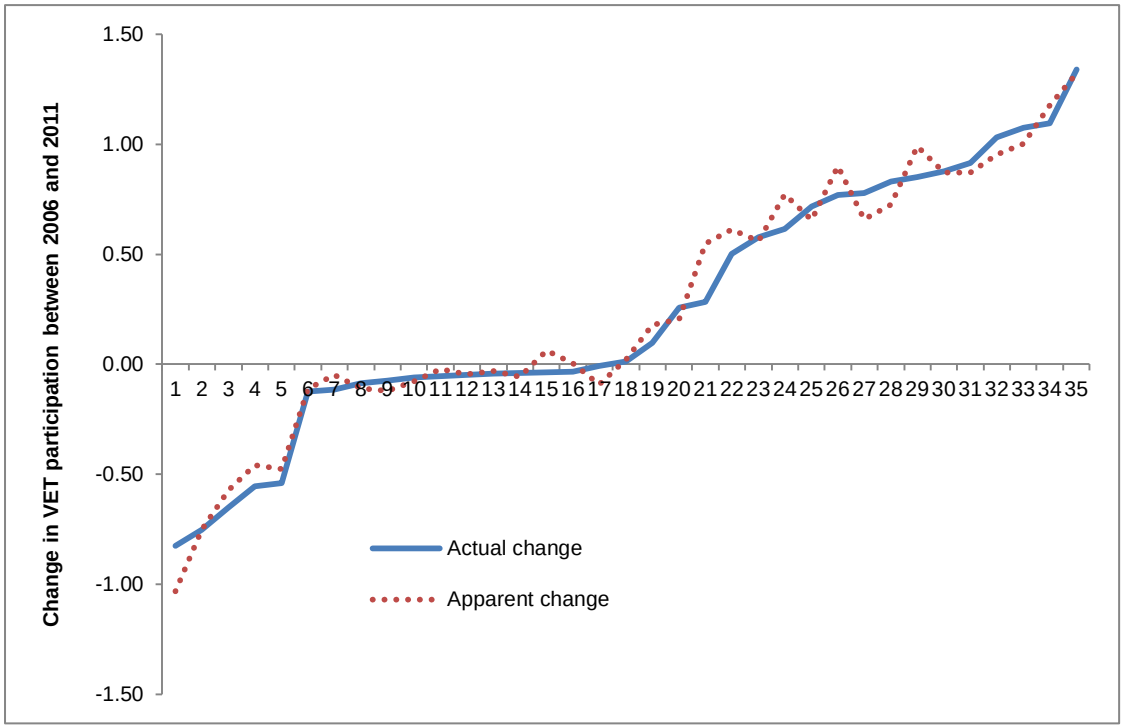


Figure 11 Changes between 2006 and 2011 in VET qualification participation rates by SES quintiles, 25–64 years, actual (2011 based on 2011 quintiles) and apparent (2011 based on 2006 quintiles)



We see from the above graphs that the estimates for 2011 based on the 2006 SES quintiles (defined according to the SLA classification) are remarkably robust, even at this fine level of disaggregation. There is some noise, but the estimates for 2011 based on the 2006 quintiles are clearly quite satisfactory. Not only are the estimates of the 2011 levels reasonably accurate but so are the estimates of the change in participation between 2006 and 2011.

The only caveat with this analysis is that the population figures used in the analysis are the 2011 usual resident population numbers.[5] In practice, intercensal estimates will need to use estimated resident population, and this will introduce a further source of error. However, this source of error would still occur even if there were no degradation in the classification of areas to quintiles.

[5] In practice, the estimated resident population should be used as the denominator. The ERP may give slightly more accurate results as they account for a census undercount. However, a comparison between ERP and URP for the 2006 and 2011 censuses showed that participation figures were very stable.

VET participation in 2006 and 2011

To complete our analysis, we present participation rates for 2006 and 2011 for each SES quintile, based on SEIFA defined by statistical local area, which we have shown to be robust over this period. These rates, with the 2006 participation rates defined using 2006 SEIFA quintiles and the 2011 rates defined using the 2011 SEIFA quintiles, can be regarded as the definitive measures of VET participation by socioeconomic status.

Tables 18 and 19 present the participation rates by age group and quintile for 2006 and 2011, respectively.

Table 18 Participation in VET, 15 to 19-year-olds, by qualification and SES quintiles, statistical local areas, 2006

Qualification category	2006 using 2006 IRSD quintiles					
	1	2	3	4	5	Total
Diploma and above	2.0	1.6	1.8	2.3	2.4	2.0
Certificate IV	1.4	1.5	1.6	1.4	1.3	1.4
Certificate III	7.9	9.5	9.5	8.7	6.5	8.4
Certificate II	10.4	10.6	9.3	6.9	5.4	8.3
Certificate I	2.9	2.6	2.6	1.8	1.1	2.1
Non-AQF	4.8	4.5	3.2	2.9	2.8	3.5
Module only	0.5	0.7	0.4	0.2	0.1	0.4
Total	**29.9**	**31.0**	**28.3**	**24.1**	**19.5**	**26.1**
Total 15 to 19-year-olds participating in VET	**53 724**	**90 238**	**77 562**	**75 055**	**58 175**	**354 781**
Number of 15 to 19-year-olds in quintile	179 948	291 542	273 736	310 949	297 846	1 356 904

Table 19 Participation in VET, 15 to 19-year-olds, by qualification and SES quintiles, statistical local areas, 2011

Qualification category	2011 using 2011 IRSD quintiles					
	1	2	3	4	5	Total
Diploma and above	1.8	1.8	2.1	2.4	2.0	2.1
Certificate IV	2.1	2.3	2.5	2.5	1.9	2.3
Certificate III	13.4	15.2	14.3	13.1	8.4	12.9
Certificate II	14.0	14.6	11.6	8.3	5.7	10.7
Certificate I	2.5	2.1	2.1	1.5	1.1	1.8
Non-AQF	3.0	2.9	2.2	1.7	1.7	2.3
Module only	0.6	0.6	0.3	0.2	0.2	0.3
Total	**37.3**	**39.5**	**35.2**	**29.8**	**20.9**	**32.4**[a]
Total 15 to 19-year-olds participating in VET	**87 172**	**114 680**	**98 632**	**98 259**	**56 150**	**454 939**
Number of 15 to 19-year-olds in quintile	233 803	290 600	280 259	329 986	268 259	1 403 435

Note: a This figure is different from that in table 12 due to a number of individuals with missing or unknown VET qualification categories.

Table 20 Participation in VET, 20 to 24-year-olds, by qualification and SES quintiles, statistical local areas, 2006

Qualification category	2006 using 2006 IRSD quintiles					
	1	2	3	4	5	Total
Diploma and above	2.4	2.1	2.1	2.5	2.9	2.4
Certificate IV	2.0	2.1	1.9	1.9	1.7	1.9
Certificate III	7.2	7.9	6.7	6.8	5.5	6.8
Certificate II	2.9	2.6	2.2	1.6	1.0	1.9
Certificate I	1.0	0.7	0.7	0.4	0.3	0.6
Non-AQF	3.4	3.1	2.4	2.2	1.9	2.5
Module only	0.5	0.7	0.4	0.3	0.2	0.4
Total	**19.2**	**19.1**	**16.7**	**15.7**	**13.5**	**16.5**
Total 20 to 24-year-olds participating in VET	**32 943**	**51 421**	**45 193**	**51 167**	**41 024**	**221 766**
Number of 20 to 24-year-olds in quintile	171 958	269 301	271 158	325 059	303 986	1 347 360

Table 21 Participation in VET, 20 to 24-year-olds, by qualification and SES quintiles, statistical local areas, 2011

Qualification category	2011 using 2011 IRSD quintiles					
	1	2	3	4	5	Total
Diploma and above	3.0	3.2	2.9	3.3	3.0	3.1
Certificate IV	3.3	3.8	3.3	3.3	2.9	3.3
Certificate III	10.5	11.1	9.2	8.5	6.5	9.0
Certificate II	3.8	3.0	2.1	1.7	1.1	2.2
Certificate I	1.0	0.7	0.5	0.4	0.2	0.5
Non-AQF	2.2	2.2	1.7	1.5	1.3	1.7
Module only	0.6	0.6	0.3	0.2	0.2	0.3
Total	**24.3**	**24.6**	**20.1**	**18.9**	**15.1**	**20.3**
Total 20 to 24-year-olds participating in VET	**53 650**	**68 307**	**61 905**	**68 309**	**43 157**	**295 380**
Number of 20 to 24-year-olds in quintile	220 074	277 645	308 624	361 625	286 705	1 455 845

Table 22 Participation in VET, 25 to 64-year-olds, by qualification and SES quintiles, statistical local areas, 2006

Qualification category	2006 using 2006 IRSD quintiles					
	1	2	3	4	5	Total
Diploma and above	0.6	0.6	0.6	0.8	0.7	0.7
Certificate IV	1.0	1.0	0.9	0.9	0.8	0.9
Certificate III	1.9	1.8	1.6	1.5	1.0	1.5
Certificate II	1.3	1.1	1.0	0.8	0.5	0.9
Certificate I	0.7	0.4	0.4	0.3	0.2	0.4
Non-AQF	2.6	2.5	1.9	1.7	1.5	2.0
Module only	0.6	0.7	0.5	0.4	0.3	0.5
Total	**8.5**	**8.3**	**7.0**	**6.4**	**5.0**	**6.8**
Total 25 to 64-year-olds participating in VET	**114 677**	**183 327**	**150 233**	**157 150**	**117654**	**723 117**
Number of 25 to 64-year-olds in quintile	1 343 850	2 223 162	2 144 894	2 465 591	2 362 379	10 569 439

Table 22 Participation in VET, 25 to 64-year-olds, by qualification and SES quintiles, statistical local areas, 2011

Qualification category	2011 using 2011 IRSD quintiles					
	1	2	3	4	5	Total
Diploma and above	1.4	1.5	1.5	1.5	1.2	1.4
Certificate IV	1.8	2.1	1.9	1.9	1.4	1.8
Certificate III	3.2	2.9	2.4	2.1	1.3	2.3
Certificate II	1.6	1.2	0.1	0.7	0.5	0.9
Certificate I	0.6	0.5	0.4	0.3	0.2	0.3
Non-AQF	1.8	1.7	1.3	1.1	0.9	1.3
Module only	0.6	0.6	0.4	0.3	0.3	0.4
Total	**10.9**	**10.6**	**8.8**	**7.7**	**5.7**	**8.6**
Total 25 to 64-year-olds participating in VET	**191 113**	**241 548**	**203 448**	**217 118**	**131 128**	**984 590**
Number of 25 to 64-year-olds in quintile	1 756 647	2 286 908	2 302 673	2 810 480	2 294 800	11 453 019

From these tables it is difficult to conclude that in 2006 there was any issue with equity at all in the VET sector. Individuals in the lowest quintile have participation rates broadly equivalent to other SES quintiles among diplomas, and certificates III and IV. What drives the skewed distribution among the lower-SES quintiles is that participation rates are higher than other quintiles in the other qualifications. If there is a policy issue, it would be the extent to which the high participation in the lower-level or non-AQF qualifications is 'converted' to enrolment and completion of the higher-level qualifications.

Discussion

We have presented our analysis of the impact of SEIFA reclassifications of areas on VET participation over time. We have looked at the overall VET participation rate for each SES quintile and also the participation rates for individual qualifications within each SES quintile. The analysis has been undertaken for three age groups: 15—19 years, 20—24 years and 25—64 years. For the future, we wish also to look at higher education participation rates by socioeconomic status. This is of particular importance in relation to efforts to broaden higher education participation and to provide greater opportunities to enrol low socioeconomic status students in universities.

The results to date are relatively reassuring but underline the importance of this type of empirical analysis. It is reassuring to find that the estimates of VET participation made for 2011 based on 2006 quintiles are reasonably accurate when the quintiles are based on statistical local areas. However, the estimates were not so good when the quintiles were based on postal areas, noting that the postal areas classification is more detailed than the classification based on statistical local areas. Why the estimates based on postal areas are so much worse is somewhat of a mystery, although it is true that the level of misclassification of quintiles in 2011 is considerably higher than is the case for SLAs. Perhaps the fact that the SLA is a statistical classification rather than one designed for the postal service is one reason.

An issue is that the ABS has revised its regional classifications and the SLA is being replaced by statistical areas, with the statistical area 2 (SA2) being the unit closest to the SLA. On the assumption that the quintiles defined by SA2 behave similarly to the statistical local areas, it should be quite satisfactory to continue to estimate participation for SES quintiles based on the 2011 census. However, the mixed results we obtained based on the finer postal areas classification imply that caution should be observed; we cannot assume with certainty that our intercensal estimates of socioeconomic status will necessarily be accurate. At the very least, the methodology needs to be checked at each census, when the SES indices are updated.

As part of the analysis we also showed that quintiles should not be taken to be a robust benchmark in the sense of representing 20% of the population. That is, the over- or under-representation of a particular group cannot be accurately judged by whether the share of a particular quintile is over or under 20%. This is because SES quintiles based on SEIFA are derived from areas and inevitably the underlying population of the area will differ from 20%. The way around this is to calculate participation rates for each quintile and use these as the basis for comparisons across quintiles. In this analysis we have used three age groups: 15—19 years, 20—24 years and 25—64 years. From the point of view of looking at intergenerational social mobility, it is the first two of these that are most relevant. Arguably, the concept of socioeconomic status is problematic for the older group since place of residence will reflect life outcomes rather than opportunities. For the older age group, perhaps a different measure of disadvantage is better. One possibility is a group defined by non-completion of school and no post-school qualification (perhaps certificate III level or higher). Of course the advantage of such a definition is that it will not be affected by the use of area measures to assess individual characteristics.

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